

As per C-20 syllabus



# D-CET

Diploma Common Entrance Test

- Introduction to D-CET Entrance Exam
- Exam Pattern, Important Dates & Syllabus
- D-CET 2023, 2024 & 2025 Question Paper with Solutions

**T.T.T Academy**

# ABOUT

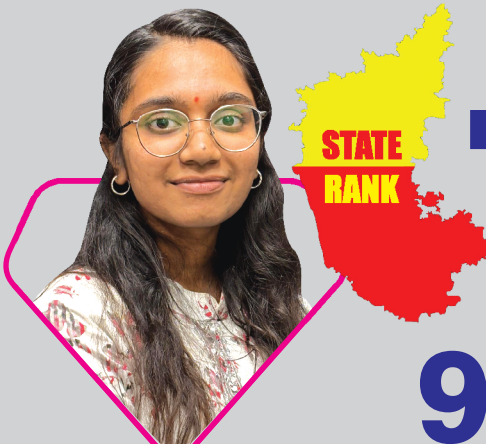
## J.P.S EDUCATIONAL & CHARITABLE TRUST<sup>®</sup>

Over the years, J.P.S Educational & Charitable Trust has been providing books and educational facilities to a number of students across different parts of Karnataka. It has provided about 15000 books till date. Through the assistance and support of T.T.T Academy, the trust has taken an initiative to provide entrance exam training courses and materials. It also provides books with detailed information on D-CET.

The Trust's main focus is on those students who are in need of such facilities and are in economically backward class. The institution helps the students in understanding the underlying difficulties of the competitive exams like D-CET, to enhance their understanding skills and train them for the same. It also helps them in understanding the complete application process and helps them in choosing the right college based on their rankings.

## Why T.T.T ACADEMY ?

- **T.T.T Methodology** : Starting with the very basics and strengthening the students at fundamentals of D-CET.
- **Study Material** : Structured & research based study material for both theory & MCQ's.
- **Test System** : Regular Mock test on every sunday.
- A year long course programme for DCET by resource persons and subject experts.
- Subject-wise focused learning.
- Interactive teaching methodology.
- Regular offline and online live coaching classes.
- Experienced faculties who have been providing supporting students score top results.
- Personalised mentoring for confidence building.
- CC camera surveillance on the campus.



**STATE RANK**

**1<sup>ST</sup>**

**93**

**100**

**Abhigna H**  
DCET - 2025

## INFRASTRUCTURE



Offline & Online Classes



Digital Classes



AC Class Room

# Message from the Director



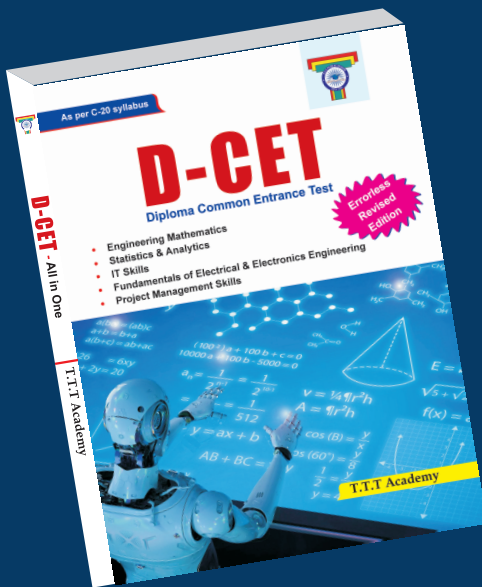
**Dr. Savina J.P** B.E., M.E., Ph.D  
Director

**Education opens the door to opportunity and growth.**

At Technical Teaching & Training Academy, we guide and support every deserving student, especially those from challenging backgrounds, to achieve their dreams. With dedicated faculty, academic support, and rich resources, we help you build confidence, excel in your studies, and succeed in your career.

Wishing you a bright future!

## T.T.T ACADEMY D-CET BOOK



[tttpublications.com](http://tttpublications.com)

**All Book Stores  
Across Karnataka**

### Why our Study Material ?

- Every year, **8000+** Students Study from T.T.T Publication's D-CET Books.
- 92+** Questions from our books have appeared in the **D-CET 2023** exam.
- 93+** Questions from our books have appeared in the **D-CET 2024** exam.
- 92+** Questions from our books have appeared in the **D-CET 2025** exam.

## Proven Track Record in T.T.T D-CET Results

### 2023 Rankers

#### DCET State **1<sup>st</sup>** Rank

Below 10 Ranks : **4** Students  
Below 100 Ranks : **23** Students  
Below 200 Ranks : **41** Students  
Below 500 Ranks : **98** Students  
Below 1000 Ranks : **173** Students  
Below 1500 Ranks : **234** Students  
Below 2000 Ranks : **289** Students

### 2024 Rankers

#### DCET State **3<sup>rd</sup>** Rank

Below 10 Ranks : **2** Students  
Below 100 Ranks : **32** Students  
Below 200 Ranks : **46** Students  
Below 500 Ranks : **99** Students  
Below 1000 Ranks : **180** Students  
Below 1500 Ranks : **257** Students  
Below 2000 Ranks : **330** Students

### 2025 Rankers

#### DCET State **1<sup>st</sup>** Rank

Below 10 Ranks : **4** Students  
Below 100 Ranks : **31** Students  
Below 200 Ranks : **53** Students  
Below 500 Ranks : **109** Students  
Below 1000 Ranks : **182** Students  
Below 1500 Ranks : **259** Students  
Below 2000 Ranks : **341** Students



# T.T.T Academy

# 13 Years OF SHARING KNOWLEDGE

## ADMISSIONS OPEN FOR DIPLOMA CET (D-CET)

### Diploma CET Course Details

#### Long Term Course

- **Batch Starts** : During 5<sup>th</sup> Sem.
- **Duration** : Till Exam Date.
- Daily 2hr - 3hr Classes + 4-5 hrs of Classes in During Crash Course.
- Offline & Online live classes.
- Mock Tests.
- Recorded Classes at App.

#### Short Term Course

- **Batch Starts** : Starting of 6<sup>th</sup> Sem.
- **Duration** : Till Exam Date.
- Daily 2hr - 3hr Classes + 4-5 hrs of Classes in During Crash Course.
- Offline & Online live classes.
- Mock Tests.
- Recorded Classes at App.

#### Crash Course

- **Batch Starts** : After 6<sup>th</sup> Sem. Exams.
- Every day 4-5 hrs of Classes.
- Offline & Online live classes.
- Mock Tests.
- Recorded Classes at App.

### OUR STUDENTS TESTIMONIALS



★★★★★

TTT Institution has provided excellent guidance for DCET preparation, ensuring my success and securing 1st rank in Karnataka State. I am also thankful to my friends who played a crucial role in helping me achieving this milestone. Special gratitude to Savin Sir and the dedicated team for their effective online coaching classes. The regular mock tests helps us identify and rectify our mistake and with no doubt TTT Institution has helped many students across Karnataka to secure good ranking in DCET by providing both online and offline classes with well-equipped classroom, study material and infrastructure !!

**Santhrupth H R**

State 1<sup>st</sup> Rank Holder (DCET - 2023)



★★★★★

Securing the state first rank feels surreal, I owe this moment to TTT Academy that stood by me throughout this journey. The dedication of faculties and the smart study strategies and the constant support and motivation created a perfect study environment for effective learning. The study materials provided were well-structured, comprehensive and perfectly aligned with the exam pattern, making preparation efficient and focused. Thanks again to TTT Academy for turning potential into performance and guiding me to this achievement.

**Abhigna H**

State 1<sup>st</sup> Rank Holder (DCET - 2025)



## FOR FREE DEMO CLASSES CONTACT US : 9986869970


📍 # 8, MEI Colony, Peenya 3rd Phase, Bengaluru - 560 058

✉ tttinstitution@gmail.com


🌐 www.tttacademics.com

☎ 9986869966 | 9986869955 | 9986869977


## OUR D-CET 2025 TOP RANK HOLDERS



**1<sup>ST</sup>**  
STATE RANK  
**93**  
**100**  
Abhigna H  
MSRP Bengaluru



**4<sup>TH</sup>**  
STATE RANK  
**87**  
**100**  
Jashua Anish  
CSIP Kanyakumari



**8<sup>TH</sup>**  
STATE RANK  
**90**  
**100**  
Thanushree  
NITTE P Bengaluru



**10<sup>TH</sup>**  
STATE RANK  
**90**  
**100**  
Darshan Raj  
Acharya Bengaluru



**25**  
Tanvipriya  
HKESP Kalburgi



**26**  
Ajay C  
MSRP Bengaluru



**28**  
Ranjith R  
MEIP Bengaluru



**29**  
Sachin R  
Bapuji Davanagere



**35**  
Saivennela  
NMIT Bengaluru



**36**  
Surendra H J  
JSS Mysuru



**41**  
Nagavallabha  
SMT L.V.P Hassan



**42**  
Ankitha A  
MEIP Bengaluru



**45**  
Shakunthala P S  
GWP Bengaluru



**47**  
Arbaz Ansari  
SJP Bengaluru



**50**  
Shivaraj M  
SJP Bengaluru



**53**  
Monika K N  
GTTC Bengaluru



**59**  
Nandhini B C  
GPT Shivamogga



**61**  
Uvika S  
MEIP Bengaluru



**62**  
Nishchith N  
SKP Ramanagara



**64**  
F Joseph  
MSRP Bengaluru



**65**  
Hemanth  
SJP Bengaluru



**72**  
Bhuvan Raj H  
PES Bengaluru



**76**  
Shivani R M  
Bapuji Davanagere



**79**  
Rakshitha S  
GWP Bengaluru



**84**  
Pruthvi Kiran  
SJP Bengaluru



**87**  
Rohan  
MEIP Bengaluru



**95**  
Srinivas B  
SPT Tumakuru



**96**  
Jeevan R  
MEIP Bengaluru



**103**  
Yogesh H  
MEIP Bengaluru



**104**  
Tejas V  
MEIP Bengaluru



**107**  
Divyashree N  
MEIP Bengaluru



**109**  
Manasa K  
SJP Bengaluru



**110**  
Chandana V  
SJP Bengaluru



**111**  
Nandi H C  
GWP Shivamogga



**114**  
Roopashree S  
Vasavi Bengaluru



**115**  
Raj Ashish Patel  
Acharya Bengaluru



**119**  
Ruchitha B  
GPT Bellary



**122**  
Gagan M  
PES Bengaluru



**125**  
Tejashwini S  
SJP Bengaluru



**131**  
Shashank T M  
GPT Chennapattana



**132**  
Rohith V  
SPT Tumakuru



**134**  
Akshay N M  
PES Bengaluru



**137**  
Nithya S  
MEIP Bengaluru



**143**  
Chethan H A  
JSS Mysuru



**147**  
Krish Kumar  
SGP Bellary



**151**  
Chaithanya J  
MEIP Bengaluru



**153**  
Thippesh B N  
GTTC Bengaluru



**170**  
Aishwarya C  
MEIP Bengaluru



**173**  
Kari Bhavitha  
Sandur Polytechnic



**176**  
Manoj R  
MSRP Bengaluru



**177**  
Shreyan Ganesh  
PES Bengaluru\*



**178**  
Swathi M S  
Sandur Polytechnic



**184**  
Amith Gowda  
SJP Bengaluru



**185**  
Monish A  
MSRP Bengaluru



**189**  
Chirag B C  
PES Bengaluru



**192**  
Manas R  
MSRP Bengaluru



**203**  
Saniya Andagi  
GTTC Gokak\*



**204**  
Dhanush M S  
G CPCP Mysuru



**210**  
Karthik K S  
GTTC Bengaluru

# Diploma CET

**ENTRANCE EXAM DETAILS**

## **SYLLABUS**

### **Question Papers with Solutions [2023, 2024 & 2025]**

**Engineering Mathematics, Statistics & Analysis,  
Project Management Skills, IT Skills, FEEE**



# **T.T.T ACADEMY**

**Trusted No. 1 D-CET Coaching Centre as per Students**

## **Diploma CET**

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# INTRODUCTION TO D-CET ENTRANCE EXAM

DCET - Diploma Common Entrance Test which is conducted by the Karnataka Examination Authority (KEA). The entrance exam is a requirement for enrolment in the second-year undergraduate engineering programmes offered through the lateral entry programme. In Karnataka, these programmes are offered at both day and evening colleges.

## D-CET EXAM PATTERN

DCET Conducting Authority	Karnataka Examination Authority
Frequency of Conduct	1 yearly once
Exam level	State level
Languages	English
Application Mode	Online
Mode of Exam	Offline / Online
Exam Duration	3 hours
Number of Subjects	5
Total Questions	100
Total Marks	100
Mode of Counselling	Online

## D-CET TENTATIVE IMPORTANT DATES

Events	Dates
Application form starts	2 <sup>nd</sup> Week of April
Last date for application submission	4 <sup>th</sup> Week of April
D-CET exam date	Month of May
Counselling date	Month of June

**DCET SYLLABUS with effect from the Year 2023**  
**As per C-20 Diploma Curriculum**  
**(Common to all Engineering Diploma Programmes)**

**DURATION : 3 Hours**

**MAXIMUM MARKS : 100**

Sl. No.	TOPICS	MARKS
1	ENGINEERING MATHEMATICS	20
2	STATISTICS & ANALYTICS	20
3	IT SKILLS	20
4	FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING	20
5	PROJECT MANAGEMENT SKILLS	20
<b>TOTAL</b>		<b>100</b>

**DETAILED SYLLABUS**

**1. ENGINEERING MATHEMATICS 20 Marks**

<b>I. Matrices And Determinants (4 Marks)</b>
<ul style="list-style-type: none"> <li>Matrix and types</li> <li>Algebra of Matrices (addition, subtraction, scalar multiplication and multiplication)</li> <li>Evaluation of determinants of a square matrix of order 2 and 3. Singular matrices</li> <li>Cramer's rule for solving system of linear equations involving 2 and 3 variables</li> <li>Adjoint and Inverse of the non- singular matrices of order 2 and 3</li> <li>Characteristic equation and Eigen values of a square matrix of order 2</li> </ul>
<b>II. Straight Lines (4 Marks)</b>
<ul style="list-style-type: none"> <li>Slope of a straight line</li> <li>Intercepts of a straight line</li> <li>Intercept form of a straight line</li> <li>Slope-intercept form of a straight line</li> <li>Slope-point form of a straight line</li> <li>Two-point form of a straight line</li> <li>General form of a straight line</li> <li>Angle between two lines and conditions for lines to be parallel and perpendicular</li> </ul>

- Equation of a straight line parallel to the given line
- Equation of a straight line perpendicular to the given line

**III. Trigonometry (4 Marks)**

- Concept of angles, their measurement, Radian measure and related conversions.
- Signs of trigonometric ratios in different quadrants (ASTC rule)
- Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say  $900 \pm \theta$ ,  $1800 \pm \theta$ ,  $2700 \pm \theta$ . and  $3600 \pm \theta$ .)
- Trigonometric ratios of compound angles (without proof)
- Trigonometric ratios of multiple angles
- Transformation formulae

**IV. Differential Calculus And Applications (4 Marks)**

- Derivatives of continuous functions in an interval (List of formulae)
- Rules of differentiation
- Successive differentiation (up to second order)
- Applications of differentiation

**V. Integral Calculus And Applications (4 Marks)**

- List of standard integrals and Basic rules of integration
- Evaluation of integrals of simple function and their combination
- Methods of integration
- Concept of definite integrals
- Applications of definite integrals

**2. STATISTICS AND ANALYTICS 20 Marks****I. Statistical Data Collection And Types (3 Marks)**

- Definition of data and classification (qualitative , quantitative discrete and continuous data)
- Data collection tools
  - i) Questionnaires.
  - ii) Survey.
  - iii) Interviews.
  - iv) Focus group discussion
- Data cleaning

**II. Summarization of Data (6 Marks)**

- Descriptive statistics
  - i) Data tabulation (Frequency table)
  - ii) Relative frequency table.
- Grouped data
  - i) Bar graph
  - ii) Pie chart
  - iii) Line graph
  - iv) Frequency polygon
  - v) Frequency curve
  - vi) Relative frequency polygon
  - vii) Histograms
  - viii) Box plot
- Leaf-stem plot

**III. Measure of Location And Dispersion (5 Marks)**

- Determination of central tendencies Range, Mean, Mode and Median for the data
- Determination of absolute measures of dispersion for data like range quartile deviation, mean deviation, standard deviation and variance.
- Skewness and kurtosis graphs

**IV. Introduction To Python Programming (6 Marks)**

- Introduction to PYTHON.
- Syntax of PYTHON.
- Comments of PYTHON.
- Data types of PYTHON.
- Variables of PYTHON.
- If-else in PYTHON.
- Loops in PYTHON.
- Arrays and functions in PYTHON.

**3. IT SKILLS 20 Marks****I. Introduction to Basics of Coding (4 Marks)**

- 1.1 Introduction to computer programming
- 1.2 Algorithms - With sufficient examples
- 1.3 Flowcharts - With sufficient examples
- 1.4 Execute simple programs
- 1.5 Introduction to Application development
- 1.6 Simple android application development

**II. Design And Develop Web Pages (4 Marks)**

- 2.1 Basic web technologies
  - Browser
  - Web - Server
  - Client-Server Model
  - URL
  - SEO techniques
  - Domain names and domain name system.
- 2.2 Creating Web-pages with HTML5 - Static
  - Introduction, Editors
  - Tags, Attributes, Elements, Headings
  - Links, Images, List, Tables, Forms
  - Formatting, Layout, Iframes.
- 2.3 Formatting web pages with style sheets (CSS3).
  - Introduction to CSS
  - Inline CSS, Internal CSS, Classes and IDs
  - div, Color, Floating, Positioning
  - Margins, Padding, Borders
  - Fonts, Aligning Text, Styling Links

<div>2.4 Creating a web page dynamic using JavaScript.<ul style="list-style-type: none"><li>• Dynamic web page and Introduction to JS</li><li>• Basic syntax</li><li>• Functions</li><li>• Events</li></ul></div> <div>2.5 Creating dashboards in websites.</div>	<div><ul style="list-style-type: none"><li>• Google docs- bring your documents to life with smart editing and styling tools to help you easily format text and paragraphs;</li><li>• Google Co-lab (Usage of Jupyter Notebook): Colab notebooks allow you to combine executable code and rich text in a single document, along with images, HTML, LaTeX, and more.</li><li>• Google App Engine: Google App Engine is a Platform as a Service and cloud computing platform for developing and hosting web applications in Google-managed data centers. Applications are sandboxed and run across multiple servers.</li></ul></div> <div>4.5 Working of IoT and IoT components (Only brief introduction and demonstration through videos)</div> <div>4.6 Explain concept of Internet of Things with examples<ul style="list-style-type: none"><li>• Smart home</li><li>• Smart city</li><li>• Smart farming</li></ul></div>
<b>III. Business Process Automation / ERP (4 Marks)</b>	
<div>3.1 Introduction to business process automation.</div> <div>3.2 Organization structure and functions composition- Properties and applications<ul style="list-style-type: none"><li>• Structure</li><li>• Types</li><li>• Functional Units</li></ul></div> <div>3.3 Workflows 4<ul style="list-style-type: none"><li>• Introduction</li><li>• Components</li><li>• Use and use cases</li></ul></div> <div>3.4 Enterprise resource planning<ul style="list-style-type: none"><li>• History</li><li>• Evolution</li><li>• Uses of ERP</li></ul></div>	
<b>IV. Introduction To Cloud And IoT Concepts (4 Marks)</b>	
<div>4.1 Fundamentals of cloud</div> <div>4.2 Cloud service models<ul style="list-style-type: none"><li>• IaaS (Infrastructure-as-a-Service)</li><li>• PaaS (Platform-as-a-Service)</li><li>• SaaS (Software-as-a-Service)</li></ul></div> <div>4.3 Cloud deployment types<ul style="list-style-type: none"><li>• Public,</li><li>• Private,</li><li>• Hybrid</li><li>• Community Cloud</li></ul></div> <div>4.4 Cloud services:<ul style="list-style-type: none"><li>• Google Drive - file storage and synchronization service developed by Google;</li></ul></div>	<b>V. Cyber security And Safety (4 Marks)</b> <div>5.1 Introduction to Cyber security and cyber safety.<ul style="list-style-type: none"><li>• Brief awareness on cyber safety measures</li><li>• Identification of basic security issues in mobile phones and personal computers</li><li>• Installation of Antivirus software</li><li>• Firewall concepts</li><li>• Browser settings</li><li>• Importance of privacy and Password policy (Best practices).</li></ul></div> <div>5.2 Common threats - Demonstration<ul style="list-style-type: none"><li>• Phishing</li><li>• DoS attack</li><li>• Man in the middle attack</li><li>• Eavesdropping</li><li>• Spamming</li></ul></div>

## 4. FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING

- 20 Marks

I. Electrical Safety	(2 Marks)
<ol style="list-style-type: none"> <li>1. Electrical Symbols</li> <li>2. Electrical safety <ul style="list-style-type: none"> <li>• Identify Various types of safety signs and what they mean</li> <li>• Demonstrate and practice use of PPE</li> <li>• Demonstrate how to free a person from electrocution</li> <li>• Administer appropriate first aid to victims, bandaging, heart attack, CPR, etc.</li> <li>• Fire safety, causes and precautionary activities.</li> <li>• Use of appropriate fire extinguishers on different types of fires.</li> <li>• Demonstrate rescue techniques applied during fire hazard, correct method to move injured people during emergency</li> <li>• Inform relevant authority about any abnormal situation</li> </ul> </li> <li>1.1 Earthing: Types</li> </ol>	
II. Electrical Fundamentals	(5 Marks)
<ol style="list-style-type: none"> <li>1. Describe the sources of electrical energy.</li> <li>2. Electrical current, voltage, emf, potential difference, resistance with their SI units.</li> <li>3. Mention the meters used to measure different electrical quantities. Identification Measuring devices <ul style="list-style-type: none"> <li>• Ammeter</li> <li>• Voltmeter</li> <li>• Wattmeter</li> <li>• Ohmmeter</li> <li>• Digital Multimeter</li> <li>• Megger</li> <li>• Tong tester</li> </ul> </li> <li>4. Explain supply systems like AC, DC. <ul style="list-style-type: none"> <li>• Relationship between V, I and R. (Ohms law)</li> </ul> </li> </ol>	

- Behavior of V, I in Series and Parallel DC circuits.
  - Describe open circuit, close circuit and short circuit
  - Equation to find the effective Resistances connected in series
  - Equation to find effective Resistances connected in parallel
  - Resistances connected series and parallel combinations
  - AC sine wave: Sinusoidal voltage, current, amplitude, time-period, cycle, frequency, phase, phase difference, and their units.
  - Electrical work, power and power factor, SI units, mention the meters used to measure them.
5. Electrical energy
    - SI units
    - Mention the meters used to measure them
    - Single phase and Three phase supply.

