

PUMDET-2017

Subject : Life Science

Time Allowed : 1Hour 30 minutes

Maximum Marks : 100

20900312

Booklet No.

INSTRUCTIONS

Candidates should read the following instructions carefully before answering the questions:

1. This question Paper contains 50 MCQ type objective questions. Each question has four answer options given, viz. A, B, C and D.
2. Only one answer is correct. Correct answer will fetch full marks 2. Incorrect answer or any combinations of more than one answer will fetch - ½ marks. No answer will fetch 0 marks.
3. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C, or D.
4. Use only **Black/Blue ball point pen** to mark the answer by complete filling up of the respective bubbles.
5. Mark the answers only in the space provided. Do not make any stray mark on the OMR.
6. Write question booklet number and your roll number carefully in the specified locations of the OMR. Also fill appropriate bubbles.
7. Write your name (in block letter), name of the examination centre and put your full signature in appropriate boxes in the OMR.
8. The OMRs will be processed by electronic means. Hence it is liable to become invalid if there is any mistake in the questions booklet number or roll number entered or if there is any mistake in filling corresponding bubbles. Also it may become invalid if there is any discrepancy in the name of the candidate, name of the examination centre or signature of the candidate vis-a-vis what is given in the candidate's admit card. The OMR may also become invalid due to folding or putting stray marks on it or any damage to it. the consequence of such invalidation due to incorrect marking or careless handling by the candidate will be sole responsibility of candidate.
9. Rough work must be done on the question paper itself. Additional blank pages are given in the question paper for rough work.
10. Hand over the OMR to the invigilator before leaving the Examination Hall.

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1. A mutation results in production of protein that inhibits the action of other protein resulting in an abnormal phenotype. The most likely mode of inheritance is

- (A) Autosomal recessive
- (B) Autosomal dominant
- (C) X-linked recessive
- (D) Mitochondrial

2. DNA methylation is associated with

- (A) Shine Dalgarno sequence
- (B) CpG islands
- (C) TATA box
- (D) Enhancer

3. Radiation can induce single & double strand breaks in DNA. A sample containing plasmid DNA is exposed to ionizing radiation and irradiated sample run on agarose gel. How many bands would you expect?

- (A) 1
- (B) 2
- (C) 3
- (D) Multiple

4. Which of the following plant hormone control plant's response to drought by regulating stomatal opening or closure?

- (A) Gibberelic acid
- (B) Auxin
- (C) Abscisic acid
- (D) Cytokinin

5. Which one of the following is an example of *ex situ* conservation?

- (A) Biosphere reserve
- (B) National park
- (C) Wildlife sanctuary
- (D) Botanical garden

6. In a mitotically dividing cell, G₂ phase occurs at

- (A) beginning of interphase
- (B) towards end of interphase
- (C) just before DNA synthesis
- (D) interphase of a mitotically dividing cell is too short to be subdivided

7. Deamination of cytosine produces

- (A) Uracil
- (B) Pseudouracil
- (C) Hypoxanthine
- (D) 5-Methyl uracil

8. Excess of water exudation through hydathodes is known as

- (A) Guttation
- (B) Transpiration
- (C) Evaporation
- (D) Bleeding

9. Which of the following endocrine gland can store its secretory products?

- (A) Thyroid
- (B) Pancreas
- (C) Pituitary
- (D) Adrenal

10. Philadelphia Chromosome is an example of

- (A) Gene amplification
- (B) Gene duplication
- (C) Reciprocal translocation
- (D) None of the above

