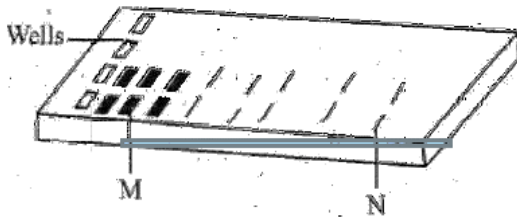


**KCET 2020 BIOLOGY QUESTION PAPER**

1. Injection of an antidote against snakebite is an example of
  - a) auto immunity
  - b) innate immunity
  - c) active immunity
  - d) passive immunity
2. Certain tumours are called malignant, because
  - a) they are not neoplastic
  - b) they are confined to specific locations
  - c) they invade and damage surrounding tissues
  - d) they show contact inhibition
3. The transport of which neurotransmitter is interfered by cocaine?
  - a) Dopamine
  - b) Acetylcholine
  - c) Serotonin
  - d) GABA
4. In the life cycle of Plasmodium, fertilisation takes place in
  - a) liver cells
  - b) salivary glands of mosquito
  - c) RBCs of humans
  - d) stomach of mosquito
5. White rust resistant variety of Brassica is
  - a) Pusa Komal
  - b) Pusa Sadabahar
  - c) Pusa Swarnim
  - d) Pusa Shubhra
6. Which of the following plant tissues cannot be used as explant in tissue culture?
  - a) Collenchyma
  - b) Meristem
  - c) Parenchyma
  - d) Sclerenchyma
7. The hybridisation between naturally incompatible plants like potato and tomato can be achieved through
  - a) mutation breeding
  - b) artificial pollination
  - c) somatic hybridisation
  - d) conventional breeding
8. A chilly plant was severely infected with Chilly Mosaic Virus (CMV). Identify the technique that helps to raise virus free plants in the next generation from the above virus infected plant.
  - a) Hydroponics
  - b) Artificial hybridisation
  - c) Meristem culture
  - d) Self-pollination
9. In sewage treatment, secondary treatment is considered highly significant, because
  - a) it increases the organic content of sewage
  - b) it helps to remove debris from the sewage
  - c) It reduces the BOD level of sewage
  - d) It helps in the production of biogas
10. Ruminant animals can digest cellulose in their food, whereas human beings are unable to do so. This is because
  - a) Methanogens are absent in human gut
  - b) Methanogens are present in human gut
  - c) Cellulose is a complex sugar
  - d) Cellulose reduces the bulk of food
11. From the given combinations of steps in PCR, identify the enzyme dependent step.
  - a) Extension only
  - b) Annealing and extension
  - c) Annealing and denaturation
  - d) Denaturation and extension
12. Biolistics method is suitable for gene transfer into \_\_\_\_\_
  - a) Plant cells
  - b) Viruses
  - c) Animal cells
  - d) Bacteria

13. Identify the labels M and N in the following agarose gel electrophoresis representation



- M – smallest DNA bands, N – Largest DNA bands
- M – Digested DNA bands, N – Undigested DNA bands
- M – Hybridised DNA bands, N – Unhybridised DNA bands
- M – Largest DNA bands, N – smallest DNA bands

14. In RNA interference, the dsRNA molecule prevents

- Aminoacylation
- Transcription of mRNA
- Transport of RNA from nucleus to cytoplasm
- Translation of mRNA

15. Now – a – days, the early diagnosis of bacterial or viral infection in humans is possible using

- CT scan
- serum analyser
- DNA sequencer
- PCR

16. Which of the following features of plants is not helpful in adapting to desert life?

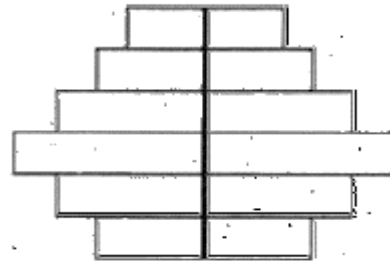
- Absence of trichomes on leaf surface
- Presence of thick cuticle on the leaf surface
- Leaves modified into spines
- Presence of sunken stomata

17. In the following equation of Verhulst – Pearl logistic growth, the letter 'r' denotes

$$\frac{dN}{dt} = rN \left( \frac{K - N}{K} \right)$$

- Population density
- Extrinsic rate of natural increase
- Intrinsic rate of natural increase
- Carrying capacity

18. The shape of the pyramids reflects the growth status of the population. Identify the type of age pyramid represented below for human population.