### III. Protective Devices And Wiring Circuits (3 Marks)

1. Protective Devices
  - Necessity of Protective Devices
  - Various Protective devices and their functions
  - fuse wire,
  - Glass cartridge fuse
  - HRC fuse
  - Kit-kat fuse
  - MCB
  - MCCB
  - RCCB
  - ELCB
  - Relay
  - Different types of electrician tools and their function.
  - Describe various wiring tools.
  - State procedure of care and maintenance of wiring tools.
2. Describe different types of wiring systems.
  - Surface conduit

<ul style="list-style-type: none"> <li>concealed conduit</li> <li>PVC casing capping</li> </ul>
3. Wiring systems and their applications.
4. Describe the types of wires, cables used for different current and voltage ratings.
<b>IV. Electrical Machines and Batteries and UPS (5 Marks)</b>
1. Transformer <ul style="list-style-type: none"> <li>working principle</li> <li>Transformation ratio</li> <li>Types and applications with their ratings</li> </ul>
2. Induction motor <ul style="list-style-type: none"> <li>Single phase and three phase Induction motor.</li> <li>Necessity of starters.</li> <li>Describe DOL AND STAR-DELTA starters.</li> </ul>
3. What are different causes and remedies for a failure of starter and induction motor.
4. Battery <ul style="list-style-type: none"> <li>Types of batteries (Lead acid battery, lithium, sealed maintenance free (SMF) battery, Modular battery).</li> <li>Selection criteria of batteries for different applications.</li> <li>Ampere-Hour Capacity.</li> <li>Efficiency</li> </ul>
5. UPS <ul style="list-style-type: none"> <li>List the types and applications</li> <li>Selection criteria of UPS</li> <li>Sizing of UPS</li> </ul>
<b>V. Introduction to Electronic Devices and Digital Electronics (5 Marks)</b>
1. Compare Conductors, insulators and semiconductors with examples.
2. Identification of types and values of resistors-color codes.
3. PN junction diode <ul style="list-style-type: none"> <li>Symbol</li> <li>Characteristics</li> <li>Diode as switch.</li> <li>Types of diodes and ratings</li> <li>Applications</li> </ul>

4. Rectifier <ul style="list-style-type: none"> <li>Need for AC to DC conversion</li> <li>Bridge rectifier with and without C filter,</li> <li>Rectifier IC.</li> </ul>
5. Transistor (BJT) <ul style="list-style-type: none"> <li>Symbol</li> <li>Structure</li> <li>Working principle</li> <li>Comparison of analog and digital signal</li> <li>Digital systems, examples.</li> <li>Binary numbers, Boolean identities and laws.</li> <li>Digital system building blocks: Basic logic gates, symbols and truth tables.</li> <li>IC-Definition and advantages.</li> </ul>
6. Sensors <ul style="list-style-type: none"> <li>Concept</li> <li>Types: Temperature, Pressure, Water, Light, Sound, Smoke, proximity Sensors, Flow, humidity, voltage, vibration, IR (Principle/working, ratings/specifications, cost, and applications)</li> </ul>
7. Actuators <ul style="list-style-type: none"> <li>Concept</li> <li>Types and applications.</li> <li>Relay as an actuator</li> </ul>
8. Microcontroller <ul style="list-style-type: none"> <li>As a programmable device and list of real-world applications.</li> <li>PLC and Their applications.</li> </ul>

## 5. PROJECT MANAGEMENT SKILLS 20 Marks

<b>I. Introduction (4 Marks)</b>
I. Introduction <ul style="list-style-type: none"> <li>Meaning of Project</li> <li>Features of a Project</li> <li>Types of Projects</li> <li>Benefits of Project Management</li> <li>Obstacles in Project Management</li> <li>Project Management as Profession</li> <li>Project Manager and His Role</li> <li>Project Consultants</li> <li>What is Operation?</li> </ul>

<ul style="list-style-type: none"> <li>• Difference between Project and Operation.</li> <li>• What is "Process" in Project Management and Process Groups?</li> <li>• What is Scope? Difference between Project Group Objectives and Project Scope.</li> </ul>	<ul style="list-style-type: none"> <li>• Functions of Project Planning</li> <li>• Steps in Project Planning</li> <li>• Project Planning Structure</li> <li>• Project Objectives and Policies</li> <li>• Tools of Project Planning</li> <li>• Project Scheduling</li> <li>• Time Monitoring Efforts</li> <li>• Bounding Schedules</li> <li>• Scheduling to Match Availability of Manpower</li> <li>• Scheduling to Match Release of Funds</li> <li>• Problems in Scheduling Real-life Projects</li> <li>• Introduction</li> <li>• Situation Analysis and Problem Definition</li> <li>• Setting Goals and Objectives</li> <li>• Generating Structures and Strategies</li> <li>• Implementation</li> <li>• What is Project Evaluation?</li> <li>• Why is Project Evaluation Important?</li> <li>• What are the Challenges in Monitoring and Evaluation ?</li> </ul>
<b>II. Project Administration (4 Marks)</b>	<b>V. Project Control, Review and Audit (4 Marks)</b>
<ul style="list-style-type: none"> <li>• Essentials of Project Administration</li> <li>• Project Team</li> <li>• Project Design</li> <li>• Work Breakdown Structure (WBS)</li> <li>• Project Execution Plan (PEP)</li> <li>• Contracting Plan</li> <li>• Work Packing Plan</li> <li>• Organisation Plan</li> <li>• Systems and Procedure Plan</li> <li>• Project Procedure Manual</li> <li>• Project Diary</li> <li>• Project Execution System</li> <li>• Project Direction</li> <li>• Communication in a Project</li> <li>• Project Co-ordination</li> <li>• Pre-requisites for Successful Project Implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Projected Control Purposes</li> <li>• Problems of Project Control</li> <li>• Gantt Charts</li> <li>• Milestone Charts</li> <li>• Critical Path Method (CPM)</li> <li>• Construction of a Network</li> <li>• Network Technique in Project Scheduling</li> <li>• Crashing Project Duration through Network</li> <li>• Project Review</li> <li>• Initial Review</li> <li>• Post Audit</li> <li>• Performance Evaluation</li> <li>• Abandonment Analysis</li> <li>• Objectives of Project Audit</li> <li>• Functions of Project Auditor</li> <li>• Project Audit Programme</li> <li>• Difficulties in Establishing Audit Purpose and Scope</li> <li>• Digital Technology trends in Project management</li> <li>• Cloud Technology, IoT, AR and VR applications in Project management, Smart Cities</li> </ul>
<b>III. Project Life cycle (4 Marks)</b>	
<ul style="list-style-type: none"> <li>• Phases of Project Life Cycle</li> <li>• Project Management Life Cycle (General)</li> <li>• Project Planning</li> <li>• Project Execution</li> <li>• Project Closure</li> <li>• Project Risks</li> <li>• Types of Risks: Illustrations</li> <li>• Risk Assessment Techniques with Illustrations</li> <li>• Project Cost Risk Analysis</li> <li>• Estimating Time and Cost Overrun Risks</li> <li>• Organization/Procedural/Systemic Reasons for Project Cost Overruns</li> <li>• Time Overruns</li> </ul>	
<b>IV. Project Planning, Scheduling and Monitoring (4 Marks)</b>	
<ul style="list-style-type: none"> <li>• Nature of Project Planning</li> <li>• Need for Project Planning</li> </ul>	



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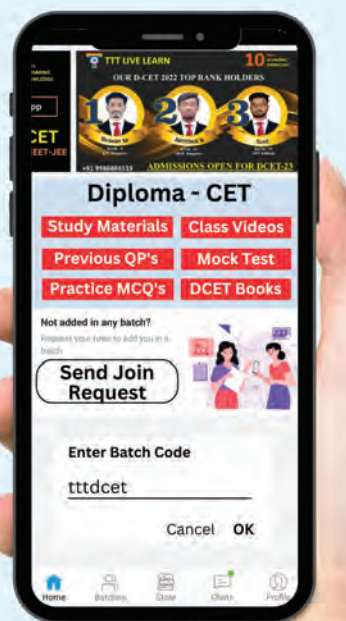
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# DCET 2023 - Question Paper & Solutions

1. In a square matrix, if the elements above the principal diagonal are zero, then it is called

- a) Identity matrix
- b) Lower triangular matrix
- c) Upper triangular matrix
- d) Diagonal matrix

Ans : (b)

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 1 & 4 & 0 \\ 2 & 5 & 1 \end{bmatrix}$$

2. The value of  $x$  if  $\begin{bmatrix} x-1 & 2 \\ 2 & 4 \end{bmatrix}$  is singular, is

- a) 3
- b) 8
- c) -2
- d) 2

Ans : (d)

Given matrix  $A = \begin{bmatrix} x-1 & 2 \\ 2 & 4 \end{bmatrix}$  is singular

w.k.t.  $|A| = 0 \quad \therefore$  singular

$$\begin{vmatrix} x-1 & 2 \\ 2 & 4 \end{vmatrix} = 0$$

$$(x-1)4 - 4 = 0$$

$$4x - 4 - 4 = 0$$

$$4x = 8$$

$$x = \frac{8}{4} \quad x = 2$$

3. The inverse of the matrix  $A = \begin{bmatrix} -1 & 0 \\ 5 & 7 \end{bmatrix}$  is

- a)  $-\frac{1}{7} \begin{bmatrix} 7 & 0 \\ -5 & -1 \end{bmatrix}$
- b)  $\frac{1}{7} \begin{bmatrix} 7 & 0 \\ -5 & -1 \end{bmatrix}$
- c)  $-\frac{1}{7} \begin{bmatrix} -7 & 0 \\ -5 & -1 \end{bmatrix}$
- d)  $\frac{1}{7} \begin{bmatrix} 7 & 0 \\ 5 & 1 \end{bmatrix}$

Ans : (a)

$$\text{Given matrix } A = \begin{bmatrix} -1 & 0 \\ 5 & 7 \end{bmatrix}$$

$$\text{WKT } A^{-1} = \frac{1}{|A|} \text{adj } A$$

$$\therefore \text{adjoint of } A = \begin{bmatrix} 7 & 0 \\ -5 & -1 \end{bmatrix}$$

$$\text{and } |A| = \begin{vmatrix} -1 & 0 \\ 5 & 7 \end{vmatrix} = -7 - 0 = -7$$

$$\therefore A^{-1} = \frac{-1}{7} \begin{bmatrix} 7 & 0 \\ -5 & -1 \end{bmatrix}$$

4. The eigenvalue of the matrix  $A = \begin{bmatrix} 3 & 0 \\ 1 & 3 \end{bmatrix}$  is

- a) 2, 2
- b) -3, -3
- c) 3, 3
- d) -3, 3

Ans : (c)

$$\text{Given } A = \begin{bmatrix} 3 & 0 \\ 1 & 3 \end{bmatrix}$$

The characteristic equation of  $A$  is,  $|A - \lambda I| = 0$

$$\begin{vmatrix} 3-\lambda & 0 \\ 1 & 3-\lambda \end{vmatrix} = 0$$

$$(3-\lambda)(3-\lambda) - 0 = 0$$

$$(3-\lambda) = 0 \text{ \& } (3-\lambda) = 0$$

$$\lambda = 3, \lambda = 3$$

5. The two lines  $ax + by = c$  and  $a'x + b'y = c'$  are perpendicular if

- a)  $ab' = ba'$
- b)  $aa' + bb' = 0$
- c)  $a'b + a'b' = 0$
- d)  $ab' + ba' = 0$

**Ans : (b)**Given  $ax + by = c$  and  $a'x + b'y = c'$  are perpendicular

$$ax + by = c \quad \text{---- (i)}$$

$$\therefore m_1 = \frac{-a}{b}$$

$$a'x + b'y = c' \quad \text{---- (ii)}$$

$$\therefore m_2 = \frac{-a'}{b'}$$

$$\therefore m_1 m_2 = -1 \quad (\because \text{lines are perpendicular})$$

$$\left(-\frac{a}{b}\right)\left(-\frac{a'}{b'}\right) = -1$$

$$aa' = -bb'$$

$$aa' + bb' = 0$$

**6. The y-intercept of any line passing through the origin in**

- a) 0      b) 1      c) -1      d) 2

**Ans : (a)**

The y-intercept of any line passing through the origin is zero.

**7. Slope intercept form of straight line is**

- a)  $y + mx - c = 0$       b)  $x = my + c$   
c)  $y = x + m$       d)  $y = mx + c$

**Ans : (d)**The slope intercept from the straight line is  $y = mx + c$ .**8. The tangent of the angle of intersection between two lines with slopes  $m_1$  and  $m_2$  is**

- a)  $\left| \frac{m_1 + m_2}{1 - m_1 m_2} \right|$       b)  $\left| \frac{m_1 + m_2}{m_1 - m_2} \right|$   
c)  $\left| \frac{m_1 - m_2}{1 - m_1 m_2} \right|$       d)  $\left| \frac{m_1 - m_2}{1 + m_1 m_2} \right|$

**Ans : (d)**

The tangent of the angle of intersection between

two lines with slopes  $m_1$  and  $m_2$  is  $\left| \frac{m_1 - m_2}{1 + m_1 m_2} \right|$ **9. If the ladder is inclined to the wall at an angle of  $135^\circ$ , then the inclination in radians is**

- a)  $\frac{4\pi}{3}$       b)  $\frac{3\pi}{4}$       c)  $\frac{2\pi}{4}$       d)  $\frac{4\pi}{5}$

**Ans : (b)**Given angle  $\theta = 135^\circ$ 

$$\begin{aligned} \text{Angle in radian} &= \frac{\pi}{180} \times \theta = \frac{\pi}{180} \times 135 \\ &= \frac{3\pi}{4} \text{ radian} \end{aligned}$$

**10. The value of  $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$  is**

- a)  $\frac{1}{2}$       b)  $-\frac{1}{2}$       c)  $\frac{\sqrt{3}}{2}$       d) 0

**Ans : (a)**

$$= \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

$$= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} - \frac{1}{2} \cdot \frac{1}{2} \times \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

**11. The simplified value of  $\frac{\sin 3A + \sin A}{\sin 3A - \sin A}$  is**

- a)  $\cot A \tan 5A$       b)  $\tan A \cot 2A$   
c)  $\tan 2A \cot A$       d)  $\tan 3A \cot 2A$

**Ans : (c)**

$$\frac{\sin 3A + \sin A}{\sin 3A - \sin A} = \frac{2 \sin\left(\frac{3A + A}{2}\right) \cos\left(\frac{3A - A}{2}\right)}{2 \cos\left(\frac{3A + A}{2}\right) \sin\left(\frac{3A - A}{2}\right)}$$

$$[\because \sin C + \sin D = 2 \sin\left(\frac{C + D}{2}\right) \cos\left(\frac{C - D}{2}\right)]$$

$$[\because \sin C - \sin D = 2 \cos\left(\frac{C + D}{2}\right) \sin\left(\frac{C - D}{2}\right)]$$

$$= \frac{2 \sin 2A \cos A}{2 \cos 2A \sin A} = \tan 2A \cot A$$

12. If  $y = \log x + \sec 2x$ , then  $\frac{dy}{dx}$  is

- a)  $-\frac{1}{x} + \sec 2x \tan x$   
 b)  $\frac{1}{x} + 2 \sec 2x \tan 2x$   
 c)  $\frac{1}{\sqrt{x}} + \sec x \tan x$   
 d)  $-\frac{1}{\sqrt{x}} + \sec 3x \tan 2x$

**Ans : (b)**

If  $y = \log x + \sec 2x$ , then

$$\frac{dy}{dx} = \frac{1}{x} + 2 \sec 2x \tan 2x$$

13. The derivative of the function  $\frac{1+x}{1-x}$  is

- a)  $\frac{-2}{(1-x)^2}$       b)  $\frac{2x}{(1-x)^2}$   
 c)  $\frac{-2x}{(1-x)^2}$       d)  $\frac{2}{(1-x)^2}$

**Ans : (d)**

$$\text{Given } y = \frac{1+x}{1-x} = \frac{x-1}{-x+1}$$

$$\frac{dy}{dx} = \frac{[1-(-1)] \cdot 1}{(1-x)^2} = \frac{2}{(1-x)^2}$$

$$\begin{aligned} \text{[shortcut method: } y = \frac{ax+d}{cx+d} \text{ then } \frac{dy}{dx} \\ = \frac{(ad-bc)f'(x)}{(cx+d)^2} \end{aligned}$$

14. Find the second order derivative of  $y = e^{2x} - e^{-x}$

- a)  $4e^{2x} - e^{-x}$       b)  $4e^{2x} + e^{-x}$   
 c)  $-4e^{2x} - e^{-x}$       d)  $4e^{2x} + e^x$

**Ans : (a)**

$$\text{Given } y = e^{2x} - e^{-x}$$

$$\frac{dy}{dx} = 2e^{2x} + e^{-x}$$

$$\frac{d^2y}{dx^2} = 4e^{2x} - e^{-x}$$

15. The equation of the tangent to the curve  $y = 2x^2 + x$  at  $(1, 2)$  is

- a)  $5x - y - 3 = 0$       b)  $5x + y + 3 = 0$   
 c)  $5x + y - 6 = 0$       d)  $5x + y + 6 = 0$

**Ans : (a)**

$$\text{Given } y = 2x^2 + x$$

$$\frac{dy}{dx} = 4x + 1$$

$$m = \left. \frac{dy}{dx} \right|_{(1,2)} = (4 \times 1) + 1 = 5$$

The equation of tangent is given by

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 2 &= 5(x - 1) \\ y - 2 &= 5x - 5 \\ 5x - y - 5 + 2 &= 0 \\ \therefore 5x - y - 3 &= 0 \end{aligned}$$

16. The value of  $\int (\sec x \tan x + \sec^2 x) dx$  is

- a)  $\sec 2x + \tan x + c$       b)  $\sec x + \operatorname{cosec} x + c$   
 c)  $\sec x + \tan x + c$       d)  $\sec 2x - \operatorname{cosec}^2 x + c$

**Ans : (c)**

$$\int (\sec x \tan x + \sec^2 x) dx = \sec x + \tan x + c$$

17. The value of

$$\int (2x^3 + 3x^2 + 2x)^{10} (3x^2 + 3x + 1) dx \text{ is}$$

- a)  $\frac{1}{22} (6x + 3x^2 + 2x)^{11} + c$

b)  $\frac{1}{22}(2x^3 + 3x^2 + 2x)^{11} + c$

c)  $\frac{1}{22}(2x^3 + 3x^2 - 2x)^{12} + c$

d)  $\frac{1}{12}(2x^3 + 3x^2 - 2x)^{12} + c$

**Ans : (b)**

$$\int (2x^3 + 3x^2 + 2x)^{10} (3x^2 + 3x + 1) dx$$

$$\int [f(x)]^n f'(x) dx = \frac{[f(x)]^{n+1}}{n+1} + c$$

$$\therefore \frac{1}{2} \int (2x^3 + 3x^2 + 2x)^{10} (6x^2 + 6x + 2) dx$$

$$= \frac{1}{2} \frac{(2x^3 + 3x^2 + 2x)^{11}}{11} + C$$

$$= \frac{1}{22} (2x^3 + 3x^2 + 2x)^{11} + C$$

**18. The value of  $\int_0^{\pi/4} \tan^2 x dx$  is**

a)  $1 + \frac{\pi}{4}$                       b)  $1 + \frac{4\pi}{2}$

c)  $1 - \frac{\pi}{4}$                       d)  $1 - \frac{4\pi}{2}$

**Ans : (c)**

$$\int_0^{\pi/4} \tan^2 x dx = \int_0^{\pi/4} (\sec^2 x - 1) dx$$

$$= \tan x \quad (\because \sec^2 \theta - \tan^2 \theta = 1)$$

$$= [\tan x - x]_0^{\pi/4} = \tan \frac{\pi}{4} - \frac{\pi}{4} - 0$$

$$= 1 - \frac{\pi}{4}$$

**19. The area bounded by  $y = \sin x$  and  $x$ -axis from  $x = 0$  to  $x = \pi$  is**

a) 2      b) -2      c) 3      d) 1

**Ans : (a)**

The required area is given by

$$\begin{aligned} A &= \int_0^{\pi} y dx = \int_0^{\pi} \sin x dx \\ &= [-\cos x]_0^{\pi} = -\cos \pi - (\cos 0) \\ &= -(-1) + 1 = 2 \end{aligned}$$

**20. The value of  $\tan 45^\circ \cot 225^\circ + \tan^2 60^\circ$  is**

a) -4      b) 4      c) 2      d) 3

**Ans : (b)**

$$\begin{aligned} \tan 45^\circ \cot 225^\circ + \tan^2 60^\circ &= 1 \times \cot (180^\circ + 45^\circ) + (\sqrt{3})^2 \\ &= 1 \times \cot 45^\circ + 3 \\ &= (1 \times 1) + 3 = 1 + 3 = 4 \end{aligned}$$

**21. \_\_\_\_\_ is an example of quantitative data.**

- a) Volume                      b) Words  
c) Symbols                      d) Colour

**Ans : (a)**

The data which can be numerically measurable is called quantitative data.

