Entrance Exam

2024



QUESTION PAPER

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BIOLOGY

1. In a dihybrid cross, the ratio of genotype in F2 generation is

   (A) 1:2:1:2:1:2 :1:2:1
   (B) 2:1:2 :1:2:1:2:1:2
   (C) 1:2:1 :2:4:2:1:2:1
   (D) 2:1:2:2:4:2:2:1:2

2. Plants in which the ovules are **not** enclosed by any ovary wall belong to the group

   (A) Angiosperms
   (B) Gymnosperms
   (C) Pteridophytes
   (D) Thallophytes

3. Which organism is responsible for the appearance of red tides?

   (A) *Euglena*
   (B) Slime mould
   (C) *Paramoecium*
   (D) *Gonyaulax*

4. Which of the following is a colonial alga?

   (A) Volvox
   (B) Ulothrix
   (C) Spirogyra
   (D) Chlorella

5. Metagenesis is found in

   (A) Obelia
   (B) Hydra
   (C) Pleurobrachia
   (D) Limulus

6. Secretion of sporopollenin is mediated by

   (A) Endothecium
   (B) Pollen mother cell
   (C) Tapetum
   (D) Cytoplasm of the pollen

7. The adaptation of having long and feathery stigma is a characteristic feature that helps in

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(A) Insect pollination
(B) Water pollination
(C) Bird pollination
(D) Wind pollination

8. Granular reaction which prevents the entry of sperm resulting in the hardening of zona pellucida is called as

(A) Cortical reaction
(B) Binding reaction
(C) Cortisol reaction
(D) Acrosin reaction

9. Bartholin gland is situated on

(A) either side of fallopian tube in humans
(B) either side of vagina
(C) either side of penis
(D) either side of vas deferens

10. A structure located on the basilar membrane of the cochlea, containing hair cells that convert sound vibrations into nerve impulses is

(A) Eustachian tube
(B) Organ of corti
(C) Scala vestibuli
(D) Scala tympani

11. Which of the following is the correct dental formula of a human?

(A) 2132/2132
(B) 1223/1223
(C) 2123/2123
(D) 3122/3122

12. Every 100 ml of deoxygenated blood delivers approximately …… of CO_2 to the alveoli.

(A) 5 ml
(B) 4 ml
(C) 10 ml
(D) 5 L

13. Each artery and vein consists of three layers. An inner tunica intima, a middle tunica media, and an external tunica externa. The tunica externa is made up of

(A) Squamous endothelium

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(B) Smooth muscle
(C) Elastic fibres
(D) Fibrous connective tissue with collagen fibres

14. The chemical nature of the hormone epinephrine is

(A) steroid
(B) aminoacid derivative
(C) peptide
(D) iodothyronine

15. Conditional reabsorption of Na+ and water takes place in

(A) Proximal Convoluted Tubule
(B) Henle's Loop
(C) Distal Convoluted Tubule
(D) Bowman's capsule

16. ECG is a graphical representation of the electrical activity of the heart during a cardiac cycle. Each peak in the ECG is identified with a letter from P to T that corresponds to a specific electrical activity of the heart. The P-wave represents

(A) depolarisation of the atria
(B) depolarisation of the ventricles
(C) repolarisation of the atria
(D) ventricular contraction

17. Which term best describes the role of plasmid DNA in the process of transferring genetic material in genetic engineering?

(A) Genetic scissors
(B) Molecular vectors
(C) DNA synthesizers
(D) PCR enzymes

18. How do restriction enzymes cut DNA strands at palindrome sites?

(A) Exactly at the center of the palindrome
(B) Randomly along the DNA strand
(C) Near the ends of the DNA strand
(D) Between the same two bases on opposite strands

19. What is the process called when isolated protoplasts from two different plant varieties with desirable characteristics are fused to create hybrid protoplasts?