- Declining
- Ascending
- Expanding
- Stable

19. Identify the possible link 'M' in the following food chain:

Plant → Insect → **M** → Snake → Eagle

- Ichthyophis
- Rabbit
- Wolf
- Frog

20. The organisms which invade a bare area to initiate an ecological succession are known as

- Pioneer species
- Key stone species
- Climatic species
- Endemic species

21. Which one of the following is not included under in – situ conservation?

- Biosphere reserve
- National park
- Sanctuary
- Botanical garden

22. Which one of the following is a wrong statement?

- Ozone in upper part of the atmosphere is harmful to animals
- Most of the forests have been lost in tropical areas
- Greenhouse effect is a natural phenomenon
- Eutrophication is a natural phenomenon in fresh water lakes

23. According to the Supreme Court of India, ruling with respect to 'Bharat Stage VI' Norms, from which date, these are supposed to be implemented in the country?

- 10<sup>th</sup> December 2020
- 1<sup>st</sup> April 2020
- 1<sup>st</sup> June 2021
- 1<sup>st</sup> January 2021

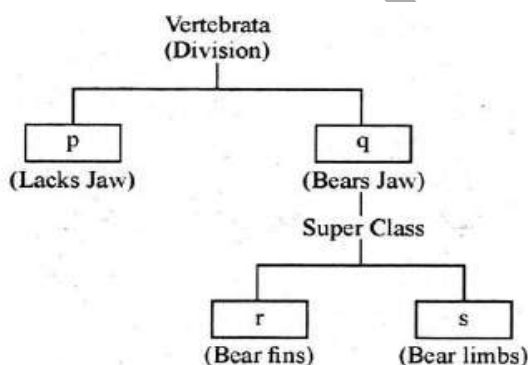
24. Match the following classes of fungi (Column - I) with the examples (Column - II)

Column I	Column II
(1) Phycomycetes	(p) Penicillium
(2) Ascomycetes	(q) Alternaria
(3) Basidiomycetes	(r) Albugo
(4) Deuteromycetes	(s) Puccinia

Choose the correct option

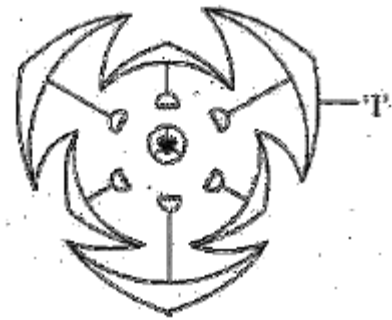
- (1) - (r), (2) - (p), (3) - (s), (4) - (q)
- (1) - (p), (2) - (s), (3) - (r), (4) - (q)
- (1) - (q), (2) - (p), (3) - (s), (4) - (r)
- (1) - (r), (2) - (p), (3) - (q), (4) - (s)

25. Observe the following simplified scheme and choose the correct option that matches with the letter given in the boxes



- p - Agnatha, q - Gnathostomata, r - Tetrapoda, s - Pisces
- p - Agnatha, q - Gnathostomata, r - Pisces, s - Tetrapoda
- p - Gnathostomata, q - Agnatha, r - Tetrapoda, s - Pisces
- p - Tetrapodam q - Pisces, r - Gnathostomata, s - Agnatha

26. Identify the floral unit 'T' in the given floral diagram

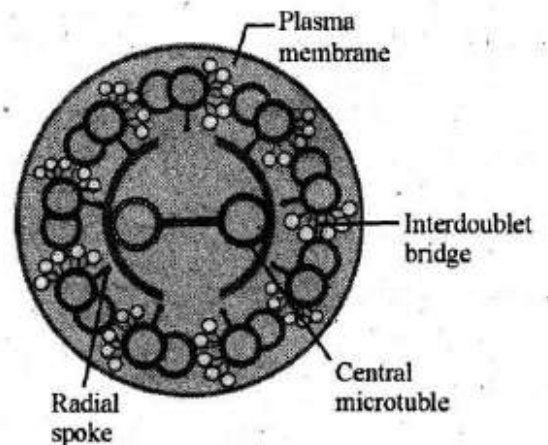


- Perianth
- Sepal
- Petal
- Tepal

27. A student observes grass and Hibiscus plants in his garden during noon. To his surprise, only the leaves of grass were found rolled inwards. The reason could be