"Volume" measured in numbers.

$\therefore$  Volume is a quantitative data

**22. Data cleaning in the process of**

- a) removing viruses  
b) correctly formatting data  
c) removing duplicate data  
d) properly formatting data

**Ans : (Grace)**

Data cleaning is the process of fixing (or) removing incorrect, corrupted, incorrectly formatted, duplicate (or) incomplete data with in a dataset.

**23. \_\_\_\_\_ is not a data collection tool.**

- a) Word                      b) Focus Group Discussion  
c) Survey                      d) Questionnaires

**Ans : (a)**

The data collection tools focus group discussion, survey method, questionnaires, observation, Interview method.

∴ Word is not a data collection tool

**24. The graph of cumulative frequency is called**

- a) Frequency polygon
- b) Histogram
- c) Cumulative frequency polygon
- d) Frequency histogram

**Ans : (Grace)**

The cumulative frequencies can be plotted only on cumulative frequency polygon (or) cumulative frequency curve (O give curve)

**25. To calculate percentage frequency, we use \_\_\_\_\_ formula.**

- a) P.f. =  $(f \times n) + 100$
- b) P.f. =  $(f \div n) \times 100$
- c) P.f. =  $(100) + (f \times n)$
- d) P.f. =  $(100) \times (f \div n)$

**Ans : (b & d)**

$$\text{Percentage frequency} = \left[ \frac{f}{n} \right] \times 100$$

**26. If  $X_1, X_2, X_3, \dots, X_n$  are the observations of a given data, then the mean of the observation will be :**

- a)  $\frac{\text{Total number of observations}}{\text{Sum of observations}}$
- b) Sum of observations + Total number of observations
- c)  $\frac{\text{Sum of observations}}{\text{Total number of observations}}$
- d) Total number of observations – Sum of observations

**Ans : (c)**

Mean of the observations is

$$\bar{X} = \frac{X_1 + X_2 + X_3 + \dots + X_n}{n} \quad \text{or}$$

$$\bar{X} = \frac{\sum X}{n} \quad \text{or}$$

$$\bar{X} = \frac{\text{Sum of observations}}{\text{Total number of observations}}$$

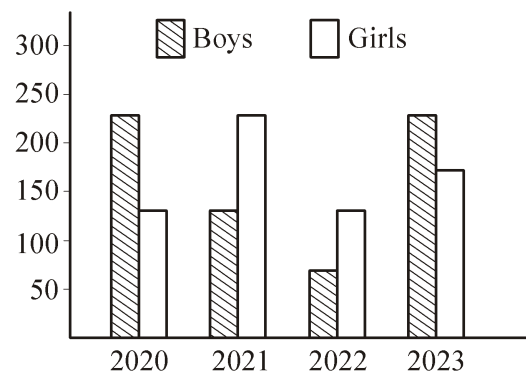
**27. The end points of a class interval are the \_\_\_\_\_ and \_\_\_\_\_ values that a variable can take.**

- a) Lowest and Highest
- b) Minimum and Maximum
- c) Numeral and Average
- d) Mean and Mode

**Ans : (a)**

If [10 – 20] is a class interval and the end points of the class interval are 10 and 20, which are the lowest and highest values in the variable.

**The graph given below, shows the participating of students of a school in outdoor games in different years. By using the data given below, answer the following questions (28 - 29) :**



**28. In which years did the girls participate more than the boys?**

- a) 2020, 2023
- b) 2021, 2022
- c) 2022, 2023
- d) 2020, 2021

**Ans : (b)**

Boys participation in	Girls participation in
2020 = 225	2020 = 125
2021 = 125	2021 = 225
2022 = 50	2022 = 125
2023 = 225	2023 = 150
From the above table, in 2021 and 2022 girls participate more than boys.	

**29. In which two years did an equal number of boys participate?**

- a) 2020, 2021      b) 2020, 2022  
c) 2020, 2023      d) 2021, 2022

**Ans : (c)**

From the above table, In the year 2020 and 2023 there are equal number of boys participate.  
In 2020 Boys participate = 225  
In 2023 Boys participate = 225

**30. To find third quartile in Excel, we use \_\_\_\_\_ formula.**

- a) =QUARTER (3, Range)  
b) =QUARTILE (3, Range)  
c) =QUARTER (Range, 3)  
d) =QUARTILE (Range, 3)

**Ans : (d)**

The formula for finding 3rd quartile in excel is =QUARTILE (Range, 3)

**31. The percentile divides a series into \_\_\_\_\_ equal parts.**

- a) fifty                      b) twenty  
c) ten                        d) hundred

**Ans : (d)**

Data which divides into 100 equal parts is called percentile. It is denoted by P

**32. The value of first quartile is 23 and interquartile of set of data range is 20. The value of third quartile is**

- a) 23    b) 33    c) 43    d) 53

**Ans : (c)**

Given, 1st quartile =  $Q_1 = 23$   
Inter quartile range =  $Q_3 - Q_1 = 20$  ---- (1)  
From equation (1)  
 $Q_3 - Q_1 = 20$   
 $Q_3 - 23 = 20$   
 $Q_3 = 20 + 23$   
 $Q_3 = 43$        $\therefore$  Third quartile = 43

**33. The algebraic sum of the deviations of a frequency distribution from its mean is always**

- a) a non-zero number    b) zero  
c) less than zero        d) greater than zero

**Ans : (b)**

The property of arithmetic mean is  
The algebraic sum of the deviations of a frequency distribution from its mean is equal to zero.

$$\text{i.e., } \sum (X - \bar{X}) = 0$$

**34. The Excel formula for 'Mean' is**

- a) =MEDIAN (array of numbers)  
b) =AVERAGE (array of numbers)  
c) =MEAN (array of numbers)  
d) =MODE (array of numbers)

**Ans : (b)**

The Excel formula for "mean" is  
=AVERAGE (array of numbers)

**35. What is output syntax in Python?**

- a) Print (" ")    b) PRINT (" ")  
c) print (" ")    d) Printf (" ")

**Ans : (c)**

in python print (" ") statement is used for output

**36. "str" is a**

- a) Text Type                      b) Numeric Type  
c) Binary Type                  d) Sequence Type

**Ans : (a)**

str is text Type

37. In Python, \_\_\_\_\_ standard data types are commonly used.

- a) three                      b) five
- c) ten                        d) four

**Ans : (Grace)**

in python standard data types are numeric, Dictionary, Boolean, Set, Sequence types

38. The result of Python program gets displayed in \_\_\_\_\_

- a) IDLE Shell 3.9.1 window
- b) IDLE Shell 3.1.9 window
- c) ILDE Shell 3.9.1 window
- d) IELD Shell 3.9.1 window

**Ans : (a)**

IDLE3.9.1 is the first version of Python it is Integrated Development and Learning Environment.

39. Which one of the following quotations in Python does not accept the quotes to denot strings?

- a) ( ' ' )                      b) ( " " )
- c) ( )                        d) ( " " " " )

**Ans : (c)**

in python its accept single quote double quote and triple quote.

40. In Python, \_\_\_\_\_ is used to end the physical line or ignore the comment.

- a) \*\*                      b) #                      c) &                      d) \\\

**Ans : (b)**

In Python, the # character is used to start a comment. The comment continues after the # until the end of the line.

41. Which of the following is *not* a cyber crime?

- a) Cryptography
- b) Denial of Service
- c) Man-in-the-middle attack
- d) Phishing

**Ans : (a)**

Cryptography is the process of hiding or coding information so that only the person a message was intended for can read it.

42. DoS is abbreviated as \_\_\_\_\_

- a) Denial of Service    b) Distribution of Server
- c) Distribution of Service
- d) Denial of Server

**Ans : (a)**

DOS Expansion is denial-of-service.

43. \_\_\_\_\_ protects interconnected systems including hardware, software and programs and data from cyber attacks.

- a) Cyber Security    b) Computer Security
- c) Resource Security    d) Hardware Security

**Ans : (a)**

CYBER SECURITY is a protection of interconnected systems including hardware software and program and data from cyber-attack.

44. Basic functionality of the network device firewall is :

- a) scans mobile applications
- b) monitoring database
- c) privatizes the computers
- d) monitoring incoming and outgoing networks

**Ans : (d)**

A firewall is a network security device that monitors incoming and outgoing network traffic and decides whether to allow or block specific traffic based on a defined set of security rules

45. An algorithm represented in the form of programming language is called :

- a) Flowchart                      b) Pseudocode
- c) Program                      d) Instruction

**Ans : (c)**

An algorithm represented in the form of a programming language is called a program.

46. The \_\_\_\_\_ symbol is used when the flowchart is starting or ending.

- a) Connector/Arrow
- b) Terminal box/Rounded rectangle
- c) Input/Output
- d) Process

**Ans : (b)**

in flow chart "Terminator Symbol," this symbol represents the start points, end points, and potential outcomes of a path



47. MIT App Inventor allows user to

- a) Create web application
- b) Build Android application
- c) Create System Software
- d) Develop Operating System

**Ans : (b)**

MIT app inventor allows user to build fully functional apps for smartphones and tablets.

48. What is the function of the "when green flag clicked" command block?

- a) Points Sprite in the specified direction
- b) If condition is true, runs the blocks inside
- c) Runs the script
- d) Stops the execution of script

**Ans : (c)**

Runs the script: - when green flag clicked block triggers the execution of the script or program attached to it.

49. The correct sequence of HTML tags for starting a webpage is

- a) Head, Title, Html, Body
- b) Html, Head, Title, Body
- c) Html, Body, Title, Head
- d) Html, Title, Head, Body

**Ans : (b)**

The correct sequence of HTML tags to start a webpage is html, head, title, and body.

50. Web server :

- a) is a computer system that delivers web pages
- b) is delivery news
- c) provides options for those seeking real-time discussions
- d) prints documents

**Ans : (a)**

A web server stores and delivers the content for a website

51. Which of the following is used to style the appearance of web pages?

- a) Html
- b) JavaScript
- c) PHP
- d) CSS

**Ans : (d)**

CSS is used to define styles for your web pages, including the design, layout and variations in display for different devices and screen sizes

52. Which of the following is an example of web browser?

- a) Google
- b) Firefox
- c) Apache
- d) MySQL

**Ans : (b)**

Fire fox is example of web browser

53. Which of the following is an open source and free workflow management software?

- a) Trello
- b) MS Excel
- c) Windows
- d) Linux

**Ans : (a)**

Trello is the visual tool that empowers your team to manage any type of project, workflow or task tracking.

54. ERP package will handle \_\_\_\_\_ business functionality/functionality.

- a) One
- b) Two
- c) Three
- d) Multiple/all

**Ans : (d)**

ERP systems supports all aspects of modules and provide transparency into complete business process.

**55. \_\_\_\_\_ is a visual diagram of a company that describes what employees do, whom they report to and how decisions are made across the business.**

- a) Physical Structure b) Organizational Structure  
c) Logical Structure d) Hybrid Structure

**Ans : (b)**

Organisational structure describes entire structure of organisation and work structure of employees.

**56. \_\_\_\_\_ is a methodology used in system analysis to identify, clarify, and organize system requirements.**

- a) Workflow b) Use case  
c) Algorithm d) Software

**Ans : (a)**

Workflow helps in identifying, clarify requirements of organise system.

**57. Which of the following is *not* an application of IoT?**

- a) Web browser b) Smart home  
c) Smart city d) Self-driven cars

**Ans : (a)**

Smart home smart city self-driving cars applications of IoT but web browser is not a application of IoT.

**58. Which of the following is *not* a cloud service option ?**

- a) VaaS b) IaaS c) PaaS d) SaaS

**Ans : (a)**

PAAS, SAAS, IAAS all three is cloud services but VAAS(Voice as a service) is not cloud service

**59. How many types of services are offered by cloud computing to the users ?**

- a) 2 b) 4 c) 3 d) 5

**Ans : (c)**

PAAS, SAAS, IAAS services offered by cloud services.

**60. Combination of Public and Private deployment is called**

- a) Hybrid b) Hyper  
c) Public d) Private

**Ans : (a)**

Hybrid cloud refers to a mixed computing, storage, and services environment made up of on-premises infrastructure, private cloud services, and a public cloud—such as Amazon Web Services (AWS) or Microsoft Azure—with orchestration among the various platforms

**61. Unit of electrical power is**

- a) Volt b) Watt  
c) Watt-hour d) Ampere-hour

**Ans : (b)**

A Watt is the unit of electrical power equal to one ampere under the pressure of one volt. 1 W is the power consumed by a device that carries 1 A of current when operated at a potential difference of 1 V.

**62. In pipe earthing, the diameter of GI pipe embedded in the pit is**

- a) 32 mm b) 38 mm  
c) 48 mm d) 56 mm

**Ans : (b)**

The size of the pipe used for earthing is of diameter 40 mm and 2.5 meters in length for ordinary soil or greater length in case of dry and rocky soil.

Pipe electrodes shall not be smaller than 38 mm internal diameter if made of galvanized iron or steel, and 100 mm internal diameter if made of cast iron.

**63. If a resistor of 100 ohms is connected in series with a parallel combination of two 200 ohms resistors, then the effective resistance is**

- a) 200 ohms  
b) 250 ohms  
c) 350 ohms  
d) 150 ohms

**Ans : (a)**

The series combination of resistor is  $R_1 = 100\Omega$   
 For parallel combination of resistor, lets  $R_2 = 200\Omega$   
 and  $R_3 = 200\Omega$

To calculate total parallel resistor  $R_p = \frac{R_2 R_3}{R_2 + R_3}$

$$= \frac{200 \times 200}{200 + 200} = 100\Omega$$

The effective resistance is  $R_p + R_1 = 100 + 100 = 200\Omega$

**64. If a resistor of 20  $\Omega$  is connected across a source of 5 volts DC supply, then the current in the circuit is**

- a) 1 Ampere                      b) 4 Amperes  
 c) 0.5 Amperes                d) 0.25 Amperes

**Ans : (d)**

Lets consider,  $R_1 = 20\Omega$      $V = 5V$

Current in the circuit is given by  $I = \frac{V}{R} = \frac{5}{20}$   
 $= 0.25$  Amperes

**65. Power factor is**

- a) ratio of resistance to inductance  
 b) ratio of apparent power to true power  
 c) ratio of resistance to impedance  
 d) ratio of inductance to capacitance

**Ans : (C)**

In AC circuits, the power factor is defined as the ratio of the resistance (R) to impedance (Z) in the circuit. Where  $\phi$  is the angle between voltage and current. If the current lags the voltage, the power factor will be lagging. If the current leads the voltage, the power factor will be leading.

**66. The phase-to-neutral voltage in a 3-phase star connected system is 230 V. The phase-to-phase (line-to-line) voltage is**

- a) 230 V                              b) 398.37 V  
 c) 400 V                              d) 440 V

**Ans : (b)**

The phase-to-phase (line-to-line) voltage is given by, where  $V_{ph} = 230V$

$$V_L = \sqrt{3} \times V_{ph} = \sqrt{3} * 230 = 398.37 V$$

**67. The time period of an AC wave at frequency of 50 Hz is**

- a) 2 milliseconds                b) 10 milliseconds  
 c) 20 milliseconds              d) 50 milliseconds

**Ans : (c)**

Time period of a wave is given by  $= \frac{1}{\text{frequency}}$

$$= \frac{1}{50} = 0.02 \text{ s}$$

Since the options is in milliseconds  $= 0.02 * 1000 = 20$  milliseconds.

**68. The type of fuse used for domestic purpose is**

- a) HRC fuse  
 b) Kit kat or rewirable fuse  
 c) Ceramic cartridge fuse  
 d) Glass cartridge fuse

**Ans : (b)**

Purpose of fuse in household circuit: It safeguards the circuit and the appliances connected in the circuit from being damaged. It also protects the appliances from the current that over exceeds the specified value due to voltage fluctuation, short circuit.

**69. MCCB stands for**

- a) Molded Case Circuit Breaker  
 b) Miniature Case Circuit Breaker  
 c) Maximum Current Circuit Breaker  
 d) Minimum Current Circuit Breaker

**Ans : (a)**

MCCB stands for Molded Case Circuit Breaker

**70. ELCB is used for detecting current leakage**

- a) above 8 kVA                      b) below 5 kVA  
 c) above 5 kVA                      d) below 8 kVA

**Ans : (Grace)**

**71. A static machine which transfers electrical power from one circuit to another circuit without changing the frequency is called**

- a) DC machine      b) Alternator
- c) Induction motor      d) Transformer

**Ans : (d)**

Since it is designed to either increase or decrease AC voltage between the circuits while maintaining the same frequency of the current.

**72. The initial type of connection of the motor windings when started with a star delta starter is**

- a) star connection      b) delta connection
- c) series      d) parallel

**Ans : (a)**

During starting the stator winding is star connected, which provides less starting torque and puts less mechanical and electrical stress on the system, thereby increasing its lifespan.

**73. The cause for a 3-phase motor producing inadvertent mechanical noise is :**

- a) Interchanged supply terminals
- b) High load on motor
- c) High voltage on motor winding
- d) Incorrect coupling

**Ans : (d)**

If the coupling is not aligned perfectly, it can cause excessive wear on the parts and eventually lead to failure. Other causes of coupling failure include poor installation, incorrect size, and material issues. Pump coupling failure can have a significant impact on the operation of a facility.

**74. Cell is an \_\_\_\_\_ device**

- a) electro-mechanical
- b) electro-chemical
- c) electro-magnetic
- d) electro-dynamic

**Ans : (b)**

An electrochemical cell is a device that can generate electrical energy from the chemical reactions occurring in it, or use the electrical energy supplied to it to facilitate chemical reactions in it. These devices are capable of converting chemical energy into electrical energy, or vice versa.

**75. The most commonly used battery in electric vehicles is**

- a) Lithium-ion battery      b) Lead-acid battery
- c) Nickel-Cadmium battery
- d) Alkaline rechargeable battery

**Ans : (a)**

Lithium-ion batteries power the lives of millions of people every day. From laptops and cell phones to hybrids and electric cars, this technology is growing in popularity due to its light weight, high energy density, low self-discharge, no memory effect, may offer longer life and ability to recharge.

**76. Digital signals are characterized by**

- a) Continuous voltage levels
- b) Infinite resolution
- c) Discrete voltage levels
- d) Variable voltage levels

**Ans : (c)**

A digital signal can only take on one value from a finite set of possible values at a given time. With digital signals, the physical quantity representing the information can be many things: Variable electric current or voltage.

**77. According to rules and laws of Boolean Algebra,  $A + A =$  \_\_\_\_\_**

- a)  $2A$       b)  $A$       c)  $1$       d)  $A^2$

**Ans : (b)**

When both the inputs are the same, applying either an AND gate or OR gate will result in an output equal to the input.

$$\therefore A + A = A \quad \& \quad A \cdot A = A$$

**78. Photo diode is used in which of the following applications ?**

- a) Voltage regulation
- b) Temperature measurement
- c) Light detection
- d) Radio Frequency (RF) Amplification

**Ans : (c)**

This effect of the proportional change in photocurrent with the change in light intensity can be easily observed by applying a reverse bias. Since photodiodes generate current flow directly depending upon the light intensity received, they can be used as photodetectors to detect optical signals.