11. Most predominant antibody in serum is
(A) IgG
(B) IgM
(C) IgD
(D) IgE
12. The technique used to locate specific genes in chromosomes is
(A) Colony hybridization
(B) Western blotting
(C) Dot blot technique
(D) *In situ* hybridization
13. The degree of inhibition for non competitive inhibition of an enzyme catalyzed reaction
(A) Increases with increase in substrate concentration.
(B) Decreases with increase in substrate concentration.
(C) Reaches a maxima with increase in substrate concentration and then decreases.
(D) None of the above
14. The use of insulin hormone to purify its receptor is an example of
(A) Ion exchange chromatography
(B) Affinity chromatography
(C) Gel filtration chromatography
(D) None of the above
15. All of the following are thermostable polymerases except
(A) Taq Polymerase
(B) DNA Polymerase III
(C) Vent Polymerase
(D) Pfu Polymerase
16. Which of the following is a connecting link showing organic evolution?
(A) Kangaroo
(B) Earthworm
(C) Cockroach
(D) Peripatus
17. Excess prolactin causes
(A) Acromegaly
(B) Early menopause
(C) Gynaecomastia
(D) Anaemia
18. The degree of genetic relatedness between the offspring and their parents is
(A) higher than that between sister and brother.
(B) lower than that between sister and brother.
(C) the same as that between sister and brother.
(D) depending on the number of siblings.
19. The biological clock in higher vertebrates is regulated by
(A) Pituitary gland
(B) Cerebral cortex
(C) Supra-chiasmatic nucleus
(D) Thymus
20. An unbiased SD of a sample is calculated because
(A) the calculated SD is representative of the sample.
(B) to test the probability of correctness of hypothesis.
(C) the calculated SD is representative of the population.
(D) the experimenter fears that there was a bias in selection of sample.

21. Selectivity of ions for an ion channel is determined primarily by

- (i) The size of the ion
 - (ii) The charge of the ion
 - (iii) The hydration state of the ion
 - (iv) Ability to interact with channel amino acids
- (A) (i) and (ii) only
 (B) (i), (ii) and (iii)
 (C) (ii) and (iii) only
 (D) (i), (ii), (iii) and (iv)

22. Detoxification of chemicals in the body occurs in

- (A) Kidney
 (B) Liver
 (C) Intestine
 (D) Heart

23. Correlation coefficients range from

- (A) +0.5 to -0.5
 (B) -1 to +1
 (C) -1 to 0
 (D) -0.5 to 0

24. A regression equation allows to

- (A) Predict a value of the dependent variable with a known independent variable within the experimental range.
 (B) Predict a value of the dependent variable with a known independent variable outside the experimental range.
 (C) Test the probability of hypothesis.
 (D) Tests the goodness of fit of an experimental data.

25. Which of the following vitamins can be sequestered in obese individuals?

- (A) Vitamin B₁
 (B) Vitamin C
 (C) Vitamin A
 (D) Vitamin B₁₂

26. Polycistronic mRNA has

- (A) only introns
 (B) both introns and exons
 (C) only exons
 (D) longer life than monocistronic mRNA

27. Zona pellucida is a glycoproteinaceous membrane secreted by

- (A) primary oocyte
 (B) secondary oocyte
 (C) secondary follicle
 (D) tertiary follicle

28. For a dsDNA you measure $OD_{280nm} = 0.55$ and $OD_{260nm} = 1.0$, which one is correct?

- (A) DNA is pure and concentration is 50mg/ml.
 (B) DNA is not pure and concentration is 50 μ g/ml.
 (C) DNA is pure and concentration is 50 μ g/ml.
 (D) DNA is not pure and concentration is 55mg/ml.

29. What is the angle between lamp and detector in a fluorimeter?

- (A) 0°
 (B) 90°
 (C) 180°
 (D) 45°

30. Genomics is the study of genomes. Genome refers to the

- (A) DNA of an organism
 (B) total DNA and RNA of an organism
 (C) entire genes of an organism
 (D) total DNA, RNA and cDNA of an organism