(A) Genetic engineering
(B) Protoplast isolation

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(C) Somatic hybridisation
(D) Plant cloning

20. The first stable compound in Calvin cycle is

(A) oxaloacetic acid
(B) 3-phosphoglyceric acid
(C) Ribulose-1,5- bisphosphate
(D) 1,3-Bisphosphoglyceric acid

21. Number of ATP and NADPH required for the synthesis of one glucose molecule in Calvin cycle

(A) 12 ATP and 18 NADPH
(B) 12 ATP and 6 NADPH
(C) 18 ATP and 12 NADPH
(D) 6 ATP and 12 NADPH

22. Malic acid is a

(A) C3-dicarboxylic acid
(B) C4-dicarboxylic acid
(C) C5-dicarboxylic acid
(D) C2-dicarboxylic acid

23. Metal cofactor of cytochrome c oxidase is

(A) Zn
(B) Co
(C) Mg
(D) Cu

24. Respiratory quotient of carbohydrate is

(A) 0.8
(B) 1
(C) 1.5
(D) 2

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25. The antagonist of gibberellin is

(A) Auxin
(B) Abscisic Acid
(C) Cytokinin
(D) Ethylene

26. Which synthetic phytohormone is widely used for maintaining weed free lawns?

(A) 2,4-Dichlorophenoxyacetic acid
(B) Ethephone
(C) 1-Naphthalene acetic acid
(D) Zeatin

27. Balloon like outgrowths seen in secondary xylem vessel are called as

(A) Tylosoid
(B) Tyloses
(C) Telome
(D) Casparian thickenings

28. Which of the following statements is true about the Krebs (citric acid) cycle and the Calvin (light independent) cycle?

(A) both results in a net production of ATP and NADH
(B) both results in release of oxygen
(C) both are carried out by enzymes located within an organelle matrix
(D) both take place within the cytoplasmic matrix

29. When one gene affects more than one phenotype it is known as

(A) Dominance
(B) Pleiotrophy
(C) Epistasis
(D) Penetrance

30. The Montreal Protocol is aimed to

(A) Reduce greenhouse gas emissions
(B) Phase out ozone-depleting substances like CFCs
(C) Protect endangered species from illegal trade
(D) Promote sustainable forestry practices

31. Which among the following bioactive molecules is used as the immuno-suppressive agent in organ transplantation?

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(A) Statin
(B) Cyclosporin-A
(C) Streptomycin
(D) Streptokinase

32. Roquefort cheese is ripened by growing a specific

(A) Bacteria
(B) Mycoplasma
(C) Fungi
(D) Algae

33. The 'clot buster' for removing clots from blood vessels in patients who have undergone myocardial infarction, is mainly obtained from the species

(A) *Streptococcus*
(B) *Staphylococcus*
(C) *Bacillus*
(D) *Pseudomonas*

34. Which antibody is produced in an 'allergic response'?

(A) IgE
(B) IgD
(C) IgM
(D) IgA

35. The cell-mediated immune response is mediated by

(A) T-lymphocyte
(B) B-lymphocyte
(C) Thymus
(D) Antibody

36. A bite of an Anopheles mosquito causes the rupture of RBCs and releases a toxic substance called as

(A) Saxitoxin
(B) Aflatoxin
(C) Haemozoin
(D) Enterotoxin

37. HIV affects the progressive decrease of

(A) Helper T-cells
(B) Cytotoxic -T –cells
(C) Interferons

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(D) M-N cells

38. A mutation disrupts a protein channel in the mitochondrial inner membrane, specifically impacting proton movement. This is most likely to impact

(A) Photosynthesis
(B) Oxidative phosphorylation
(C) Glycolysis
(D) Fatty acid oxidation

39. Bacteria utilize a variety of transport mechanisms to acquire nutrients from their environment. Which of the following mechanisms is most likely dependent on a proton motive force across the cell membrane?

(A) Simple diffusion
(B) Facilitated diffusion
(C) Group translocation
(D) Active transport

40. Autophagy is a cellular self-degradation mechanism that clears damaged components and maintains cellular homeostasis. Which organelle serves as the primary site for autophagic cargo degradation?