**79. If a resistor is having a colour band as first band = Brown, second band = Black and third band = Red, then the resistance value is**

- a) 1 k $\Omega$
- b) 10 k $\Omega$
- c) 100  $\Omega$
- d) 100 k $\Omega$

**Ans : (a)**

According to colour code method each bands will have its own values, i.e., 1<sup>st</sup> band Brown = 1, 2<sup>nd</sup> band Black = 0, 3<sup>rd</sup> band is Red (multiplier band) = 100

Multiply all the band values. Then the resistance values is,  $10 \times 100 = 1000 = 1\text{k}\Omega$

**80. The binary equivalent of the decimal number 9 is**

- a) 1001
- b) 1000
- c) 1100
- d) 1010

**Ans : (a)**

2	9	..... 1
2	4	..... 0
2	2	..... 0
	1	

$$\therefore 9_{10} = 1001_2$$

**81. Project Management is a combination of**

- a) human and non-human resources
- b) only human resources

- c) only non-human resources
- d) no resources at all

**Ans : (a)**

Project management involves the coordination and utilization of both human resources (such as project managers, team members, stakeholders) and non-human resources (such as tools, equipment, technology, materials, and finances) to achieve project goals and objectives. It is a holistic approach that combines both human and non-human elements to successfully complete a project.

**82. The consultant who is appointed to carry out the project work is**

- a) Compound house consultant
- b) In-house consultant
- c) Out-house consultant
- d) Bridge consultant

**Ans : (c)**

An outsourced consultant is someone who is hired from outside the organization to provide expertise, guidance, and support for a specific project or task

**83. The type of project which requires minimum amount of capital is**

- a) Crash project
- b) Normal project
- c) Disaster project
- d) Consultant project

**Ans : (b)**

Normal projects, will be allowed to take their normal time, minimum capital with no sacrifice in quality.

**84. Projects like building a hospital, a park, a playground and government projects like highway construction are examples of**

- a) Social needs
- b) Customer needs
- c) Market needs
- d) Ecological needs

**Ans : (a)**

The basic requirements for a society is hospital, park, schools, road construction etc., hence they all are social need projects.

**85. In Project Management, WBS stands for**

- a) Work Breakdown Structure
- b) Waste Breakdown Structure
- c) Window Breakdown Structure
- d) Wireless Breakdown Structure

**Ans : (a)**

WBS full form: Work Breakdown Structure

**86. The first step in Project Execution Plan is**

- a) Work packaging plan
- b) Contracting plan
- c) Organization plan
- d) Procedure plan

**Ans : (b)**

Under the four sub plans of Project Execution Plan, the contracting plan will be the first step used in preparation of PEP. To develop self-regulating systems, it is necessary to contract out those areas where the owner companies do not have inherent competence.

**87. The team which gives the idea to start a project is**

- a) Core project team
- b) Full project team
- c) Advising project team
- d) Initial project team

**Ans : (d)**

The initial project team consists of specific people who initially conceive the idea of starting a project.

**88. In PEP, the letter 'E' stands for**

- a) Execution                      b) Estimation
- c) Evaluation                    d) Enthusiasm

**Ans : (a)**

PEP full form Project Execution Plan.

**89. In Project Life Cycle, more time is required for**

- a) Project closure      b) Project initiation
- c) Project execution   d) Project planning

**Ans : (c)**

Execution phase consumes maximum time to complete work in a project life cycle.

**90. Innovation is the hallmark of every project. Here innovation means**

- a) New ideas
- b) Project success
- c) Professional approach
- d) Project Management

**Ans : (a)**

Innovation is a hallmark of many successful projects, and it refers to the process of introducing new ideas, methods, products, services, or approaches that create value and improve upon existing practices.

**91. The Project Life Cycle Curve indicates**

- a) Work packaging
- b) Number of workers in the project
- c) Growth, maturity and decline
- d) Project manual

**Ans : (c)**

Project life cycle curve explains how project is initiated, its growth, its working process, maturity and the completion of project.

**92. In Project Management, taking actions to measure the quality accurately is the function of**

- a) Quality management    b) Cost management
- c) Review management    d) Risk management

**Ans : (a)**

Quality Management is one of the methods to measure quality accurately in Project Management.

**93. Project planning methodologies involve**

- a) Planning by non-incentive and direction
- b) Planning by incentive and direction
- c) Unplanned initiation
- d) Changing the project policies

**Ans : (b)**

**Planning by Incentive:** This could mean that project planning involves creating incentives or rewards to motivate project team members and stakeholders.

**Planning by Direction:** Planning by direction suggests that project planning involves providing clear guidance and direction to the project team.

**94. Identify the *incorrect* statement below:**

- a) Project objective should be specific
- b) Project objective should be realistic
- c) Project objective should not be framed timely
- d) Project objective should be measurable

**Ans : (c)**

Project objective must be specific measurable and realistic. It cannot be changed timely.

**95. WBS, PEP and PPM are the tools used to design**

- a) Project plan                      b) Project work system
- c) Project diary                    d) Project direction

**Ans : (b)**

Project Work system classifies into Work Breakdown Structure , Project Execution Plan , Project Procedure Manual.

**96. The earliest method used for planning of project was**

- a) CPM                                  b) PERT
- c) Bar Chart                         d) Milestone Chart

**Ans : (c)**

The earliest method used for project planning is Bar chart.

**97. The expansion of PERT is**

- a) Programme Evaluation and Review Technique
- b) Project Estimation and Recording Tool
- c) Project Estimation and Resource Technology
- d) Performance Estimation and Resource Tool

**Ans : (a)**

PERT full form Programme Evaluation and Review Technique

**98. For non-repetitive projects \_\_\_\_\_ tool is used in production planning and scheduling.**

- a) CPM                                  b) PERT
- c) Both CPM and PERT          d) Bar Chart

**Ans : (b)**

For non-repetitive projects PERT is the tool used in project planning and scheduling

**99. The purpose of conducting a project review is**

- a) To close the project
- b) To initiate the project
- c) To develop the project scope
- d) To assess project performance

**Ans : (d)**

Project review will help in evaluating project performance.

**100. A project review does *not* contain**

- a) Performance evaluation
- b) Evaluating the capital budget
- c) Data collection
- d) Initial review

**Ans : (c)**

Data Collection is not the step of project review.



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### 2024 Rankers

#### DCET State 3<sup>rd</sup> Rank

Below 10 Ranks : **2** Students  
Below 100 Ranks : **32** Students  
Below 200 Ranks : **46** Students  
Below 500 Ranks : **99** Students  
Below 1000 Ranks : **180** Students  
Below 1500 Ranks : **257** Students  
Below 2000 Ranks : **330** Students

### 2023 Rankers

#### DCET State 1<sup>st</sup> Rank

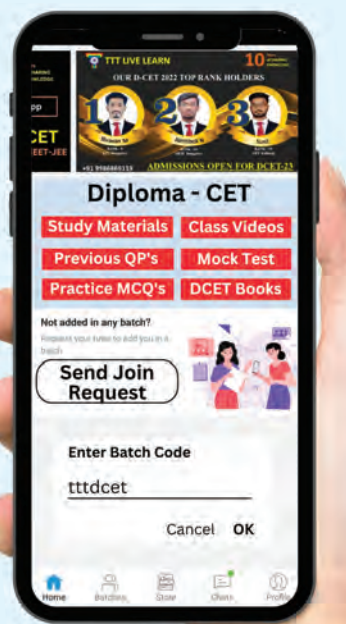
Below 10 Ranks : **4** Students  
Below 100 Ranks : **23** Students  
Below 200 Ranks : **41** Students  
Below 500 Ranks : **98** Students  
Below 1000 Ranks : **173** Students  
Below 1500 Ranks : **234** Students  
Below 2000 Ranks : **289** Students

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# DCET 2024 - Question Paper & Solutions

1. If  $A = \begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$  and  $A - B = \begin{bmatrix} 5 & -3 \\ 4 & 6 \end{bmatrix}$ , then matrix  $B$  is \_\_\_\_\_.

- a)  $\begin{bmatrix} -3 & 2 \\ -4 & -1 \end{bmatrix}$       b)  $\begin{bmatrix} -5 & 3 \\ -4 & -6 \end{bmatrix}$   
 c)  $\begin{bmatrix} -2 & 1 \\ 0 & -5 \end{bmatrix}$       d)  $\begin{bmatrix} 2 & -1 \\ 0 & 5 \end{bmatrix}$

**Ans : (c)**

$$\text{Given, } A = \begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix} \text{ and } A - B = \begin{bmatrix} 5 & -3 \\ 4 & 6 \end{bmatrix}$$

$$\therefore \begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix} - \begin{bmatrix} 5 & -3 \\ 4 & 6 \end{bmatrix} = B$$

$$B = \begin{bmatrix} -2 & 1 \\ 0 & -5 \end{bmatrix}$$

2. If  $\begin{bmatrix} 3 & -4 \\ 9 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 2 \end{bmatrix}$ , then the values of  $x$  and  $y$  are \_\_\_\_\_

- a)  $\left(\frac{2}{3}, -2\right)$       b)  $\left(2, \frac{2}{3}\right)$   
 c)  $\left(-2, \frac{2}{3}\right)$       d)  $\left(\frac{-2}{3}, 2\right)$

**Ans : (a)**

$$\text{Given } \begin{bmatrix} 3 & -4 \\ 9 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} (3x) + (-4y) \\ (9x) + (2y) \end{bmatrix} = \begin{bmatrix} 10 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} 3x - 4y \\ 9x + 2y \end{bmatrix} = \begin{bmatrix} 10 \\ 2 \end{bmatrix}$$

$$\therefore 3x - 4y = 10$$

$$9x + 2y = 2 \rightarrow \times 2$$

$$3x - 4y = 10$$

$$18x + 4y = 4$$

$$21x + 0 = 14$$

$$21x = 14$$

$$x = \frac{14}{21}$$

$$x = \frac{2}{3}$$

$$\therefore 3x - 4y = 10$$

$$3\left(\frac{2}{3}\right) - 4y = 10$$

$$2 - 4y = 10$$

$$2 - 10 = 4y$$

$$-8 = 4y$$

$$\frac{-8}{4} = y$$

$$\therefore y = -2$$

3. If  $A = \begin{bmatrix} -2 & 6 \\ -2 & 3 \end{bmatrix}$ , then  $A^{-1}$  is \_\_\_\_\_.

- a)  $\frac{1}{18} \begin{bmatrix} 3 & -6 \\ 2 & -2 \end{bmatrix}$       b)  $\frac{1}{6} \begin{bmatrix} 3 & -6 \\ 2 & -2 \end{bmatrix}$   
 c)  $\begin{bmatrix} 3 & -6 \\ 2 & -2 \end{bmatrix}$       d)  $\frac{1}{6} \begin{bmatrix} -2 & 6 \\ -2 & 3 \end{bmatrix}$

**Ans : (b)**

$$\text{Given } A = \begin{bmatrix} -2 & 6 \\ -2 & 3 \end{bmatrix}, |A| = \begin{vmatrix} -2 & 6 \\ -2 & 3 \end{vmatrix} = -6 - (-12)$$

$$|A| = -6 + 12 = 6$$

$$\text{W.K.T. } A^{-1} = \frac{1}{|A|} \cdot \text{adj } A$$

$$\therefore \text{Adjoint of } A = \begin{bmatrix} 3 & -6 \\ 2 & -2 \end{bmatrix} \text{ and}$$

$$\therefore A^{-1} = \frac{1}{6} \begin{bmatrix} 3 & -6 \\ 2 & -2 \end{bmatrix}$$

4. If  $x + y = 3$  and  $2x + 3y = 8$  are the linear equations, then  $x$  and  $y$  are \_\_\_\_\_.

- a)  $(1, -2)$    b)  $(1, 2)$    c)  $(-1, -2)$    d)  $(-1, 2)$

**Ans : (b)**

$$x + y = 3 \rightarrow \text{(i)} \text{ and } 2x + 3y = 8 \rightarrow \text{(ii)}$$

$$x + y = 3 \rightarrow \times 2$$

$$\cancel{2x} + 2y = 6$$

$$\cancel{2x} + 3y = 8$$

$$-y = -2$$

$$y = 2$$

Put  $y = 2$  in equation (i)

$$x + y = 3$$

$$x + 2 = 3$$

$$x = 3 - 2$$

$$x = 1$$

5. If the straight line is  $2y = 3x + 4$ , then the y-intercept is \_\_\_\_\_.

- a) 4   b) 2   c)  $-\frac{4}{3}$    d) -2

**Ans : (b)**

$$\text{Given } 2y = 3x + 4$$

$$0 = 3x - 2y + 4$$

$$3x - 2y + 4 = 0$$

$$y\text{-intercept} = \frac{-c}{b} = \frac{-4}{-2} = 2$$

6. The acute angle of inclination made by the line  $3x - 3y - 2 = 0$  with positive x-axis is \_\_\_\_\_.

- a)  $135^\circ$    b)  $30^\circ$    c)  $45^\circ$    d)  $0^\circ$

**Ans : (c)**

$$\text{Given } 3x - 3y - 2 = 0$$

$$\text{Slope, } m = \frac{-a}{b} = \frac{-3}{-3} = 1$$

$$\text{w.k.t } m = \tan 45^\circ = 1 \quad \therefore \text{inclination } \theta = 45^\circ$$

7. The slope of a straight line passing through the points  $(1, 2)$  and  $(5, -3)$  is \_\_\_\_\_.

- a)  $\frac{5}{4}$    b)  $\frac{1}{6}$    c)  $-\frac{1}{4}$    d)  $-\frac{5}{4}$

**Ans : (d)**

$$\text{Given } (x_1, y_1) = (1, 2) \text{ and } (x_2, y_2) = (5, -3)$$

$$\text{Slope } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 2}{5 - 1} = \frac{-5}{4}$$

8. If the slope of the straight line is  $-\frac{3}{2}$  and

y-intercept is  $\frac{5}{2}$ , then the equation of the straight line is \_\_\_\_\_.

- a)  $3x + 2y - 5 = 0$    b)  $3x - 2y - 5 = 0$   
c)  $3x + 2y + 5 = 0$    d)  $3x - 2y + 5 = 0$

**Ans : (a)**

$$\text{Given, slope, } m = -\frac{3}{2} \text{ and } y\text{-intercept, } c = \frac{5}{2}$$

(Slope - intercept form)

$$y = mx + c$$

$$y = -\frac{3}{2}x + \frac{5}{2}$$

$$y = \frac{-3x + 5}{2}$$

$$2y = -3x + 5$$

$$3x + 2y - 5 = 0$$

9. The line perpendicular to the straight line  $5x - y + 1 = 0$  and passing through the point  $(2, 3)$  is \_\_\_\_\_.

- a)  $x - 5y - 17 = 0$    b)  $x + 5y - 13 = 0$   
c)  $x + 5y - 17 = 0$    d)  $x + 5y + 13 = 0$

**Ans : (c)**

$$\text{Given line } 5x - y + 1 = 0 \text{ and point } (2, 3) = (x_1, y_1)$$

$$\text{Slope of perpendicular line} = \frac{b}{a} = \frac{-1}{5}$$

(slope - point form)

$$y - y_1 = m(x - x_1)$$

$$(y-3) = \frac{-1}{5}(x-2)$$

$$5y-15 = -1x+2$$

$$1x+5y-15-2=0$$

$$x+5y-17=0$$

10. The value of  $\cot 660^\circ$  is \_\_\_\_.

- a)  $\frac{-1}{\sqrt{3}}$    b)  $\sqrt{3}$    c)  $\frac{1}{\sqrt{3}}$    d)  $-\sqrt{3}$

**Ans : (a)**

Given,  $\cot 660^\circ$

$$\cot 660^\circ = \cot (360^\circ + 300^\circ)$$

$$= \cot 300^\circ$$

$$= \cot (270^\circ + 30^\circ)$$

$$= -\tan 30^\circ$$

$$\cot 660^\circ = -\frac{1}{\sqrt{3}}$$

11. The value of  $\cos 75^\circ$  is \_\_\_\_.

- a)  $\frac{\sqrt{3}+1}{2\sqrt{2}}$    b)  $\frac{\sqrt{3}-1}{\sqrt{3}-1}$    c)  $\frac{\sqrt{3}-1}{2\sqrt{2}}$    d)  $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

**Ans : (c)**

$$\cos 75^\circ = \cos (45^\circ + 30^\circ)$$

$$= \cos (A+B)$$

$$= (\cos A \cdot \cos B) - (\sin A \cdot \sin B)$$

$$= (\cos 45^\circ \times \cos 30^\circ) - (\sin 45^\circ \times \sin 30^\circ)$$

$$= \left( \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{2} \right) - \left( \frac{1}{\sqrt{2}} \times \frac{1}{2} \right)$$

$$= \frac{\sqrt{3}}{2\sqrt{2}} - \frac{1}{2\sqrt{2}} = \frac{\sqrt{3}-1}{2\sqrt{2}}$$

12. If a ladder is inclined to the wall with base angle  $30^\circ$ , then the angle in radians is \_\_\_\_

- a)  $\frac{\pi}{3}$    b)  $\frac{\pi}{4}$   
c)  $\frac{\pi}{2}$    d)  $\frac{\pi}{6}$

**Ans : (d)**

Given angle  $\theta = 30^\circ$

$$\begin{aligned} \text{Angle in radian} &= \frac{\pi}{180^\circ} \times \theta = \frac{\pi}{180^\circ} \times 30^\circ \\ &= \frac{\pi}{6} \text{ radian} \end{aligned}$$

13. If  $\sin A = \frac{3}{5}$  and  $\cos B = \frac{12}{13}$ , then  $\cos (A-B)$  is \_\_\_\_.

- a)  $\frac{-33}{65}$    b)  $\frac{63}{65}$    c)  $\frac{-63}{65}$    d)  $\frac{33}{65}$

**Ans : (b)**

$$\text{Given } \sin A = \frac{3}{5} = \frac{\text{opp}}{\text{Hyp}}, \quad \cos B = \frac{12}{13} = \frac{\text{adj}}{\text{hyp}}$$

Triplets

3	4	5
---	---	---

opp  $\uparrow$  Hyp

adj

Triplets

5	12	13
---	----	----

$\uparrow$  Adj Hyp

opp

$$\therefore \cos A = \frac{\text{Adj}}{\text{Hyp}} = \frac{4}{5} \quad \sin B = \frac{\text{Opp}}{\text{Hyp}} = \frac{5}{13}$$

$$\cos(A-B) = (\cos A \cdot \cos B) + (\sin A \cdot \sin B)$$

$$= \left( \frac{4}{5} \times \frac{12}{13} \right) + \left( \frac{3}{5} \times \frac{5}{13} \right)$$

$$= \frac{48}{65} + \frac{15}{65} = \frac{48+15}{65} = \frac{63}{65}$$

14. If  $y = 2 \sin x - 4 \cot x + e^{-x} + 7$ , then  $\frac{dy}{dx}$  is \_\_\_\_.

- a)  $-2 \cos x - 4 \operatorname{cosec}^2 x - e^{-x} + 7x$   
b)  $2 \cos x + 4 \operatorname{cosec}^2 x - e^{-x}$   
c)  $2 \cos x + 4 \operatorname{cosec}^2 x + e^x + 7$   
d)  $2 \sin x - 4 \operatorname{cosec}^2 x + e^x$

**Ans : (b)**

$$\text{If } y = 2 \sin x - 4 \cot x + e^{-x} + 7$$

$$\frac{dy}{dx} = 2 \cos x - 4 (-\operatorname{cosec}^2 x) - e^{-x}$$

$$= 2 \cos x + 4 \operatorname{cosec}^2 x - e^{-x}$$

15. If  $y = \left(x + \frac{1}{x}\right)^2$ ,  $\frac{dy}{dx}$  is:

- a)  $x^2 + \frac{1}{x^2} + 2$       b)  $2x + \frac{1}{x^2}$   
 c)  $2x - \frac{2}{x^3}$       d)  $2x + \frac{1}{x}$

**Ans : (c)**

$$\text{If } y = \left(x + \frac{1}{x}\right)^2$$

$$y = x^2 + \frac{1}{x^2} + \frac{2x}{x}$$

$$y = x^2 + \frac{1}{x^2} + 2$$

$$\frac{dy}{dx} = 2x - \frac{2}{x^3} + 0 = 2x - \frac{2}{x^3}$$

16. If  $y = e^{3x} + e^{7x}$ , then  $\frac{d^2y}{dx^2}$  at  $x = 0$  is \_\_\_\_.

- a) 10      b) 58      c) 1      d) 2

**Ans : (b)**

$$\text{If } y = e^{3x} + e^{7x} \text{ at } x = 0$$

$$\frac{dy}{dx} = 3e^{3x} + 7e^{7x}$$

$$\frac{d^2y}{dx^2} = 3 \cdot 3 e^{3x} + 7 \cdot 7 e^{7(0)}$$

$$= 3 \cdot 3 e^{3(0)} + 7 \cdot 7 e^{3(0)} \quad \text{w.k.t, } e^0 = 1$$

$$= 9(1) + 49(1)$$

$$= 58$$

17. If  $y = \log(\sec x + \tan x)$ , then  $\frac{dy}{dx}$  is \_\_\_\_.

- a)  $\sec x + \tan x$       b)  $\frac{1}{\sec x + \tan x}$   
 c)  $\sec x$       d)  $\sec^2 x$

**Ans : (c)**

$$y = \log(\sec x + \tan x)$$

$$\frac{dy}{dx} = \frac{1}{\sec x + \tan x} \cdot \frac{d}{dx}(\sec x + \tan x)$$

$$= \frac{\sec x \cdot \tan x + \sec^2 x}{\sec x + \tan x}$$

$$= \frac{\sec x(\sec x + \tan x)}{\sec x + \tan x} = \sec x$$

18.  $\int (3x^2 + 2x + 2)^{3/2} (3x + 1) dx$  is \_\_\_\_.