- Due to higher rate of transpiration
- Presence of more number of stomata on the grass leaves
- Undifferentiated mesophyll in grass leaves
- Presence of bulliform cells in the grass leaves

28. In the below diagram, identify the part which connects the peripheral microtubules to the central strength



- Radial spok
- Plasma membrane
- Interdoublet bridge
- Central microtubule

29. The element whose percentage weight is highest in both Earth's crust and human body is

- a) Calcium                      b) Hydrogen  
c) Carbon                        d) Oxygen

30. Identify the event in meiosis mediated by the enzyme recombinase

- a) Interkinesis                b) Synaptic pairing  
c) Terminalization          d) Crossing Over

31. The deficiency of which of the these elements interrupts photolysis of water during photosynthesis?

- a) N and P                        b) Mn and Cl  
c) Zn and Cu                    d) Ca and K

32. In  $C_4$  plants,  $C_3$  cycle takes place in

- a) Bundle sheath cells  
b) Mesophyll cells  
c) Bulliform cells  
d) Companion cells

33. During citric acid, the various organic acid undergo decarboxylation. Which of the following organic acids of the above cycle have 4C, 5C and 6C respectively?

- a) Pyruvic acid,  $\alpha$ -ketoglutaric acid and citric acid  
b) Oxaloacetic acid, citric acid and succinic acid  
c) Succinic acid,  $\alpha$ -ketoglutaric acid and citric acid  
d) Pyruvic acid, malic acid and  $\alpha$ -ketoglutaric acid

34. Consider the following statements regarding photosynthesis and respiration in plants and select the correct option.

- I. RuBisCO has high affinity to oxygen in low  $CO_2$  concentration.  
II. The Calvin pathway occurs in the chloroplast of bundle sheath cells of  $C_4$  plants  
III. Yeast poison themselves when the concentration of alcohol reaches 7%  
IV. Oxygen is a final hydrogen acceptor during aerobic respiration

- a) Statements I & IV are correct, III is wrong  
b) Statements II & IV are correct, I is wrong  
c) Statements I & II are correct, IV is wrong  
d) Statements I & III are correct, II is wrong

35. Match the digestive glands given in Column - I with their respective enzymes given in Column - II and choose the correct combination from the given options.

Column I	Column II
1) Pancreas	(p) Pepsin
2) Gastric glands	(q) Enterokinase
3) Small intestine	(r) Ptyalin
4) Salivary glands	(s) Trypsin

Choose the correct option:

- a) (1) - (q), (2) - (s), (3) - (r), (4) - (p)  
b) (1) - (p), (2) - (q), (3) - (r), (4) - (s)  
c) (1) - (s), (2) - (p), (3) - (q), (4) - (r)  
d) (1) - (r), (2) - (q), (3) - (p), (4) - (s)

36. Match the different types of leucocytes (Column - I) with their percentage of occurrence (Column - II) in a healthy adult human and choose the correct answer.

Column I	Column II
1) Neutrophils	(p) 6 - 8%
2) Lymphocytes	(q) 60 - 65 %
3) Monocytes	(r) 0.5 - 1 %
4) Basophils	(s) 2 - 3 %
5) Eosinophils	(t) 20 - 25%

Choose the correct option:

- a) (1) - (q), (2) - (t), (3) - (p), (4) - (r), (5) - (s)  
b) (1) - (q), (2) - (r), (3) - (s), (4) - (t), (5) - (p)  
c) (1) - (r), (2) - (s), (3) - (t), (4) - (q), (5) - (p)  
d) (1) - (q), (2) - (t), (3) - (r), (4) - (s), (5) - (p)