31. State which one is the wrong
- (A) Tyrosine phosphorylation of the IRSs followed by activation of the PI3 kinase is a common feature of signaling by insulin.
 - (B) Tyrosine phosphorylation of the IRSs followed by activation of the PI3 kinase is a common feature of signaling by several cytokines and insulin.
 - (C) Tyrosine phosphorylation of the IRSs followed by activation of the PI3 kinase is a common feature of signaling by several cytokines and erythropoietin.
 - (D) Tyrosine phosphorylation of the IRSs followed by activation of the PI3 kinase is a common feature of signaling by several cytokines and glucagon.
32. Choose the wrong one:
- (A) Steroid hormones bind to HREs, located downstream of the transcription start site of the genes
 - (B) The most highly conserved region of the nuclear receptor is a stretch of about 65-70 amino acid residues that constitute the DNA binding domain.
 - (C) The receptor dimers after binding to DNA recruit coactivators.
 - (D) The receptor dimers after binding to DNA recruit corepressors.
33. Function of LCAT is related with
- (A) cholesterol transport through LDL.
 - (B) cholesterol transport through HDL.
 - (C) cholesterol transport through chylomicron.
 - (D) cholesterol transport through VLDL.
34. Which of the following is the origin of the majority of the ATP used in the pathway of gluconeogenesis?
- (A) β -oxidation of fatty acid
 - (B) Break down of amino acid
 - (C) Degradation of glycogen
 - (D) Oxidation of glucose-6-phosphate
35. Substrate level phosphorylation is catalysed by which of the following enzyme?
- (A) Hexokinase
 - (B) Glycerol kinase
 - (C) Pyruvate kinase
 - (D) Phosphofructokinase-I
36. Matrix-assisted laser desorption ionization time of flight (MALDI-TOF) spectrometry is most useful for predicting the following:
- (A) Molecular mass
 - (B) Isoelectric point
 - (C) Bonding pattern
 - (D) Secondary structure
37. The optical absorbance of protein is measured at 280nm. At this wavelength, the absorbance of protein is mainly due to which of the following amino acids?
- (A) Tyrosine and Cysteine
 - (B) Valine and Serine
 - (C) Leucine and Glycine
 - (D) Tryptophan and Tyrosine
38. The isoelectric point (pI) is the pH at which a particular molecule of surface carries no net electrical charge. Amino acids alanine, glutamate and arginine were subjected to electric field in a buffer of pH 6. Given that the pI of alanine is 6, of glutamate is 3.22, of arginine is 10.76, which of the following statements about their mobility is correct?
- (A) Glutamate would move towards cathode.
 - (B) Arginine would move towards anode.
 - (C) Alanine would not move.
 - (D) All of them would move towards cathode.

39. A virus contains 256 proteins, 64 homodimers having a molecular weight of 32kD and 192 homotetramers having a molecular weight of 64kD. If the virus is disrupted and analyzed by SDS-PAGE, how many bands would you expect?

- (A) 256
- (B) 16
- (C) 1
- (D) 64

40. Transport of neutral substances across the cell membrane occurs via

- (A) Porins
- (B) Ionophore
- (C) Lipopolysaccharides
- (D) Diffusion

41. Amylin is secreted by which cells of the islet of Langerhans?

- (A) Beta cells
- (B) Alpha cells
- (C) Delta cells
- (D) Gamma cells

42. To a seriously ill patient addition of amino acid in diet results in a positive nitrogen balance. The mechanism underlying the phenomena is

- (A) increased growth hormone secretion.
- (B) enhanced rate of gluconeogenesis.
- (C) increased absorption of amino acid from diet.
- (D) increased secretion of insulin.

43. Which of the following would you expect to find in a patient whose diet has been low in calcium for last two months?

- (A) Increased phosphate levels
- (B) Raised calcitonin levels
- (C) Increased parathormone secretion
- (D) Activation of 24-25 dihydrocolecalciferol

44. 2 enzyme required for removing RNA primer from the lagging strand during bacterial DNA replication is

- (A) DNA primase
- (B) DNA ligase
- (C) DNA polymerase I
- (D) DNA polymerase III

45. Endothelium derived relaxing factor (EDRF) induced vasodilation is mediated by

- (A) increased intracellular cGMP
- (B) decreased intracellular cGMP
- (C) increased extracellular cAMP
- (D) decreased intracellular cAMP

46. Enzymes which catalyze the geometric or structural changes within a single molecule are

- (A) Lyases
- (B) Ligases
- (C) Isomerases
- (D) Transferases

47. Zika primarily infects

- (A) Fetal Liver
- (B) Fetal Kidney
- (C) Fetal reproductive tissues
- (D) Fetal neuronal tissues

48. You engineered a bacteriophage that had the protein coat of T2 phage and the DNA of T4 phage. The composite bacteriophage was allowed to infect bacteria. What would be the composition of the new phages produced in the bacterial cells?

- (A) New phages would have the protein coat DNA of T2 and the DNA of T4
- (B) New phages would have the protein coat DNA of T2 and
- (C) New phages would have the protein coat DNA of T4 and
- (D) New phages would have a mixture of the DNA and proteins of both phages.

49. The BOD (Biological Oxygen Demand) of polluted water bodies will be

- (A) high
- (B) low
- (C) extremely Low
- (D) No change

50. The number of autosomes in humans

- (A) 21 pairs
- (B) 46
- (C) 45
- (D) 44