- a)  $\frac{(3x+5)}{5} + C$       b)  $\left(\frac{3x-5}{5}\right) + C$   
 c)  $\left(\frac{3x^2 - 2x - 2}{5}\right)^{5/2}$       d)  $\frac{(3x^2 + 2x + 2)^{5/2}}{5} + C$

**Ans : (d)**

$$\int (3x^2 + 2x + 2)^{3/2} (3x + 1) dx$$

By logic

$$\frac{2}{5} \left( \frac{3x^2 + 2x + 2}{2} \right)^{5/2} + C$$

$$\left( \frac{3x^2 + 2x + 2}{5} \right)^{5/2} + C$$

$$3x^2 + 2x + 2$$

$$\frac{dy}{dx} = 6x + 2 + 0$$

$$\frac{dy}{dx} = 2(3x + 1)$$

19. The integral of  $x^3 + \frac{1}{x} + e^x$  is \_\_\_\_

- a)  $\frac{x^4}{4} + \log x - e^x + C$   
 b)  $\frac{x^4}{4} + \log x + e^x + C$   
 c)  $3x^2 - \frac{1}{x^2} + e^x + C$   
 d)  $3x^2 - \frac{1}{x^2} - e^x + C$

**Ans : (b)**

$$\int x^3 + \frac{1}{x} + e^x \, dx$$

$$= \frac{x^4}{4} + \log x + e^x + C$$

20.  $\int x \sin x \, dx = \underline{\hspace{2cm}}$ .

- a)  $x \cos x - \sin x + C$     b)  $-x \cos x + \sin x + C$   
 c)  $x \cos x + \sin x + C$     d)  $-x \cos x - \sin x + C$

**Ans : (b)**

$$\int x \sin x \, dx$$

$$= +[x] [-\cos] - [1] [-\sin x] + \underbrace{[0] [ ]}_0$$

$$= -x \cos x + \sin x + c$$

21. Which of the following are not obstacles in project management?

- a) Project complexities  
 b) Project risks  
 c) Changes in technology  
 d) Early identification of problems

**Ans : (d)**

Early identification of problems is the benefit of project management and it is not an obstacle.

22. \_\_\_\_\_ provides guidance as well as direction to the project and he/she is *not* a part of the project team.

- a) CEO                      b) Project Manager  
 c) Team Leader        d) Project Consultant

**Ans : (d)**

Project consultant guides the project but not a part of the project team.

23. Repair of dam in case of damage due to natural calamities is an example of \_\_\_\_\_.

- a) Normal project    b) Crash project  
 c) Risky project      d) Disaster project

**Ans : (d)**

Project performed due to effect of natural calamities is known as disaster project.

24. \_\_\_\_\_ refers to a detailed description of the expected outcome of a project.

- a) Project scope    b) Project operation  
 c) Project objective    d) Project process

**Ans : (c)**

Project objective illustrate the tasks you execute to achieve the result.

25. The process of dividing the project into number of tasks in order to carry out the effective project administration is:

- a) PPM    b) WBS    c) PEP    d) Project diary

**Ans : (b)**

Work Breakdown Structure (WBS) is the process of dividing the project work into number of tasks.

26. The project \_\_\_\_\_ relieves a project team from most regular work such as planning, tracking and reporting responsibility.

- a) Manager                      b) CEO  
 c) Administration        d) Leader

**Ans : (c)**

Project administration relieves a project team.

27. The use of authority to channelize the activities of the project on desired lines is referred to as \_\_\_\_\_.

- a) Project direction        b) Project coordination  
 c) Project communication  
 d) Project execution

**Ans : (a)**

Project direction channelize the activities of the project on desired lines.

28. \_\_\_\_\_ illustrates total project work into divisions of major work packages.

- a) PERT    b) CPM    c) WBS    d) PEP

**Ans : (c)**

WBS divides the work into major packages

29. \_\_\_\_\_ is a condition wherein a construction or manufacturing project does not complete well within its prescribed time schedule.

- a) Time analysis      b) Time estimate  
c) Time overrun      d) Cost overrun

**Ans : (c)**

Overrun of a time is a condition where project cannot be completed within its prescribed time schedule.

30. A project \_\_\_\_\_ creates damages or adverse effects to either project activities or project deliverables.

- a) Failure   b) Undertaken   c) Risk   d) Analysis

**Ans : (c)**

Damages or uncertainties affects the project is known as risk.

31. Identify the correct risk analysis which has typically one variable changed at a time

- a) Sensitivity Analysis      b) Scenario Analysis  
c) Best and Worst Case Analysis  
d) Simulation Analysis

**Ans : (a)**

Sensitivity Analysis is a type of risk analysis which is done by changing one variable at a time.

32. Risk usually \_\_\_\_\_ as the project progresses.

- a) Increases      b) Reduces  
c) Remains same      d) Becomes negligible

**Ans : (b)**

As project progress towards goal risk usually reduces.

33. In 'SMART', the letter R stands for \_\_\_\_\_.

- a) Realistic   b) Reliable   c) Reasonable   d) Relation

**Ans : (a)**

The full form of SMART.

S - Specific

M - Measurable

A - Achievable

R - Realistic

T - Timely

34. \_\_\_\_\_ is a step-by-step process of collecting, recording and organising information about project results.

- a) Project planning      b) Project evaluation  
c) Project scheduling      d) Project monitoring

**Ans : (b)**

Project evaluation is a process where information are collected recorded and organised to check about project results.

35. Which one of the following is *not* a policy of a project?

- a) Extent of work given to outside contractors  
b) Number of contractors to be employed  
c) Monitoring the progress of project  
d) Terms of contract

**Ans : (c)**

Monitoring the progress of project is the phase of project life cycle, not a policy,

36. The scheduling, 'EST' stands for:

- a) Easiest Start Time      b) Earliest Start Time  
c) Earliest Schedule Time  
d) Earliest Schedule Technique

**Ans : (b)**

EST - Earliest Start Time

37. \_\_\_\_\_ is an expert in measuring, confirming, investigating and reporting status of a project.

- a) Project Guide      b) Project Reviewer  
c) Project Auditor      d) Project Advisor

**Ans : (c)**

Project Auditor is the one who reports the status of a project.

38. \_\_\_\_\_ is the time estimate if there are no hurdles in an activity.

- a) Pessimistic time      b) Optimistic time  
c) Most likely time      d) Expected estimated time

**Ans : (b)**

Optimistic time is where project time is scheduled based on quickest completion of time without any risk.

39. \_\_\_\_\_ is the last phase of the project life cycle which reports overall achievements of a project in terms of defined performance measures.

- a) Project closure    b) Project initiation  
c) Project execution    d) Project planning

**Ans : (a)**

Project closure is the final phase of the project life cycle.

40. The objective of network analysis in a project is to \_\_\_\_\_.

- a) Minimise total project duration  
b) Minimise total project cost  
c) Minimise production delays  
d) Minimise manpower requirements

**Ans : (a)**

Minimize total project duration is the objective of network analysis.

41. What is the output of the following?

`a = 10`

`if (a > 1) then`

`print "TWENTY"`

`else`

`print "TEN"`

- a) 10    b) TEN    c) TWENTY    d) No Output

**Ans : (c)**

Assignment: `a = 10`

This line assigns the value 10 to the variable a

Conditional statement: `if (a > 1) then`

This line starts a conditional statement. The condition being checked is whether the value of a is greater than 1. In this case, it is (since 10 is greater than 1).

Print statement: `print "TWENTY"` If the condition is true, this line would print the word "TWENTY"

Else statement : `else` This line indicates the start of the else block of the conditional statement.

Print statement : `print "TEN"` This line would print the word "TEN" if the condition in the if statement is not true.

Since the value of a is 10, which is greater than 1, the condition in the if statement is true.

42. The symbol used to connect two parts of a big flowchart is \_\_\_\_\_

- a) Oval    b) Rectangle    c) Diamond    d) Circle

**Ans : (d)**

In flowcharts, circles are used as connector symbols to show the continuation of the flow across multiple pages or through a complex chart.

43. Which symbol is used to represent start or stop in a flowchart?

- a) Rectangle    b) Diamond    c) Oval    d) Circle

**Ans : (c)**

In standard flowcharting practices, the oval symbol is used to represent the start and end points of a process

44. What does CSS stand for?

- a) Colourful Style Sheet    b) Cascading Style Sheet  
c) Creative Style Sheet    d) Computer Style Sheet

**Ans : (b)**

The fullform of CSS is cascading style sheet

45. Which of the following is *not* a web browser?

- a) Google Chrome    b) Netscape Navigator  
c) Safari    d) Apache

**Ans : (d)**

Google Chrome: Google Chrome is a popular web browser developed by Google

Netscape Navigator: Netscape Navigator was one of the first popular web browsers

Safari: Safari is a web browser developed by Apple.

Apache: Apache is a web server software, not a web browser.

46. What is the correct syntax to change the background colour with CSS?

- a) `background – color = "purple";`  
b) `background – color : purple;`  
c) `background – color = orange`  
d) `change-background-color : purple`

**Ans : (b)**

background-color is a property in CSS that specifies the background color of an element.

**The colon :** separates the property name from the value.

purple is the value assigned to the property, which in this case sets the background color to purple.

**47. Which HTML tag gives a scrolling effect of a given text?**

- a) <div> b) <scroll> c) <marquee> d) <effect>

**Ans : (c)**

The <marquee> tag is an HTML tag that is used to create scrolling text

**48. ERP package will handle \_\_\_\_\_ business functionality / functionalities.**

- a) One b) Two c) Three d) Multiple

**Ans : (d)**

ERP integrates all the functional unit.

**49. Which one is a type of organizational structure?**

- a) Responsibility structure b) Behavioural structure  
c) Functional structure d) Relational structure

**Ans : (c)**

Functional structure is a type of organisational structure where it works on the basis of functional units.

**50. The \_\_\_\_\_ describes how an actor uses a system to accomplish a particular goal for describing the activities.**

- a) Process case b) Work case  
c) Use case d) Sub process

**Ans : (c)**

Use case describes how an employee uses a system.

**51. Which of the following is not a characteristic of First-generation ERP system?**

- a) They were based on mainframe computer  
b) They focused on accounting and finance  
c) They used centralized database  
d) They supported real-time data processing

**Ans : (d)**

First generation ERP stand alone applications designed to automate specific functions such as inventory management, accounting and order processing.

**52. Which cloud service model enables users to develop, run, manage application without worrying about underlying infrastructure?**

- a) IAAS b) PAAS c) SAAS d) NAAS

**Ans : (b)**

Platform as a Service (PaaS): PaaS provides a platform for developing, deploying, and managing applications. Users don't have to worry about managing the underlying infrastructure.

**53. Which of the following is *not* a Google application?**

- a) Google Docs b) Google slides  
c) Google Sheets d) Google Word

**Ans : (d)**

Google Word is not a Google application. The correct name for Google's word processing application is Google Docs

**54. IoT is a \_\_\_\_\_.**

- a) Network of sensors  
b) Network of objects in a ring structure  
c) Network of virtual objects  
d) Network of physical objects embedded with sensors.

**Ans : (d)**

IoT refers to the network of physical objects or "things" that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

**55. \_\_\_\_\_ is a file storage and synchronization service developed by Google which provides complete office tools with cloud storage.**

- a) Google Colab b) Google Drive  
c) Google Meet d) AWS Cloud

**Ans : (b)**

Google Drive is a file storage and synchronization service developed by Google that provides cloud storage, file sharing, and collaborative editing. It integrates with Google's office suite of tools, such as Google Docs, Google Sheets, and Google Slides

**56. Which of the following is not a security issue in a personal computer?**

- a) Ransomware Attack      b) Data Breach  
c) Code Injection              d) IoT

**Ans : (d)**

The Internet of Things (IoT) is a network of physical objects that are embedded with sensors, software, and other technologies to connect and exchange data with other devices and systems over the internet.

**57. Which of the following is not a firewall?**

- a) Packet filtering      b) Stateful inspection  
c) Panda                  d) Circuit Level Gateway

**Ans : (c)**

Panda is not a type of firewall; it is a brand name associated with cybersecurity products, including antivirus software. The other options—packet filtering, stateful inspection, and circuit-level gateway—are all types of firewalls.

**58. "S" in HTTPS stands for \_\_\_\_.**

- a) Safe    b) Secure    c) System    d) Server

**Ans : (b)**

In HTTPS, the "S" stands for Secure. HTTPS is a protocol for secure communication over a computer network.

**59. The process used to get an output 43205 from a given input "DCTE" is \_\_\_\_.**

- a) Hashing                  b) Compression  
c) Decompression        d) Encryption

**Ans : (a)**

Hashing is a process that converts an input of any size into a fixed-length alphanumeric string. In this case, "DCTE" would be converted into a string of numbers and letters, potentially resulting in something like "43205"..

**60.  $a = 10$**

**$b = 20$**

**$a = a + b$**

**$b = a - b$**

**$a = a - b$**

**The final values of a and b are:**

- a)  $a = 30, b = 10$       b)  $a = 30, b = 20$   
c)  $a = 20, b = 10$       d)  $a = 20, b = 30$

**Ans : (c)**

- $a = 10$ : This assigns the value 10 to variable  $a$ .
  - $b = 20$ : This assigns the value 20 to variable  $b$ .
  - $a = a + b$ : This adds the current value of  $b$  (which is 20) to the current value of  $a$  (which is 10) and stores the result back into  $a$ . So now,  $a$  becomes 30 ( $10 + 20$ ).
  - $b = a - b$ : This subtracts the current value of  $b$  (which is still 20) from the current value of  $a$  (which is now 30) and stores the result back into  $b$ . So now,  $b$  becomes 10 ( $30 - 20$ ).
  - $a = a - b$ : This subtracts the current value of  $b$  (which is 10) from the current value of  $a$  (which is still 30) and stores the result back into  $a$ . So now,  $a$  becomes 20 ( $30 - 10$ ).
- Therefore, after all the calculations,  $a$  will be 20 and  $b$  will be 10.

**61. Which one of the following is not essential for good questionnaires?**

- a) Logically arranged  
b) Avoiding personal questions  
c) Limiting number of questions  
d) Unlimited number of questions

**Ans : (d)**

Unlimited number of questions is not essential for good questionnaire.

**62. Both categorical and numerical data variables can be used for \_\_\_\_.**

- a) Continuous variable  
b) Class intervals  
c) Distribution of frequency  
d) Frequency distribution table

**Ans : (d)**

It is used for both categorical and numerical data variable.

**63. Match the following:**

- a) Mean                      i. =  $Q_3 - Q_1$   
 b) Absolute value        ii. = AVERAGE (array)  
 c) IQR                        iii. = ABS (cell)
- a) a - i   b - ii   c - iii  
 b) a - ii   b - iii   c - i  
 c) a - iii   b - i   c - ii  
 d) a - i   b - iii   c - ii

**Ans : (b)**

Mean formula in Excel = AVERAGE (Array)  
 Absolute value formula in excel = ABS (Cell)  
 IQR formula =  $Q_3 - Q_1$

**64. \_\_\_\_\_ type of chart is used to show the relationship between numerical and categorical variable**

- a) Plot    b) Pie    c) Bar    d) Line

**Ans : (c)**

Bar chart is used to show the relationship between numerical and categorical variable.

**65. Who developed Python language?**

- a) Zim Den                      b) Guido van Rossum  
 c) Niene Stom                d) Wick van Rossum

**Ans : (b)**

Python was created by Guido van Rossum

**66. Which one of the following is *not* the benefit of data cleaning?**

- a) Removal of errors when multiple sources of data are at play  
 b) Boosts results and revenue  
 c) Helps with faster decision-making and more efficient business practices  
 d) Consumes more time

**Ans : (d)**

Consuming more time is not the benefit of data cleaning.

**67. Is Python code complied or interpreted?**

- a) Python code is both complied and interpreted  
 b) Python code is neither complied nor interpreted  
 c) Python code is only complied  
 d) Python code is only interpreted

**Ans : (a)**

Python code is first compiled into bytecode, which is an intermediate form that is not human-readable. This bytecode is then interpreted by the Python virtual machine (PVM) to execute the program.

**68. Which one of the following is *not* a type of interview?**

- a) Unstructured              b) Semi-structured  
 c) Audio recorder          d) Structured

**Ans : (c)**

Audio recorder is not a type of interview.

**69. The time, in seconds, taken by 180 athletes to run a 110 m hurdle race are tabulated below:**

Class	Frequency
13.8 to 14	2
14 to 14.2	4
14.2 to 14.4	15
14.4 to 14.6	74
14.6 to 14.8	36
14.8 to 15	49

**The number of athletes who completed the race in less than 14.6 seconds is:**

- a) 19    b) 95    c) 131    d) 180

**Ans : (b)**

The number of athletes who completed the race in less than 14.6 seconds is  $2 + 4 + 15 + 74 = 95$

**70. The higher value of the range represents \_\_\_\_.**

- a) greater spread of the Data  
 b) lesser spread of the Data  
 c) equal to range of the Data  
 d) average of the Data

**Ans : (a)**

If range of the data is more then spread of data is also more.

**71. The middle number in a given data set is called:**

- a) Mean b) Mode c) Frequency d) Median

**Ans : (d)**

Median is the middle most value in arrange data.

**72. \_\_\_\_\_ is the example of qualitative Data.**

- a) Temperature b) Ability of students  
c) Prices d) Area

**Ans : (b)**

The data which cannot be numerically measurable is called qualitative data.

Ability of students are not numerically measurable.  
∴ It is a qualitative data

**73. Direct personal observation is a method of collection of:**

- a) Secondary Data b) Primary Data  
c) Mixed Data d) Unpublished Data

**Ans : (b)**

Direct personal observation is one type or method of collection of primary data.

**74. The in-built function to find the mean of a given data in Excel is:**

- a) =AVERAGE() b) =MEAN()  
c) =MEDIAN() d) =MODE()

**Ans : (a)**

Excel formula for mean is = Average()

**75. The formula for Relative Frequency is:**

- a) Frequency  $\times$  No. of observations  
b)  $\frac{\text{No. of observations}}{\text{Frequency}}$   
c)  $\frac{\text{Frequency}}{\text{No. of observations}}$   
d) No. of observations + Frequency

**Ans : (c)**

Relative frequency formula is  $R.f = f/n$

**76. In Python, "str" is a:**

- a) Numeric type b) Binary type  
c) Text type d) Sequence type

**Ans : (c)**

- Numeric type refers to data that represents numbers, such as integers or floating-point numbers.
- Binary type stores data in binary format (0s and 1s).
- Text type (or string type) is used for textual data, like words or sentences.
- Sequence type refers to an ordered collection of items, such as lists or tuples.

**77. The results of Python program get displayed in \_\_\_\_\_.**

- a) IDLE 3.1.9 Window  
b) IELD shell 3.9.1 Window  
c) IDLE shell 3.9.1 Window  
d) ILDE shell 3.1.9 Window

**Ans : (c)**

IDLE (Integrated Development and Learning Environment) is an integrated development environment for Python.

**78. The process of Data cleaning is \_\_\_\_\_.**

- a) Removing virus b) Deduplication  
c) Survey d) Google form

**Ans : (b)**

The process of data cleaning is removing duplicate data. ∴ It is called deduplication.

**79. Data collected for the first time is called:**

- a) Published Data b) Mixed Data  
c) Primary Data d) Secondary Data

**Ans : (c)**

The data collected for the first time directly from field by investigator is called primary data.

**80. The Excel formula for standard deviation of a sample is:**

- a) STDEV.P b) SDTEV.S  
c) STDEV.S d) SDTEV.P

**Ans : (c)**

Excel formula for calculating standard deviation of a sample = STDEV.S

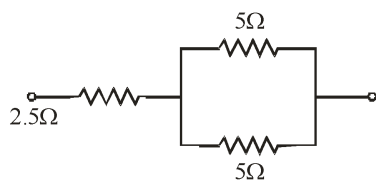
81. CPR stands for \_\_\_\_\_

- a) Cardio Permanent Respiration
- b) Cardio Pulmonary Respiration
- c) Cardio Pulmonary Resuscitation
- d) Cardio Pulmonary Retrieval

**Ans : (c)**

Explanation : CPR stands for Cardio Pulmonary Resuscitation.