37. In which part of the human of the human brain corpora quadrigemina is located?

- a) Cerebral hemisphere    b) Forebrain  
c) Hindbrain                    d) Midbrain

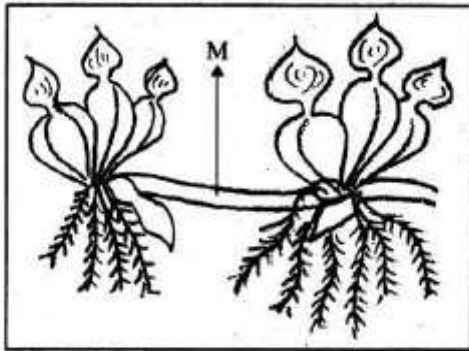
38. A girl after attaining sexual maturity shows development of growing ovarian follicles, development of mammary glands and high pitch of voice. These changes are attributed to \_\_\_\_\_ hormones.

- a) Androgens                      b) Melatonin  
c) Estrogens                      d) progesterone

39. In apple, the chromosome number of gametes is 17. What is the chromosome number in its primary endosperm nucleus (PEN)?

- a) 51                                      b) 34  
c) 68                                      d) 17

40. Identify the vegetative propagule 'M' in the following diagram:



- a) Runner                              b) Bulbil  
c) Offset                                d) Rhizome

41. During an excavation of soil, pollen fossils were retrieved from the deepest layer of soil. The pollen grains remained as fossils because

- a) Pollen grains are asexual reproductive structures  
b) The intine of pollen grains is made up of pectin  
c) Exine has spiny ornamentation  
d) The exine of pollen grains is highly resistant to enzyme action

42. Identify the mismatch

- a) Primary Endosperm Nucleus – Triploid  
b) Antipodals – Haploid  
c) Zygote – Diploid  
d) Synergids – Diploid

43. Identify the correct order of events in pollen – pistil interaction from the options given below:

- I. Release of male gametes into the embryo sac.  
II. Deposition of pollen grains on stigma  
III. Entry of pollen tube into embryo sac.  
IV. Development of pollen tube  
V. Entry of pollen tube into the ovule  
a) V → IV → III → II → I  
b) IV → III → II → I → V  
c) II → IV → V – III → I  
d) II → IV → III → V → I

44. Match the months listed in column – I with the organogenesis of foetus in Column – II

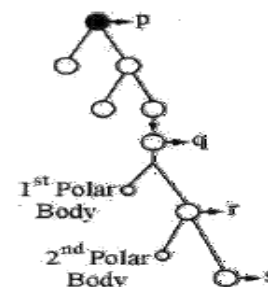
Column I	Column II
(i) Frist month	a) Separation of eye lids
(ii) Second month	b) Hairs on head
(iii) Fifth month	c) Heart
(iv) Six month	d) Limbs and digits

- (i)    (ii)    (iii)    (iv)  
a) (c)    (d)    (b)    (a)  
b) (c)    (d)    (a)    (b)  
c) (b)    (c)    (d)    (a)  
d) (d)    (b)    (c)    (a)

45. When the fallopian tube is blocked at ampullary region, the ovum fails to move from

- a) Infundibulum to isthmus  
b) Isthmus to infundibulum  
c) Ovary to ampulla  
d) Isthmus to uterus

46. Identify the cells represents as p, q, r and s in the schematic representation of oogenesis, shown below and choose the correct option