(A) Golgi apparatus
(B) Endoplasmic reticulum
(C) Lysosome
(D) Vacuole

41. In peas, a pure tall (TT) is crossed with a pure short plant(tt). The ratio of pure tall plants to pure short plants in the F2 generation is:

(A) 1:3
(B) 3:1
(C) 1:1
(D) 2:1

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42. An organism with radial symmetry, exclusively marine, having no notochord and having eight pairs of comb plates can be classified under the phylum

(A) Ctenophora
(B) Rotifera
(C) Ectoprocta
(D) Acanthocephala

43. The suspensor cell in monocots may serve as a

(A) Micropyle
(B) Hilum
(C) Haustorium
(D) Endosperm

44. Which one of the following plant Phyla has no vascularization?

(A) Bryophyta
(B) Filicinophyta
(C) Coniferophyta
(D) Angiospermophyta

45. As per Whitaker's five kingdom classification, a single-celled organism lacking membrane-bound organelles and has a cellwall composed of pseudo peptidoglycans is placed under the kingdom

(A) Monera
(B) Protista
(C) Fungi
(D) Animalia

46. Which animal phylum exclusively contains osmoconformers?

(A) Chordata
(B) Annelida
(C) Echinoderms
(D) Arthropoda

47. Coelacanth fish is considered as a connective link between

(A) Fish and amphibian
(B) Cartilaginous fish and bony fish
(C) Non chordates and chordates
(D) Cyclostomes and cartilaginous fish

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48. Which phylum follows the process of metagenesis?

(A) Cnidaria
(B) Protozoa
(C) Porifera
(D) Arthropoda

49. The receptor that is not involved in photoreception of Cockroaches is

(A) Ommatidia
(B) Rhabdomeres
(C) Statocyst
(D) Ocellus

50. The type of root system which is found exclusively in Pteridophytes is

(A) Adventitious roots only
(B) Both adventitious and tap-roots
(C) Tap roots only
(D) Mostly tap roots and rarely adventitious

51. Chitin from insects form strong nanofibrils with a tensile strength of ~1.6–3.0 GPa providing rigidity because of their

(A) Van der Waals force across chitin chains
(B) Hydrogen bonds
(C) Electrostatic interaction between atoms
(D) Carbon – Carbon bonds across chitin chains

52. Which of the following sensory receptors do the antennae of Cockroaches have?

(A) Tactile and Olfactory only
(B) Olfactory and Photosensory reception only
(C) Tactile, Olfactory and Thermal receptors
(D) Tactile and thermal receptors

53. Hemocyanins are metalloproteins that transport oxygen throughout the body of some invertebrate animals. The site of hemocyanin production in crustaceans is

(A) Digestive glands
(B) Malpighian tubules
(C) Dorsal ganglion
(D) Mandibles

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54. The appendages of arthropods are made up of several polymorphic subunits called

(A) Podomeres
(B) Rhabdomeres
(C) Myomeres
(D) Botticelli

55. Which of the following has a subset of channels that remain open even in an unstimulated resting cell?

(A) Na^+ voltage-gated channel
(B) K^+ leaky channel
(C) Ca^{2+} channel
(D) Cl^- channel

56. Cell will usually divide, if it receives the proper signal at

(A) M Phase
(B) S phase
(C) G1 phase
(D) G2 phase

57. Membrane potential in mitochondria is critical in oxidative phosphorylation and is monitored by

(A) Patch clamping
(B) Measuring internal sodium ions after lysing the mitochondria
(C) Measuring the distribution of labelled ions across the mitochondrial membrane
(D) Measuring the consumption of ATP

58. The effect of 2,4 –dinitrophenol on mitochondria is

(A) Blocks ATP synthesis without inhibiting electron transport by dissipating the proton gradient
(B) Blocks the electron transport and ATP synthesis by inhibiting ATP-ADP exchange across the inner mitochondrial membrane
(C) Blocks electron transport chain
(D) Interacts directly with ATP synthase and inhibits its activity

59. In humans, the concept of dosage compensation is done by

(A) Hyperactivation of X chromosome
(B) Hyperactivation of Y chromosome
(C) Heterochromatization of X chromosome
(D) Heterochromatization of Y chromosome

60. Which protein destabilizes microtubule arrays by increasing the shrinkage rate of microtubules?

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(A) End-binding protein 1
(B) Catastrophins
(C) Dynein
(D) Dynamitin

61. After translation, protein particles are modified in

(A) Golgi apparatus
(B) Lysosome
(C) Ribosome
(D) Centrosome

62. The cell cycle regulatory protein primarily involved in the exit from mitosis is

(A) CDK- Activating Kinase (CAK)
(B) M- Cyclins
(C) Anaphase Promoting Complex (APC)
(D) Cdc 20