82. The effective resistance of the circuit below is:



- a) 0.5 Ω
- b) 5Ω
- c) 2.5Ω
- d) 7.5Ω

**Ans : (b)**

Explanation : From the given fig  
Two 5Ω Resistors are connected in parallel

$$R_T = \frac{R_1 \times R_2}{R_1 + R_2} = \frac{5 \times 5}{5 + 5} = \frac{25}{10} = 2.5\Omega$$

This parallel combination is connected in series with 2.5Ω Resistor.

$$\begin{aligned} R_T &= R_1 + R_2 \\ &= 2.5 + 2.5 \\ R_T &= 5\Omega \end{aligned}$$

83. The relationship between Voltage (V), Current (I) and Resistance (R) is:

- a)  $I = VR$
- b)  $R = VI$
- c)  $V = IR$
- d)  $V = I^2R$

**Ans : (c)**

Explanation : According to ohm's law statement,

$$V = I \cdot R$$

The ohm's law  $V = IR$  describes, the relation between voltages (V), Current (I) and Resistance (R).

84. ELCB stands for:

- a) Earth Line Circuit Breaker
- b) Electric Load Circuit Breaker
- c) Earth Leakage Circuit Breaker
- d) Electric Line Circuit Breaker

**Ans : (c)**

Explanation : ELCB stands for Earth leakage circuit breaker.

85. Good fuse wire must have:

- a) Low melting point
- b) High melting point
- c) High resistivity
- d) High melting point and high resistivity

**Ans : (a)**

Explanation : A good fuse wire must have low melting point.

86. A 10 HP submersible pump set is used in a borewell for irrigation purpose. It normally uses \_\_\_\_\_ type of motor.

- a) Single-phase induction motor
- b) Three-phase induction motor
- c) DC motor
- d) FHP motor

**Ans : (b)**

Explanation : A Three phase Induction motor is used in a borewell for irrigation purpose with a 10 HP submerise pump set.

87. SMF in batteries stands for:

- a) Sealed Moulded - Free
- b) Semiconductor Maintenance - Free
- c) Sealed Maintenance - Free
- d) Solar Maintenance - Free

**Ans : (c)**

Explanation : SMF batteries stands for Sealed Maintenance Free batteries.

88. The typical use of LVDT is to sense \_\_\_\_\_.

- a) Light intensity
- b) Humidity
- c) Pressure
- d) Temperature

**Ans : (c)**

Explanation : LVDT sensor is used to sense Displacement, Force and Pressure.

**89. A p-n junction diode is a \_\_\_\_\_**

- a) Bidirectional switch
- b) Unidirectional switch
- c) Bidirectional Controlled Switch
- d) Unidirectional Controlled Switch

**Ans : (b)**

Explanation : A P-N junction diode is a unidirectional switch. It allows the flow of current in only one direction i.e., From Anode to Cathode terminal.

**90. The purpose of C Filter in a power supply is to \_\_\_\_\_**

- a) Degrade regulation
- b) Reduce ripple
- c) Reduce gain
- d) Reduce the change of an electric shock

**Ans : (b)**

Explanation : The purpose of C Filter in a power supply is used to decrease unwanted ripple voltage. In a rectifier the C filter is connected in parallel with the load.

**91. Lead acid cell is an example of \_\_\_\_\_**

- a) Secondary cell      b) Solar cell
- c) Primary cell        d) Fuel cell

**Ans : (a)**

Explanation : A secondary cell is a cell that is designed to be recharged with electricity and reused many times.

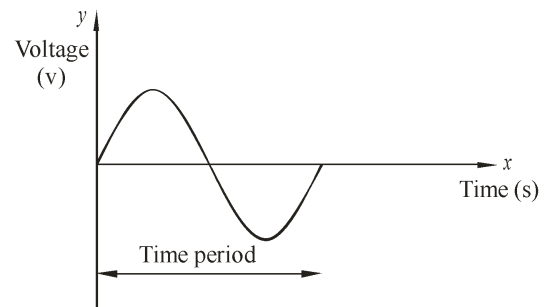
Ex : Lead-Acid, Nickel Cadmium, Lithium ion.

**92. Time taken by the alternating quantity to complete one cycle is called \_\_\_\_\_**

- a) Frequency            b) Time period
- c) Amplitude           d) Wavelength

**Ans : (b)**

Explanation : The time taken by an alternating quantity to complete one cycle is called Time period.



**93. What does "PLC" stand for in the context of Industrial Automation?**

- a) Programmable Logic Circuit
- b) Process Logic Controller
- c) Programmable Logic Controller
- d) Processor Logic Controller

**Ans : (c)**

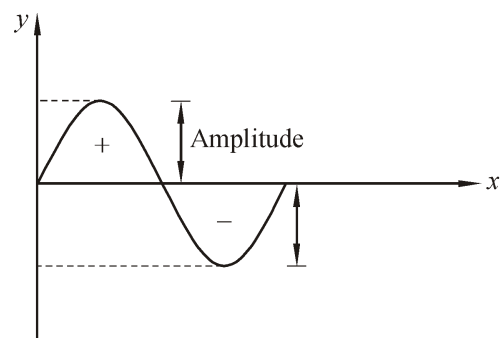
Explanation : PLC stands for Programmable Logic Controller which is used for Industrial Automation.

**94. Maximum value attained by the alternating quantity either in positive half-cycle or negative half-cycle is called \_\_\_\_\_.**

- a) Frequency            b) Altitude
- c) Amplitude           d) Wavelength

**Ans : (c)**

Explanation : Amplitude is the maximum value attained by the Alternating quantity either in positive (or) Negative Half cycle of the waveform



**95. Which of the following statement is correct?**

- a) In series circuit the current through each resistor is different.
- b) In parallel circuit the voltage across each resistor is same.
- c) In parallel circuit the equivalent resistance is sum of individual resistances
- d) In series circuit the reciprocal of equivalent resistance is sum of reciprocal of individual resistances.

**Ans : (b)**

Explanation : The voltage value should be same (or) equal (or) remains constant in the parallel circuit.

**96. The cell which cannot be recharged and reused is \_\_\_\_\_.**

- a) Secondary cell      b) Battery
- c) Primary cell      d) Simple cell

**Ans : (c)**

A primary cell is a cell that is designed to be used once and discarded and not recharged with electricity and can not reused like a secondary cell.

**97. Specific gravity of a fully charged lead acid battery will be in the range of \_\_\_\_\_**

- a) 1000 to 1210      b) 1100 to 1310
- c) 1150 to 1310      d) 1230 to 1300

**Ans : (d)**

Explanation : Specific gravity of a fully charged lead acid battery will be in the range of 1230 to 1280.

**98. The best sensor for sensing vibration is \_\_\_\_\_**

- a) Thermistor      b) Thermocouple
- c) Piezoelectric crystal
- d) Hygrometer

**Ans : (c)**

The piezo electric crystal sensor is used for sensing vibration of an object.

**99. During charging of batteries**

- a) Chemical energy is converted to Mechanical energy
- b) Mechanical energy is converted to Chemical energy
- c) Electrical energy is converted to Chemical energy
- d) Chemical energy is converted to Electrical energy.

**Ans : (c)**

Explanation : During charging of a batteries, Electrical energy is converted to chemical energy.

**100. When an electric stove is connected across 230 volts, 50 Hz AC supply for the duration of one hour and takes a current of 10 amperes, the energy consumed is:**

- a) 230 units
- b) 2.3 units
- c) 23 units
- d) 0.23 units

**Ans : (b)**

Explanation :

$$V = 230V$$

$$I = 10A$$

$$t = 1 \text{ hr}$$

$$\text{Energy} = V \times I \times t$$

$$= 230 \times 10 \times 1$$

$$= \frac{2300}{1000} [\because \text{In terms of units Energy} \div 1000]$$

$$\text{Energy} = 2.3 \text{ units}$$



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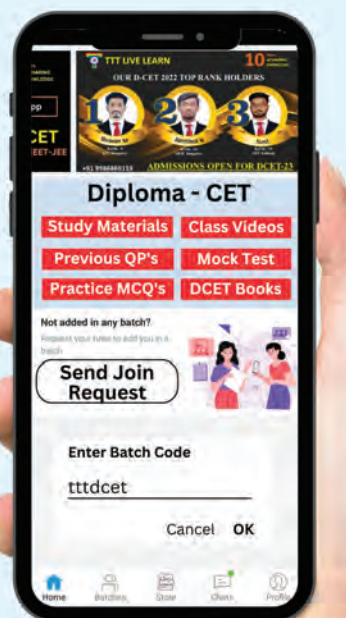
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# DCET 2025 - Question Paper & Solutions

1. Choose the correct answer from the following:

- a) Every identity matrix is a scalar matrix
- b) Every scalar matrix is an identity matrix
- c) Every diagonal matrix is an identity matrix
- d) A square matrix whose each element is one is an identity matrix.

**Ans : (a)**

An identity matrix has 1's on the primary diagonal and all the other elements are zero.

A scalar matrix is a diagonal matrix where all diagonal elements are equal (not necessarily 1). So, an identity matrix is a scalar matrix where the scalar is 1.

2. The value of  $\begin{vmatrix} 3 & 1 & -9 \\ -1 & 2 & 3 \\ 2 & 1 & -6 \end{vmatrix}$  is

- a) 45
- b) 90
- c) 0
- d) -45

**Ans : (c)**

$$\begin{vmatrix} 3 & 1 & -9 \\ -1 & 2 & 3 \\ 2 & 1 & -6 \end{vmatrix} = 3 \begin{vmatrix} 2 & 3 \\ 1 & -6 \end{vmatrix} - 1 \begin{vmatrix} -1 & 3 \\ 2 & -6 \end{vmatrix} + (-9) \begin{vmatrix} -1 & 2 \\ 2 & 1 \end{vmatrix}$$

$$= 3(-12 - 3) - 1(6 - 6) - 9(-1 - 4)$$

$$= 3(-15) - 1(0) - 9(-5)$$

$$= -45 - 0 + 45 = 0$$

3. The characteristic equation of  $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$  is

- a)  $\lambda^2 - 3\lambda - 2 = 0$
- b)  $\lambda^2 - 5\lambda + 10 = 0$
- c)  $\lambda^2 - 5\lambda - 2 = 0$
- d)  $\lambda^2 + 3\lambda + 10 = 0$

**Ans : (b)**

$$|A - \lambda I| = 0$$

$$\begin{vmatrix} (1-\lambda) & -2 \\ 3 & (4-\lambda) \end{vmatrix} = 0$$

$$(1-\lambda)(4-\lambda) - [(3)(-2)] = 0$$

$$4 - \lambda - 4\lambda + \lambda^2 + 6 = 0$$

$$\lambda^2 - 5\lambda + 10 = 0$$

4. If  $|A| I = \begin{bmatrix} -3 & 0 \\ 0 & -3 \end{bmatrix}$ , then  $A \cdot \text{adj } A$  is equal to \_\_\_

- a)  $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$
- b)  $\begin{bmatrix} 9 & 0 \\ 0 & 9 \end{bmatrix}$
- c)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
- d)  $\begin{bmatrix} -3 & 0 \\ 0 & -3 \end{bmatrix}$

**Ans : (d)**

- For any square matrix  $A$ , the identity matrix  $I$ :  
 $A \cdot \text{adj}(A) = |A| I$  is always true.

$$\therefore |A| I = \begin{bmatrix} -3 & 0 \\ 0 & -3 \end{bmatrix}$$

$$\text{Here } A \cdot \text{adj}(A) = |A| I = \begin{bmatrix} -3 & 0 \\ 0 & -3 \end{bmatrix}$$

5. The slope of the straight line joining two points  $(3, -4)$  and  $(-1, 5)$  is

- a)  $4/9$
- b)  $-4/9$
- c)  $-1/4$
- d)  $-9/4$

**Ans : (d)**

- Slope of straight line,  $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$(3, -4) = (x_1, y_1)$$

$$(-1, 5) = (x_2, y_2)$$

$$m = \frac{5 - (-4)}{-1 - 3} = \frac{5 + 4}{-4} = \frac{9}{-4} = \frac{-9}{4}$$

6. The angle of inclination of the straight line is  $\pi/4$  and y-intercept is 3, then equation of the straight line is

- a)  $y = x + 3$       b)  $y = x - 3$   
c)  $y = -x - 3$       d)  $y = -x + 3$

**Ans : (a)**

- Inclination,  $\theta = \frac{\pi}{4}$  rad      |  $\pi = 180^\circ$

$$\theta = 45^\circ$$

$$y\text{-intercept}, c = 3$$

$$\text{slope}, m = \tan \theta$$

$$m = \tan 45^\circ = 1$$

**slope – intercept form**

$$y = mx + c$$

$$y = 1x + 3$$

$$y = x + 3$$

7. The equation of straight line passing through  $(-5, 4)$  and parallel to X-axis is \_\_\_\_\_

- a)  $x - y + 9 = 0$       b)  $x + 5 = 0$   
c)  $x + y + 1 = 0$       d)  $y - 4 = 0$

**Ans : (d)**

- The slope of a line parallel to x-axis is zero.  
 $\therefore m = 0$  and line passing through the point  $(x_1, y_1) = (-5, 4)$   
Slope - point form  
 $(y - y_1) = m(x - x_1)$   
 $y - 4 = 0(x - (-5))$   
 $y - 4 = 0$

8. What is the equation of the straight line passing through the points  $(1, 5)$  and  $(3, 2)$ ?

- a)  $7x - 4y + 13 = 0$       b)  $3x + 2y - 17 = 0$   
c)  $3x + 2y - 13 = 0$       d)  $3x + 2y + 13 = 0$

**Ans : (c)**

- Two points given  
 $(1, 5) = (x_1, y_1)$  and  $(3, 2) = (x_2, y_2)$   
  
Slope,  $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 5}{3 - 1} = \frac{-3}{2}$

$$\therefore \text{slope}, m = \frac{-3}{2} \text{ and point } (1, 5)$$

$$(y - y_1) = m(x - x_1)$$

$$(y - 5) = \frac{-3}{2}(x - 1)$$

$$2(y - 5) = -3(x - 1)$$

$$3x + 2y - 13 = 0$$

9. The ramp in front of a gate is elevated by an angle of  $\pi/3$  radians, then the angle in degrees is \_\_\_\_\_

- a)  $15^\circ$       b)  $75^\circ$   
c)  $60^\circ$       d)  $30^\circ$

**Ans : (c)**

- The angle of elevation is  $\frac{\pi}{3}$  radians

$$\text{Degrees} = \text{Radians} \times \frac{180}{\pi}$$

$$= \frac{\pi}{3} \times \frac{180}{\pi}$$

$$= 60^\circ$$

10. If  $\sin(90 - \theta) + \cos \theta = \sqrt{2} \cos(90 - \theta)$ , then the value of  $\operatorname{cosec} \theta$  is \_\_\_\_\_.

- a)  $\frac{\sqrt{3}}{2}$       b)  $\sqrt{\frac{3}{2}}$   
c)  $\sqrt{\frac{2}{3}}$       d)  $\sqrt{3}$

**Ans : (b)**

- $\sin(90 - \theta) + \cos \theta = \sqrt{2} \cos(90 - \theta)$

$$\cos \theta + \cos \theta = \sqrt{2} \sin \theta \quad \left| \begin{array}{l} \sin(90^\circ - \theta) = \cos \theta \\ \cos(90^\circ - \theta) = \sin \theta \end{array} \right.$$

$$2\cos \theta = \sqrt{2} \sin \theta$$

$$\frac{2}{\sqrt{2}} = \frac{\sin \theta}{\cos \theta}$$

$$\frac{2}{\sqrt{2}} = \tan\theta$$

$$\therefore \tan\theta = \frac{2}{\sqrt{2}} = \frac{\sqrt{2} \times \sqrt{2}}{\sqrt{2}} = \sqrt{2}$$

W.K.T.

$$\tan\theta = \frac{\text{Opp}}{\text{Adj}} = \frac{\sqrt{2}}{1}$$

$$\text{Hyp}^2 = \text{Opp}^2 + \text{Adj}^2 \quad \left| \quad \therefore \csc\theta = \frac{\text{Hyp}}{\text{Opp}} \right.$$

$$\text{Hyp}^2 = (\sqrt{2})^2 + 12 \quad \left| \quad = \frac{\sqrt{3}}{\sqrt{2}} = \sqrt{\frac{3}{2}} \right.$$

$$\text{Hyp}^2 = 2 + 1$$

$$\text{Hyp} = \sqrt{3}$$

11. If  $A, B, C$  are the angles of a triangle, then the incorrect relation is \_\_\_\_\_

a)  $\sin\left(\frac{A+B}{2}\right) = \cos\left(\frac{C}{2}\right)$

b)  $\cos\left(\frac{A+B}{2}\right) = \sin\left(\frac{C}{2}\right)$

c)  $\tan\left(\frac{A+B}{2}\right) = \sin\left(\frac{C}{2}\right)$

d)  $\cot\left(\frac{A+B}{2}\right) = \tan\left(\frac{C}{2}\right)$

Ans : (c)

- Since,  $\angle A + \angle B + \angle C = 180^\circ$

$$A + B = 180^\circ - C$$

According complementary angles

$$\sin\left(\frac{A+B}{2}\right) = \cos\left(\frac{C}{2}\right)$$

$$\cos\left(\frac{A+B}{2}\right) = \sin\left(\frac{C}{2}\right)$$

$$\cot\left(\frac{A+B}{2}\right) = \tan\left(\frac{C}{2}\right)$$

$$\text{But } \tan\left(\frac{A+B}{2}\right) \neq \sin\left(\frac{C}{2}\right)$$

$\therefore$  3 option is incorrect relation.

12. The value of  $\sin 40^\circ + \sin 20^\circ$  is \_\_\_\_\_

a)  $\sqrt{3} \cos 10^\circ$

b)  $\sqrt{3} \cos 20^\circ$

c)  $\cos 10^\circ$

d)  $\sqrt{2} \cos 10^\circ$

Ans : (c)

$$= \sin 40^\circ + \sin 20^\circ$$

$$\sin C + \sin D = 2 \sin\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$$

$$= 2 \sin\left(\frac{40+20}{2}\right) \cos\left(\frac{40-20}{2}\right)$$

$$= 2 \sin 30^\circ \cdot \cos 10^\circ$$

$$= 2 \times \frac{1}{2} \times \cos 10^\circ$$

$$= \cos 10^\circ$$

13. The derivative of  $y = \frac{1+x}{1-x}$  is \_\_\_\_\_

a)  $\frac{2}{(1-x)^2}$

b)  $\frac{-2}{(1-x)^2}$

c)  $\frac{2}{1-x^2}$

d)  $\frac{-2x}{(1-x)^2}$

Ans : (a)

$$y = \frac{1+x}{1-x} = \frac{x+1}{-x+1} = \frac{1x+1}{-1x+1} = \frac{a f(x)+b}{c f(x)+c}$$

using shortcut

$$\frac{dy}{dx} = \frac{(ad-bc)(f'(x))}{(\text{Denominator})^2}$$

$$\frac{dy}{dx} = \frac{[(1 \times 1) - (1 \times -1)](1)}{(1-x)^2}$$

$$= \frac{(1+1)1}{(1-x)^2} = \frac{2}{(1-x)^2}$$

14. If  $y = \log(\sqrt{\tan x})$ , then the value of  $\frac{dy}{dx}$

at  $x = \frac{\pi}{4}$  is \_\_\_\_\_

- a)  $\infty$     b) 1    c) 0    d)  $1/2$

**Ans : (b)**

$$y = \log(\sqrt{\tan x})$$

$$\text{diff. } \log x \Rightarrow \frac{1}{x}$$

$$\text{diff. } \sqrt{x} \Rightarrow \frac{1}{2\sqrt{x}}$$

$$\text{diff. } \tan x \Rightarrow \sec^2 x$$

$$\begin{aligned} \frac{dy}{dx} &= \frac{1}{\sqrt{\tan x}} \times \frac{1}{2\sqrt{\tan x}} \times \sec^2 x \\ &= \frac{\sec^2 x}{2 \tan x} \\ &= \frac{\sec^2 45^\circ}{2 \tan 45^\circ} \quad \left| \text{at } x = \frac{\pi}{4} \right. \\ &= \frac{(\sqrt{2})^2}{2(1)} = \frac{2}{2} = 1 \quad \left. x = 45^\circ \right| \end{aligned}$$

15. If  $y = (2 + 3 \log x)^{10}$ , then  $\frac{dy}{dx}$  at  $x = 1$  is \_\_\_\_\_

- a)  $15(2^9)$     b)  $(15 \times 2)^{10}$   
c)  $15(2^{10})$     d)  $10(5^9)$

**Ans : (c)**

$$y = (2 + 3 \log x)^{10}$$

$$\frac{dy}{dx} = 10 \times (2 + 3 \log x)^9 \times \left(0 + 3 \frac{1}{x}\right)$$

$$= 10 \times (2 + 3 \log x)^9 \times \left(\frac{3}{x}\right)$$

$$= \frac{30}{x} (2 + 3 \log x)^9$$

$$\text{at } x = 1 = \frac{30}{1} (2 + 3 \log 1)^9 \quad | \log 1 = 0$$

$$= 30(2 + 3(0))^9$$

$$= 30(2)^9$$

$$= 15 \times 2 \times 2^9$$

$$= 15 \times 2^{10} = 15(2^{10})$$

16. If  $y = \sqrt{\sin x + y}$ , then  $\frac{dy}{dx} =$  \_\_\_\_\_

- a)  $\cos x / (2y - 1)$     b)  $\cos x / (1 - 2y)$   
c)  $\sin x / (2y - 1)$     d)  $\sin x / (1 - 2y)$