- a) p – Oogonia, q – Primary oocyte, r – Secondary oocyte, s – Ovum  
 b) p – Ovum, q – Oogonia, r – Primary oocyte s – Secondary oocyte  
 c) p – Secondary oocyte, q – Primary oocyte, r – Ovum, s – Oogonia  
 d) p – Ovum, q – Secondary oocyte, r – Primary oocyte, s – Ovum
47. Which of the following contraceptives could be effective in avoiding pregnancy if used within 72 hours after casual unprotected intercourse?  
 a) Progestogen – Estrogen combination  
 b) Androgen – FSH combination  
 c) Testosterone – Relaxin combination  
 d) Relaxin – Oxytocin combination
48. Choose the correct statement regarding the GIFT (Gamete Intrafallopian Tube Transfer Procedure)  
 a) Ova are collected from a female donor and are transferred to the uterus of recipient  
 b) Ova collected from a female donor are transferred to the fallopian tube to facilitate zygote formation in the recipient  
 c) Zygote is collected from a female donor and transferred to the fallopian tube of recipient  
 d) Zygote is collected from a female donor and transferred to the uterus of recipient
49. Which of the following characters was not studied by Mendel in his pea plant experiments?  
 a) Leaf shape                      b) Stem height  
 c) Pod shape                        d) Seed shape
50. In an organism, mutation in a single gene exhibits multiple phenotypic expressions. Identify the underlying genetic mechanism in the above instance.  
 a) Multiple allelism  
 b) Pleiotropy  
 c) Incomplete dominance  
 d) Polygenic inheritance
51. A pure breeding pea plant with round yellow seeds was crossed with a pea plant having wrinkled green seeds. On selfing of  $F_1$  hybrid of his cross, 64 progenies were obtained in the  $F_2$  generation. Find out the number of  $F_2$  progenies showing non – parental characters.  
 a) 24                                      b) 36  
 c) 4                                        d) 12
52. A man with blood group A marries a woman having blood group B. The maximum possible blood groups among their progenies are  
 a) A, B, AB, O                      b) AB only  
 c) A, B, AB                          d) A, B
53. The length of DNA helix in a typical nucleosome is  
 a)  $6.6 \times 10^9$  bp                      b) 200 bp  
 c) 1000 bp                              d)  $3.2 \times 10^6$  bp
54. Which of the following types of RNA carries amino acids towards the ribosome during translation?  
 a) mRNA                                b) rRNA  
 c) dsRNA                                d) tRNA
55. In eukaryotes, the entire base sequence of a gene do not appear in mature RNA because  
 a) Some gene sequences are removed by exonuclease  
 b) Transcription in eukaryotes consumes more energy  
 c) Coding sequences are removed during processing  
 d) Introns are removed during processing
56. Suppose DNA samples collected for DNA fingerprinting analysis are less than the required quantity. Which of the following techniques is helpful to make the samples sufficient for above analysis?  
 a) DNA probing                      b) Electrophoresis  
 c) Chromatography                  d) PCR

57. When *Escherichia coli* cells are cultured in a medium where lactose is absent, the 'I' gene of Lac Operon continues to produce repressor mRNA, because it is

- a) A structural gene
- b) a non – coding gene
- c) an operator gene
- d) a constitutive gene

58. For the given sequence of DNA, identify the complementary sequence of bases on its mRNA from the options given below

DNA 3' – ATGCATGCATGC – 5'

- a) 5' – GCATGCATGCAT – 3'
- b) 5' – UACGUACGUACG – 3'
- c) 5' – TACGTACGTACG – 3'
- d) 3' – UACGUACGUACG – 5'

59. Which among the following was the biggest land dinosaur?

- a) Triceratops
- b) Stegosaurus
- c) Tyrannosaurus rex
- d) Brachiosaurus

60. In a population of plants, some were extremely tall and the remaining were extremely dwarf. No plants of the population showed intermediate height. The type of operation of natural selection in the above case is

- a) Disruptive
- b) balancing
- c) directional
- d) stabilizing

### ANSWER KEYS

1. (d)	2. (c)	3. (a)	4. (d)	5. (c)	6. (d)	7. (c)	8. (c)	9. (c)	10. (a)
11. (a)	12. (a)	13. (d)	14. (d)	15. (d)	16. (a)	17. (c)	18. (a)	19. (d)	20. (a)
21. (d)	22. (a)	23. (b)	24. (a)	25. (b)	26. (d)	27. (d)	28. (a)	29. (d)	30. (d)
31. (b)	32. (a)	33. (c)	34. (a)	35. (c)	36. (a)	37. (d)	38. (c)	39. (a)	40. (c)
41. (d)	42. (d)	43. (c)	44. (a)	45. (a)	46. (a)	47. (a)	48. (b)	49. (a)	50. (b)
51. (a)	52. (a)	53. (b)	54. (d)	55. (d)	56. (d)	57. (d)	58. (b)	59. (c)	60. (a)