**Ans : (a)**

$$y = \sqrt{\sin x + y}$$

sq. on both side

$$y^2 = \sin x + y$$

diff.

$$2y \times \frac{dy}{dx} = \cos x + \frac{dy}{dx}$$

$$2y \cdot \frac{dy}{dx} - \frac{dy}{dx} = \cos x$$

$$\frac{dy}{dx} = \frac{\cos x}{(2y - 1)}$$

17.  $\int \cot^2 x dx =$  \_\_\_\_\_

- a)  $-\cot x - x + c$   
b)  $\cot x - x + c$   
c)  $\tan x - x + c$   
d)  $\tan^2 x + c$

**Ans : (a)**

$$\int \cot^2 x \, dx \quad | \cot^2 x = \operatorname{cosec}^2 x - 1$$

$$\int (\operatorname{cosec}^2 x - 1) \, dx$$

$$\int \operatorname{cosec}^2 x \, dx - \int 1 \, dx$$

$$= -\cot x - x + c$$

18. The value of  $\int_0^{\frac{\pi}{4}} \frac{\sec^2 x}{1 + \tan x} \, dx$  is \_\_\_\_\_

- a)  $\log 2 + 1$       b)  $\log 1$   
c)  $\log 2$       d)  $\log 2 - 1$

**Ans : (c)**

$$\int_0^{\frac{\pi}{4}} \frac{\sec^2 x}{1 + \tan x} \, dx$$

Using:-  $\int \frac{f'(x)}{f(x)} \, dx = \log(f(x))$

$$f(x) = 1 + \tan x, \quad f'(x) = \sec^2 x$$

$$\left[ \log(1 + \tan x) \right]_0^{\frac{\pi}{4}} \quad \left| \frac{\pi}{4} = 45^\circ \right.$$

**Upper Limit (UL)**  $\log(1 + \tan 45^\circ) = \log 2$

**Lower Limit (LL)**  $\log(1 + \tan 0^\circ) = \log 1$

$$\therefore \text{UL} - \text{LL} = \log 2 - \log 1 \quad | \log 1 = 0$$

$$= \log 2$$

19.  $\int \sqrt{1 + \cos 2x} \, dx$  is \_\_\_\_\_

- a)  $2 \cos x + c$       b)  $2 \sin x + c$   
c)  $\sqrt{2} \cos x + c$       d)  $\sqrt{2} \sin x + c$

**Ans : (d)**

$$\int \sqrt{1 + \cos 2x} \, dx \quad | 1 + \cos 2x = 2\cos^2 x$$

$$\int \sqrt{2\cos^2 x} \, dx$$

$$\int \sqrt{2} (\cos x) \, dx$$

$$= \sqrt{2} \int \cos x \, dx$$

$$= \sqrt{2} \sin x + c$$

20. The value of  $\int_0^{\frac{\pi}{4}} \sin x \cos x \, dx$  is \_\_\_\_\_

- a)  $-1/4$       b)  $1/4$   
c)  $\pi/2$       d)  $\pi/4$

**Ans : (b)**

$$\int f(x) \cdot f'(x) \, dx = \frac{(f(x))^2}{2}$$

$$f(x) = \sin x, \quad f'(x) = \cos x$$

$$\left[ \left( \frac{(\sin x)^2}{2} \right) \right]_0^{\pi/4} \quad \left| \frac{\pi}{4} = 45^\circ \right.$$

**Upper Limit (UL)**  $\frac{(\sin 45^\circ)^2}{2} = \frac{\left(\frac{1}{\sqrt{2}}\right)^2}{2} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

**Lower Limit (LL)**  $\frac{(\sin 0)^2}{2} = 0$

$$\therefore \text{UL} - \text{LL} = \frac{1}{4} - 0$$

$$= \frac{1}{4}$$

21. The data extracted from the google forms has the file extension as

- a) .doc      b) .docx  
c) .csv      d) .xlsx

**Ans : (c)**

The data extracted from the google forms has the extension as .csv

22. Match the following with respect to the classification of data and data collection.

a) <b>Data</b>	i) <b>Survey</b>
b) <b>Questionnaire</b>	ii) <b>Number of students appearing for exam</b>
c) <b>Interview</b>	iii) <b>Google form</b>
d) <b>Quantitative data</b>	iv) <b>Facts and figure</b>

- a) a -iv, b - i, c - iii, d-ii  
 b) a -iv, b - ii, c - iii, d-i  
 c) a -iv, b - iii, c - i, d-ii  
 d) a -iv, b - i, c - ii, d-iii

**Ans : (c)**

- a) Collection of facts and figures is called data  
 b) Questionnaire can be prepared by using google form  
 c) Collection of data through interview is one of the method of survey  
 d) The data which can be numerically measurable is called quantitative data

Ex:- Number of students appearing for exam

**23. Data cleaning refers to**

- a) Modifying the gathered data  
 b) Adding data to the gathered data  
 c) Removing the data from gathered data  
 d) Processing the data according to the defined problem statement.

**Ans : (a / b / c / d)**

Objectives of data cleaning is

- 1) Modifying the gathered data  
 2) Adding data to the gathered data  
 3) Removing the data from the gathered data  
 4) Processing the data according to the defined problem statement.

**24. The syntax to find frequency distribution in an interval in excel is**

- a) = COUNTIFS (criteria\_range 1, criteria 1, .....)  
 b) = COUNTIF (criteria\_range 1, criteria 1, .....)  
 c) = COUNT (criteria\_range 1, criteria 1, .....)  
 d) = COUNTIFS (criteria 1, criteria 2, .....)

**Ans : (a)**

The syntax to find frequency distribution in an interval in excel is

= COUNTIFS (criteria\_range 1, criteria 1, .....)

**25. Which tab in Excel supports in plotting Piechart?**

- a) Home tab                      b) View tab  
 c) Insert tab                     d) Data tab

**Ans : (c)**

We can plot pie-chart of a data in excel using tab called insert

**26. Frequency polygon is a \_\_\_\_ graph**

- a) Scatter graph                b) Pie graph  
 c) Bar graph                    d) Line graph

**Ans : (d)**

Frequency polygon is a line graph.

**27. Which of the following statements on Histogram is true?**

- a) A Histogram can display categorical data effectively.  
 b) The bars in a Histogram should not touch each other.  
 c) A Histogram shows the frequency distribution of continuous data  
 d) A Histogram is same as a bar chart

**Ans : (c)**

Histogram can be constructed for continuous frequency distribution.

**28. Choose the right steam-leaf plot from the following plots for the data set.**

52, 20, 44, 28, 20, 41, 30, 56, 32, 28

	Stem	Leaf		Stem	Leaf
	2	0088		2	0088
Plot-1:	3	20	Plot-2:	3	02
	4	14		4	14
	5	26		5	26

	Stem	Leaf		Stem	Leaf
	2	08		2	80
Plot-3:	3	20	Plot-4:	3	20
	4	14		4	41
	5	26		5	62

- a) Plot - 1                      b) Plot - 2  
c) Plot - 3                      d) Plot - 4

**Ans : (b)**

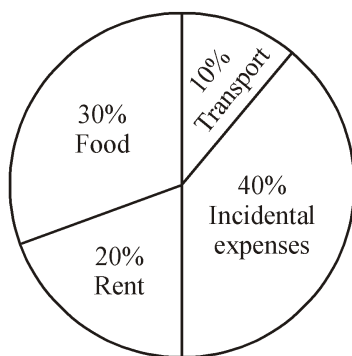
Arrange the data in ascending order

20, 20, 28, 28, 30, 32, 41, 44, 52, 56

Stem	Leaf
2	0088
3	02
4	14
5	26

Key : 2/0 = 20

29. The below chart represents the expenditure of a person in a month. If his salary is ₹50,000 what is his total expenditure on rent and transport?



- a) ₹ 30,000                      b) ₹ 25,000  
c) ₹ 15,000                      d) ₹ 10,000

**Ans : (c)**

Total expenditure = 50000

Rent and transport = 20% + 10% = 30%

∴ Total expenditure on rent and transport is

$$= \frac{50000}{100} \times 30 = 15000$$

30. For the data set given below, match the values of statistical parameters.

i) Range	a) 58
ii) Mean	b) 44
iii) Mode	c) 48.4545
iv) Median	d) 48

Dataset : 28, 36, 44, 58, 44, 33, 76, 59, 58, 39, 58.

- a) i - d, ii - c, iii - b, iv - a  
b) i - d, ii - c, iii - a, iv - b  
c) i - a, ii - b, iii - c, iv - d  
d) i - d, ii - a, iii - b, iv - c

**Ans : (b)**

$$1) \text{ Range} = H - L = 76 - 28 = 48$$

$$2) \text{ Mean} = \bar{X} = \frac{\sum X}{n} = \frac{28+36+44+58+44+33+76+59+58+39+58}{11}$$

$$= \frac{533}{11}$$

$$\text{Mean} = 48.4545$$

- 3) Most frequently occurring value in a data is 58  
∴ Mode = 58

- 4) Arrange the data in order  
28, 33, 36, 39, 44, 44, 58, 58, 58, 59, 76  
The middle most value is 44  
∴ Median = 44

31. The Excel syntax for finding quartile 4 (4<sup>th</sup> quartile) for a given data set is

- a) = QUARTILE [array, 4]
- b) = QUARTILE (array, 4)
- c) = QUARTILE (array\_4)
- d) = QUARTILE (array-4)

**Ans : (b)**

The excel syntax for finding quartile 4 (4th quartile) for a given data set is

= QUARTILE (array, 4)

**32. Which of the following equalities and inequalities is true for the data set 25, 25, 25, 25, 25, 25, 25, 25, 25?**

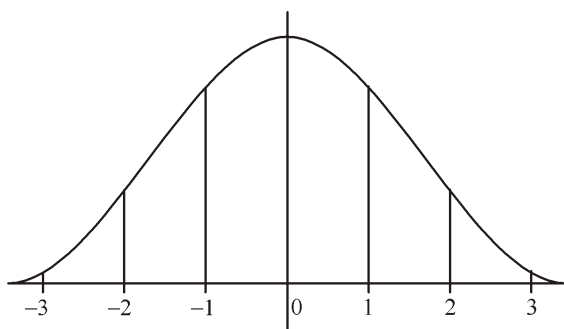
- a) Variance > Standard deviation
- b) Variance = Standard deviation
- c) Variance < Standard deviation
- d) Variance < 0, Standard deviation < 0

**Ans : (b)**

If all the observations are same then variance and S.D are equal

∴ Variance = S.D = 0

**33. Skewness of the distribution shown below is**



- a) > 0
- b) = 0
- c) < 0
- d) = 1

**Ans : (b)**

The above diagram is symmetric distribution.

In symmetric distribution skewness is zero ( $\beta_1 = 0$ )

**34. If the Kurtosis = 3, then the data distribution is called**

- a) Leptokurtic
- b) Mesokurtic
- c) Platykurtic
- d) Skewkurtic

**Ans : (b)**

If Kurtosis = 3 ( $\beta_2 = 3$ )

Then the given distribution is mesokurtic.

**35. Assertion (A) : An "int" type data in Python can store floating point numbers.**

**Reasoning (R) : Python "int" type only stores positive integers.**

- a) A is true, R is false
- b) A is false, R is true
- c) A is false, R is false
- d) A is true, R is true

**Ans : (c)**

**Assertion (A): An "int" type data in Python can store floating point numbers.**

In Python, the `int` data type is used to store whole numbers (integers), both positive and negative, and zero. It **cannot** store floating-point numbers (numbers with a decimal point). Floating-point numbers are stored using the `float` data type.

Therefore, Assertion (A) is false.

**Reasoning (R): Python "int" type only stores positive integers.**

Python's `int` type can store positive integers, negative integers, and zero. For example, 5, -10, and 0 are all valid `int` values.

**36. Match the following data types:**

a) a = 5	i) string
b) a or b	ii) float
c) "Hello KEA"	iii) Integer
d) C = 5.9	iv) Boolean

- a) a -iii, b - iv, c - i, d-ii
- b) a -iv, b - i, c - ii, d-iii
- c) a -iv, b - i, c - iii, d-ii
- d) a -i, b - ii, c - iii, d-iv

**Ans : (a)**

**a = 5**

- This is a whole number without a decimal.
- In Python, this is of type **int** → (iii) **Integer**

**b = a or b**

- The expression **a or b** performs a **logical OR** operation.
- In Python, **or** returns the **first truth value**, and the result is typically **interpreted as a Boolean context**.
- For the sake of data type matching, **a or b** falls under **Boolean logic** → (iv) **Boolean**

**c = "Hello KEA"**

- Text enclosed in quotes (") is a **string** → (i) **string**

**d = 5.9**

- A number with a decimal point is of type **float** in Python → (ii) **float**

**Therefore, the correct matches are:**

- a → iii (Integer)
- b → iv (Boolean)
- c → i (String)
- d → ii (Float)

**37. What is the syntax to assign the data type to a variable in Python?**

- Name = "hello world"
- Height = 5.9
- Assertion = True
- All of the above

**Ans : (d)**

In Python, **data types are assigned automatically based on the value** you assign to a variable. This is known as **dynamic typing**.

**a) Name = "hello world"**

- "hello world" is a **string** (text).
- So Name becomes a **string** type variable.

**b) Height = 5.9**

- 5.9 is a **floating-point number**.

- So Height becomes a **float**.

**c) Assertion = True**

- True is a **Boolean** value.
- So Assertion becomes a **bool**.
- All three assignments correctly assign a variable along with its appropriate data type based on the value.

Hence, the correct answer is:

**(D) All of the above**

**38. Which of the following is a valid variable name in Python?**

- 1 Var
- Var\_name
- Var - name
- Var name

**Ans : (b)**

Rules for Valid Python Variable Names:

- Must start with a letter** (A–Z or a–z) or an underscore \_
- Cannot start with a digit**
- Can contain letters, digits, and underscores only**
- Cannot contain spaces or special characters** like -, @, #, etc.
- Cannot be a Python keyword** (like if, while, etc.)

Let's analyze the invalid options:

**a) 1 Var**

X Invalid: Starts with a number and contains a space

**c) Var - name**

X Invalid: Contains a minus - symbol, which is not allowed

**d) Var name**

X Invalid: Contains a space

**Valid Option:**

**b) Var\_name**

- ✓ Starts with a letter
- ✓ Contains only letters and underscore
- ✓ No spaces or invalid symbols

39. The output of the following Python program is

```
n = 5
A = 0
while (n > 0):
    A = A + n
    n = n - 1
print(A)
```

- a) 15                      b) 5  
c) 55                      d) 0

**Ans : (a)**

We are adding  $n$  to  $A$  repeatedly while  $n > 0$ , and decreasing  $n$  by 1 each time.

**Initial Values:**

- $n = 5$
- $A = 0$

**Loop Execution:**

1.  $n = 5 \rightarrow A = 0 + 5 = 5$ , then  $n = 4$
2.  $n = 4 \rightarrow A = 5 + 4 = 9$ , then  $n = 3$
3.  $n = 3 \rightarrow A = 9 + 3 = 12$ , then  $n = 2$
4.  $n = 2 \rightarrow A = 12 + 2 = 14$ , then  $n = 1$
5.  $n = 1 \rightarrow A = 14 + 1 = 15$ , then  $n = 0$

Now  $n$  is 0, so the loop stops.

40. Which of the following is the correct syntax of an if statement in Python?

- a) if  $x > 0$  then:      b) if  $(x > 10)$   
c) if  $x > 10$ :          d) if  $x > 10$ ;

**Ans : (c)**

**Syntax of if Statement in Python**

Python uses a **simple and clean syntax** for conditional statements:

**if condition:**

**Key points:**

- The **if** keyword is followed by a **condition**.
- The **condition does not need parentheses** (unlike languages like C or Java).
- It **must end with a colon**:

41. Consider the following algorithms:

Step 1 :  $A = 5, B = 3$

Step 2 : if  $A > B$ , then  $A = A - B$

Step 3 :  $B = A + B$

Step 4 : Output  $B$

What is the output?

- a) 2                      b) 5  
c) 8                      d) 3

**Ans : (b)**

Let's go step-by-step again clearly:

**Step 1:**

- $A = 5$
- $B = 3$

**Step 2:**

- Is  $A > B$ ? Yes  $\rightarrow 5 > 3$
- Then:  $A = A - B = 5 - 3 = 2$

Now:

- $A = 2$
- $B = 3$

**Step 3:**

- $B = A + B = 2 + 3 = 5$

**Step 4:**

- Output  $B \rightarrow 5$

42. Which of the following best defines an algorithm?

- a) A graphical representation  
b) A code snippet  
c) A step-by-step procedure to solve a problem  
d) A mobile application

**Ans : (c)**

An algorithm is:

**A finite sequence of well-defined steps or instructions used to solve a problem or perform a task.**

43. Consider the following algorithm:

**Start**

**if  $a \leq b$  and  $a \leq c$**

```

    print a
else if b <= a and b <= c
    print b
else
    print c
End.

```

if  $a = 10, b = 25, c = 33$

What output will be printed for the above algorithm?

- a) 25                      b) 10  
c) 33                      d) None of the above

**Ans : (b)**

**Algorithm Logic:**

We are given:

- $a = 10$
- $b = 25$
- $c = 33$

**Condition 1: if  $a \leq b$  and  $a \leq c$**

Substitute values:

- $10 \leq 25 \rightarrow \text{True}$
- $10 \leq 33 \rightarrow \text{True}$

Since **both conditions are true**, this block is executed:  
So, **10 is printed** and the rest of the conditions (else if, else) are skipped.

**44. Consider the following algorithm:**

```

if num > 0
    num = num + 10
    print num
else if num == 0
    num = num * 10
    print num
else
    print num.

```

What will be the output, if  $\text{num} = -5$ ?

- a) 50                      b) -50  
c) -5                      d) 5

**Ans : (b)**

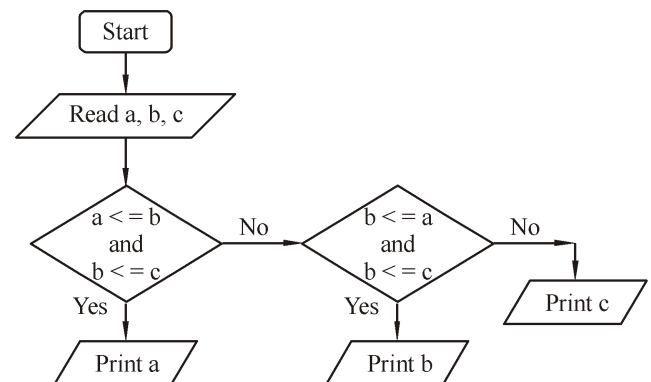
Substitute  $\text{num} = -5$  into the algorithm:

1. If  $\text{num} > 0$ : Is  $-5 > 0$ ? No, this condition is false.
2. The program moves to the else if block. Else if  $\text{num} == 0$ : Is  $-5 == 0$ ? No, this condition is also false.
3. Since neither the if nor the else if conditions were true, the program executes the else block. **else: print num**

At this point, the value of  $\text{num}$  is still  $-5$  because none of the  $\text{num}$  modification statements in the if or else if blocks were executed.

Therefore, the output will be  $-5$

**45. Consider the following flowchart.**



**What will be the output if  
 $a = 10, b = 15, c = 5$ ?**

- a) 10                      b) 15  
c) error                      d) 5

**Ans : (d)**

Let's trace the flowchart with the given input values:  
 $a = 10, b = 15, c = 5$

**Step 1: Start and Read a, b, c** the values are read:  
 $a = 10, b = 15, c = 5$ .

**Step 2: First Decision Block  $a \leq b$  and  $b \leq c$**   
Substitute the values:  $10 \leq 15$  and  $15 \leq 5$

- $10 \leq 15$  is **True**.
- $15 \leq 5$  is **False**.
- True and false evaluates to **False**.

Since the condition is False ("No" path), the control flows to the next decision block.

**Step 3: Second Decision Block  $b \leq a$  and  $b \leq c$**

Substitute the values:  $15 \leq 10$  and  $15 \leq 5$

- $15 \leq 10$  is **False**.
- $15 \leq 5$  is **False**.
- **False and false** evaluates to **False**.

Since the condition is False ("No" path), the control flows to the `Print c` step.

**Step 4: Print c** the value of `c` is 5. So, 5 is printed.

**46. Which of the following statements about web browsers is correct?**

- Web browsers translate HTML, CSS and JavaScript into machine code before displaying a web page to the user.
- Web browsers can only display content written in HTML and CSS, but they cannot execute JavaScript.
- Web browsers interpret HTML, CSS & JavaScript to render a webpage allowing dynamic content and interaction.
- Web browsers use server-side programming languages like PHP to render webpages directly

**Ans : (c)**

- **HTML:** Parsed to understand the structure and content of the page.
  - **CSS:** Interpreted to apply styling (colors, fonts, layout, etc.) to the HTML elements.
  - **JavaScript:** Executed to provide dynamic behavior, interactivity (e.g., button clicks, form validation, animations), and fetch data.
- The combination of these three is how browsers render rich, interactive web pages.

**47. Consider the following HTML code snippet.**

```
<select name = "cars" id = "carselect">
  <option value = "volvo">Volvo </option>
  <option value = "XUV">XUV</option>
  <option value = "Tata">Tata</option>
</select>
```

**What does the `<select>` element do in this code?**

- It creates a text input field for users to type in
- It creates a dropdown list from which the user can select a car brand.
- It allows users to choose multiple options from a list of cars.
- It creates a button that users can click to select a car brand

**Ans : (b)**

AN HTML code snippet. It's a `<select>` element, which creates a dropdown list (or a selection list) on a web page.

**It creates a dropdown list from which the user can select a car brand.**

By default, without the `multiple` attribute, a `<select>` element creates a single-selection dropdown list. The options provided are "Volvo", "XUV", and "Tata", which are car brands.

**48. Which CSS property is used to set the background color of a webpage?**

- background-color
- color
- bg-color
- background-image

**Ans : (a)**

CSS property is used to set the background color of a webpage. Let's look at the options:

**a) background-color:** This is the correct CSS property used to define the background color of an element, including the `<body>` element (which represents the entire visible page).

**Example:** `body { background-color: lightblue; }`

**49. Which CSS selector is used to select an HTML element with a specific id?**

- .id
- #id
- id
- [id]

**Ans : (b)**

CSS selector for selecting an HTML element with a specific id attribute.

The hash symbol (#) is used as the ID selector.

For example, if you have <div id="header">, you would select it with #header.

HTML element with a specific ID is **b) #id**.

**50. Which event is triggered when a user clicks on an HTML element in JavaScript?**

- a) onload                      b) onclick
- c) onhover                    d) onchange

**Ans : (b)**

The **onclick** event is specifically triggered when a user clicks on an HTML element.

It is commonly used in JavaScript to run code when a button, link, or other clickable element is clicked

**51. Which of the following factors can help improve a website's SEO ranking?**

- a) Using JavaScript for content rendering
- b) High Keyword density in the content
- c) Using relevant and high-quality backlinks
- d) Including as many images as possible on the homepage.

**Ans : (c)**

**Impact on SEO:** This is a **major positive factor** for SEO. Backlinks (links from other websites to yours) are often seen as "votes of confidence" or endorsements.

Backlinks are links from other websites that point to your site. When **reputable and relevant** websites link to your content, it tells search engines that your site is **trustworthy and authoritative**.

**52. Which of the following are the correct description with respect to structured organisation.**

- (a) Operations → produces goods or services, ensures quality and efficiency.
- (b) Marketing → Identifies customer needs, promotes or services.

(c) H.R. (Human Resources): Manages budgeting, accounting and financial planning.

- a) (a), (b)                      b) (a), (b), (c)
- c) (a) only                      d) (b) only

**Ans : (a)**

HR does not handle budgeting or financial planning — that is handled by Finance. Operations and Marketing statements are correctly matched to their roles.

**53. Which of the following statements best describes the purpose of ERP tools in an organisation.**

- a) ERP tools are designed to manage customer relationships and marketing strategies.
- b) ERP tools are used to integrate and automate key business processes across department as finance, HR, inventory and supply chain.
- c) ERP tools are primarily focused in managing email communication between employees an organization.
- d) ERP tools are closely used for managing the IT infrastructure and hardware resources organisation.

**Ans : (b)**

ERP (Enterprise Resource Planning) systems unify operations across departments. Their goal is seamless coordination and improved productivity.

**54. In cloud computing, data is stored in**

- a) Local folders              b) Physical notebooks
- c) Remote servers accessed via the internet
- d) USB drives.

**Ans : (c)**

Cloud computing stores data on internet-connected to servers rather than local devices. This enables global access and scalability.

**55. Which of the following is an example of IoT in smart homes?**

- a) A GPS system in a car for navigation
- b) A thermostat that adjusts temperature based on occupancy and preferences

- c) An e-commerce website for shopping  
d) A manual doorbell

**Ans : (b)**

Smart thermostats use sensors and connectivity, a core IoT feature. They automate home climate control for efficiency and comfort.

**56. Which of the following is an example of Software-as-a-Service (SaaS)?**

- a) Microsoft Azure    b) Google Drive  
c) Amazon Web Services (AWS) EC2  
d) Google Kubernetes Engine (GKE)

**Ans : (a & b)**

SaaS delivers applications over the internet without local installation.

- Microsoft Azure is primarily focuses on PaaS but it also provides services of SaaS.
- Google Drive is accessed online and provides storage + editing tools as a service.

**57. Which of the following is a platform for developing IoT applications?**

- a) Google Docs    b) Arduino  
c) Microsoft    d) WinZip

**Ans : (b)**

Arduino is a widely used open-source electronics platform for building IoT devices. It allows sensors and actuators to be connected and programmed easily.

**58. Ravi often uses incognito mode while browsing, believing it protects him from all types of tracking and threats. He does not use antivirus software or phishing protection.**

**Which of the following statement about Ravi's assumption is correct?**

- a) Incognito mode provides full malware protection  
b) Incognito mode hides activity from the device and protects against all trackers  
c) Incognito mode only prevents local history tracking not online threats  
d) Incognito mode encrypts his traffic and logic credentials

**Ans : (c)**

Incognito mode only stops the browser from saving history, cookies, and site data. It does not protect from malware, phishing, or external tracking.

**59. Rita is using a public computer in a cyber cafe to check her email. After reading her messages, she closes the browser without logging out of her account.**

**What cyber safety mistake did Rita make?**

- a) She read personal emails in public  
b) She used a public computer  
c) She didn't logout of her account  
d) She didn't clear the browsing history

**Ans : (c)**

Not logging out on public/shared computers can let others access your private data. It poses a high risk of unauthorized access to personal accounts.

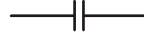

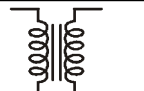

**60. To safeguard against cyber attacks that steal sensitive information or install malicious software, which browser setting should be enabled?**

- a) Enable automatic updates  
b) Turn on phishing and malware protection  
c) Disable phishing and malware protection  
d) Enable cookies

**Ans : (b)**

This setting warns users about harmful websites and malicious downloads. It reduces the risk of identity theft and malware infection.

**61. Match the following with symbols**

i) Resistance	a) 
ii) Transformer	b) 
iii) Capacitor	c) 
iv) Battery	d) 

- a) i - a, ii - c, iii - d, iv - b  
b) i - d, ii - b, iii - c, iv - a  
c) i - b, ii - c, iii - d, iv - a

- d) i - d, ii - c, iii - a, iv - b

**Ans : (d)**

**62. Earthing plate is made up of \_\_\_\_\_**

- a) Bakelite                      b) Aluminum  
c) Copper                        d) Plastic

**Ans : (c)**

**Explanation:** Copper is a good conductor of electricity and corrosion-resistant, making it ideal for use in earthing systems to provide a low-resistance path to the ground.

**63. Match the following:**

i) Current	a) Watts
ii) Power	b) Hertz
iii) Energy	c) Kwh
iv) Frequency	d) Ampere

- a) i - a, ii - b, iii - d, iv - c  
b) i - a, ii - c, iii - b, iv - d  
c) i - c, ii - b, iii - d, iv - a  
d) i - d, ii - a, iii - c, iv - b

**Ans : (d)**

Current is measured in amperes

Power is measured in watts.

Energy is measured in kilowatt-hours (kWh).

Frequency is measured in hertz (Hz).

**64. If resistance of value  $12\Omega$  and  $6\Omega$  are connected in parallel, the equivalent resistance of the combination is**

- a)  $18\Omega$                       b)  $06\Omega$   
c)  $04\Omega$                       d)  $02\Omega$

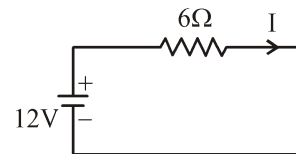
**Ans : (c)**

**For parallel resistors:**

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{12} + \frac{1}{6} = \frac{1+2}{12} = \frac{3}{12} = \frac{1}{4}$$

$$\Rightarrow R = 4\Omega$$

**65. In a given electrical circuit, find the value of current.**



- a) 72A                              b) 0.5 A  
c) 2A                                d) 1.2A

**Ans : (c)**

**Explanation:**

Given,  $R = 6\Omega$ ,  $V = 12V$

Ohm's Law  $I = \frac{V}{R}$

$$I = \frac{12}{6} = 2A$$

**66. The frequency of signal with a period of 0.02 Sec is**

- a) 100 Hz                        b) 200 Hz  
c) 50 Hz                         d) 150 Hz

**Ans : (c)**

**Explanation:**  $f = \frac{1}{T} = \frac{1}{0.02} = 50 \text{ Hz}$

**67. In a pure resistive circuit, which one of the following statement is true?**

- a) Both current and voltage are in phase  
b) Current leads the voltage  
c) Voltage lags the current  
d) Both current and voltage are out of phase

**Ans : (a)**

**Explanation:** In a pure resistive AC circuit, current and voltage reach their peak and zero values simultaneously. So, they are **in phase**.

**68. HRC fuses can be used upto a maximum current of \_\_\_\_\_**

- a) 250 mA                        b) 500 mA  
c) 1A                                d) 1250 A

**Ans : (d)**

High Rupturing Capacity (HRC) fuses are designed to handle **very high fault currents**, typically up to **1250 A or more**, depending on the rating.

**69. To control single lamp from two different places, the control switch used is \_\_\_\_ switch.**

- a) Double pole      b) Two way  
c) Single pole      d) One way

**Ans : (b)**

**Explanation:** Two-way switches allow a single lamp or device to be controlled from **two different locations**, such as at the top and bottom of a staircase.

**70. A fuse is always connected \_\_\_\_ to the circuit.**

- a) Parallel      b) Across the load  
c) Series      d) Across the supply

**Ans : (c)**

A fuse is connected **in series** so that if excessive current flows, the fuse will blow and **break the circuit** to prevent damage.

**71. In a Transformer, \_\_\_\_ remains constant**

- a) Voltage      b) Frequency  
c) Current      d) Both current and voltage

**Ans : (b)**

In both step-up and step-down transformers, the **frequency of the input and output remains the same** (e.g., 50 Hz in India).

**72. The combination of two or more cells is \_\_\_\_**

- a) Battery      b) load cell  
c) Primary cell      d) Generator

**Ans : (a)**

A **battery** is formed by connecting **two or more cells** in series or parallel to provide a combined voltage or capacity.

**73. Match the following:**

i) Ampere hour	a) 1 $\phi$ Induction motor
ii) KVA	b) lead acid battery
iii) Star delta	c) Transformer
iv) Fan	d) 3 $\phi$ Induction motor

- a) i - a, ii - b, iii - c, iv - d  
b) i - c, ii - a, iii - d, iv - b  
c) i - b, ii - c, iii - d, iv - a  
d) i - b, ii - a, iii - c, iv - d

**Ans : (c)**

**Ampere-hour** is the unit of charge/storage capacity (used for **batteries**)

**KVA** is used for apparent power rating, often for **transformers**.

**Star-delta** is a starting method for **3-phase motors**.

**Fan** typically uses a **1-phase induction motor**.

**74. In a transformer, the winding to which the load connected is called \_\_\_\_ winding**

- a) Primary      b) Axillary  
c) Secondary      d) Concentric

**Ans : (c)**

In a transformer, the **secondary winding** is connected to the **load** and delivers the output voltage.





**75. Which of the following statements is FALSE with respect to transformer?**

- a) Converts high voltage to low voltage  
b) Converts high frequency to low frequency  
c) Converts low voltage to high voltage  
d) Transfers energy at constant frequency

**Ans : (b)**

A transformer **does not change the frequency** of the input signal. It works on **AC of constant frequency** (e.g., 50 Hz). It can **step up or step down voltage**, but the frequency remains unchanged. So, option (2) is false.

76. Match the following logic gates with their symbols:

i) AND	a) 
ii) OR	b) 
iii) NAND	c) 
iv) NOR	d) 

- a) i - a, ii - b, iii - c, iv - d    b) i - b, ii - c, iii - d, iv - a  
c) i - d, ii - a, iii - c, iv - b    d) i - c, ii - d, iii - a, iv - b

Ans : (d)

77. Which of the following is a common type of sensor used for measuring temperature?

- a) Proximity sensor    b) Pressure sensor  
c) Flow sensor    d) Thermocouple

Ans : (d)

A **thermocouple** is a widely used temperature sensor that converts thermal energy into electrical voltage. It's durable, simple, and accurate over wide temperature ranges

78. What does the fourth band in a 4-band resistor indicate?

- a) Resistance    b) Multiplier  
c) Power rating    d) Tolerance

Ans : (d)

In a 4-band resistor:  
1st & 2nd bands = significant digits  
3rd band = multiplier  
**4th band = tolerance**

79. Which of the following is an example of Insulator?

- a) Aluminium    b) Rubber    c) Iron    d) Silicon

Ans : (b)

**Rubber** is a good **electrical insulator**; it resists the flow of electric current.  
Aluminium and Iron are conductors.  
Silicon is a semiconductor.

80. Diode is made up of \_\_\_\_\_ material.

- a) Conducting    b) Semiconducting  
c) Insulating    d) Electronic

Ans : (b)

A **diode** is made using **semiconductor materials** like **Silicon or Germanium**. It allows current to flow in only one direction due to the p-n junction.

81. Complete the following analogy.

**Project : Deliverables :: Operation : \_\_\_\_\_**

- a) Deadlines    b) Efficiency  
c) Repetition    d) Conclusion

Ans : (c)

Project are temporary endeavors with specific goals and deliverables operations are permanent process with repetitive outcome.

82. Multiple objectives are achieved again and again in \_\_\_\_\_

- a) Operation    b) Project    c) Business    d) Sales

Ans : (a)

Operation are considered as repetitive process hence multiples objectives are achieved again & again.

83. Which of the following are the examples of consultancy firms?

- A) Accenture    B) TCS  
C) Tata Motors    D) Birla Technical Services

**Codes:**

- a) A, B and C only    b) A, B and D only  
c) A and D only    d) A, B, C and D

Ans : (b)

Accenture, TCS and Birla Technical services are works as consultancy firms where as Tata motors are automotive manufacturing.

84. Which of the following is NOT an obstacle in project management?

- a) Undefined project scope  
b) Poor communication among team members  
c) Clear project objectives and goals  
d) Limited resources

**Ans : (c)**

Option a, b, d are obstacle of project management and option 'c' is an advantage of project management.

**85. Complete the following analogy**

**Project procedure Manual : Provides standard operating procedures :: Project diary : \_\_\_\_\_**

- a) Records daily events and issues
- b) Provides step-by-step instructions
- c) Outlines rules and processes
- d) Used only during project closure

**Ans : (a)**

Project diary is a document used to record daily events activities and issues throughout project life cycle.

**86. Match the following**

i) Initial project team	a) Guides the project with advice and support
ii) Core project team	b) Works on the project every day, making decisions and doing tasks
iii) Project stakeholders	c) People interested in the project outcomes like clients or sponsors.
iv) Project advisors	d) Helps to start the project and plan the initial steps

- a) i - d, ii - b, iii - c, iv - a
- b) i - a, ii - b, iii - c, iv - d
- c) i - b, ii - a, iii - c, iv - d
- d) i - d, ii - c, iii - b, iv - a

**Ans : (a)**

**87. What does Work Breakdown Structure (WBS) do to help a Project Manager?**

- a) Track the project's financial performance
- b) Breakdown the project into smaller, manageable tasks.
- c) Determine project's risk level
- d) Allocate resources to team members

**Ans : (b)**

WBS - Work Breakdown Structure is a breakdown of work from complex to smaller, manageable tasks.

**88. Which of the following is NOT a subpart of Project Execution Plan (PEP)?**

- a) Organizational plan    b) Work packing plan
- c) Staffing plan            d) Contracting plan

**Ans : (c)**

Staffing plan is not included in PEP.

**89. High demand, high selling price, low variable cost are the examples of \_\_\_\_\_**

- a) Normal Scenario    b) Worst Scenario
- c) Best Scenario        d) Abnormal Scenario

**Ans : (c)**

High demand, high selling price, low variable cost are considered as best scenario.

**90. In \_\_\_\_\_ phase, project definition and problem identification are defined**

- a) Planning                b) Execution
- c) Initiation               d) Closure

**Ans : (c)**

Initiation is the first phase of project life cycle where, project is defined and problems are identified.

**91. Risk arising due to fluctuation of interest rate OR mistakes in accounting is known as \_\_\_\_\_ risks.**

- a) Policy                    b) Technical
- c) Marketing              d) Financial

**Ans : (d)**

Financial risks arise due to fluctuation of interest rate or mistakes in accounting.

**92. Assertion (A) : Time overrun can lead to cost overrun in a project.**

**Reason (R) : More time often means, more money spent on labour and resources.**

- a) Both (A) and (R) are true and (R) is the correct explanation of (A)
- b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- c) (A) is true, but (R) is false
- d) (A) is false, but (R) is true

**Ans : (a / b)**

**93. The full form of CPM in project management is \_\_\_\_\_**

- a) Critical Process Management
- b) Critical Path Method
- c) Continuous Project Monitoring
- d) Cost Planning Model

**Ans : (b)**

CPM - Critical Path Method

**94. Which of the following is NOT a tool of project planning, scheduling and monitoring?**

- a) Gantt Chart      b) Flow chart
- c) PERT Chart      d) Milestone Chart

**Ans : (b)**

Flow chart is not a tool used for project planning scheduling and monitoring.

**95. Project Evaluation can be done \_\_\_\_\_**

- a) At the end of the project only
- b) Throughout the project lifecycle
- c) Only during the planning phase
- d) At the start of the project only

**Ans : (b)**

Project evaluation is done throughout the project life cycle.

**96. Identify the incorrect statement regarding the functions of project planning.**

- a) Defines project goals and objectives

- b) Allocates resources without considering constraints
- c) Establishes a project timeline and milestones.
- d) Identifies potential-risks and mitigates them

**Ans : (b)**

Project planning allocate resources by considering constraints.

**97. Which of the following is NOT a key component of "SMART" goal?**

- a) Time-Bound      b) Random
- c) Achievable      d) Specific

**Ans : (b)**

SMART - Specific, Measurable, Achievable, Realistic, Timely / Time-Bound.

**98. The process of correcting and rectifying the errors in the project is \_\_\_\_\_**

- a) Project Audit      b) Project Monitoring
- c) Project Evaluation      d) Project Review

**Ans : (d)**

Project review is defined as process of correcting and rectifying the errors in the project.

**99. The time estimation for a given project are as follows: Optimistic Time = 4 days, Pessimistic time = 8 days, Most likely time = 6 days. The expected time to complete is \_\_\_\_\_**

- a) 7 days    b) 6 days    c) 5 days    d) 4 days

**Ans : (b)**

$$T_e = \frac{t_o + 4t_m + t_p}{6} = \frac{4 + 4(6) + 8}{6} = \frac{36}{6} = 6 \text{ days}$$

**100. Watching 3D movie is an example of \_\_\_\_\_**

- a) Augmented Reality      b) Virtual Reality
- c) Augmented and Virtual Reality
- d) Cloud Technology

**Ans : (a, b, c)**

Watching 3D movie is an example of both augmented and virtual reality.

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Securing the state first rank feels surreal, I owe this moment to TTT Academy that stood by me throughout this journey. The dedication of faculties and the smart study strategies and the constant support and motivation created a perfect study environment for effective learning. The study materials provided were well-structured, comprehensive and perfectly aligned with the exam pattern, making preparation efficient and focused. Thanks again to TTT Academy for turning potential into performance and guiding me to this achievement.

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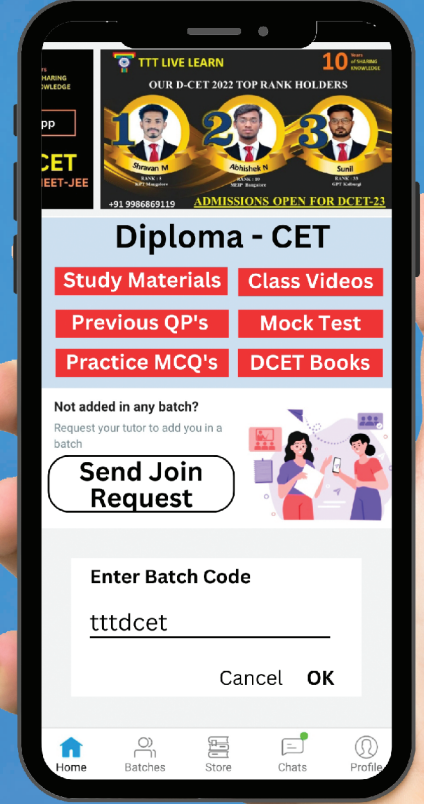
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