63. Photorespiration lowers the efficiency of photosynthesis by preventing the formation of

(A) 3-phosphoglycerate
(B) Ribulose bisphosphate
(C) ATP
(D) Carbon dioxide

64. The enzyme that helps in photorespiration and is seen in the peroxisome is

(A) Phosphoglycolate phosphatase
(B) Glycerate kinase
(C) Glycine decarboxylase
(D) Serine aminotransferase

65. The first step in the NADP-ME type C_4 pathway is the conversion of pyruvate to phosphoenolpyruvate by

(A) Pyruvate dikinase
(B) Pyruvate phosphate dikinase
(C) Phosphate dikinase
(D) Phosphokinase

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66. Which of the following amino acids is formed on catabolism of histidine?

(A) Alpha-ketoglutarate
(B) Glutamate
(C) Proline
(D) Glutamine

67. Bohr effect in haemoglobin describes

(A) Higher pH found in actively metabolic tissues
(B) Effect of pH on haemoglobin and myoglobin
(C) Increased affinity for O_2 at lower pH
(D) Decreased affinity for O_2 at lower pH

68. When breastfeeding is replaced by less nutritive food low in proteins and calories, infants below the age of one year are likely to suffer from

(A) Marasmus
(B) Rickets
(C) Kwashiorkor
(D) Pellagra

69. The following measurements were obtained in a patient: Central venous pressure 10 mm/Hg; Heart rate 70 beats/min; Pulmonary vein O_2: 0.24ml O_2/ml; Whole body O_2 consumption 500ml/min. What is the patient's cardiac output?

(A) 1.65 L/min
(B) 4.55 L/min
(C) 5.00 L/min
(D) 6.25 L/min

70. Which of the following organs in mammals does not have a central medullary region surrounded by a cortical region?

(A) Ovary
(B) Adrenal
(C) Liver
(D) Kidney

71. Which of the following contains only the mesodermal structures?

(A) Heart, blood, bones, notochord
(B) Heart, blood, muscles, liver
(C) Notochord, blood, liver, muscles
(D) Liver, heart, bones, blood

72. What is the purpose of using hormonal stimulation in IVF?

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(A) To prevent fertilization
(B) To enhance sperm motility
(C) To induce multiple egg development
(D) To inhibit ovulation

73. How many autosomes does a human primary spermatocyte have?

(A) 34
(B) 44
(C) 54
(D) 33

74. Which among the following is a living 'fossil'?

(A) *Ginkgo biloba*
(B) *Taxus bacata*
(C) *Psilotum*
(D) *Nepenthes*

75. *Mycobacterium tuberculosis* is able to cause disease because it enters the host cell and does not allow endosomes to fuse with

(A) Lysosomes
(B) Peroxisome
(C) ER
(D) Golgi complex

76. Lymphatic system is mainly involved in

(A) Innate immunity
(B) Adaptive immunity
(C) Phagocytosis
(D) Recycling lymph

77. Which among the following is prevented by a live attenuated vaccine?

(A) Poliomyletes
(B) Smallpox
(C) Diphtheria
(D) Tetanus

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78. What is the significance of the "polylinker" region in a plasmid used for gene cloning?

(A) It contains the gene of interest
(B) It facilitates DNA replication
(C) It allows easy insertion of foreign DNA
(D) It codes for a selectable marker

79. The limit of BOD prescribed by the Central Pollution Control Board for the discharge of industrial and municipal wastewater into natural surface waters is

(A) < 30 ppm
(B) < 3.0 ppm
(C) < 10 ppm
(D) < 100 ppm

80. Which of the following is an example of a keystone species?

(A) Squirrel
(B) Oak tree
(C) Beaver
(D) Sea otter

81. Who proposed the mass flow hypothesis?

(A) Ernst Munch
(B) Clement Adebooye
(C) Daniel I. Arnon
(D) Elijah Ateka

82. Which process in C3 pathway is catalysed by RuBisCO enzyme?

(A) Reduction
(B) Oxidation
(C) Phosphorylation
(D) Carboxylation

83. Bud dormancy and seed germination are facilitated by

(A) Auxin
(B) Gibberellin
(C) Cytokinin
(D) Ethylene

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84. Hyperinflation causing permanently expanded “barrel chest” is a characteristic of

(A) Lung cancer
(B) Pulmonary emphysema
(C) Chronic bronchitis
(D) Tuberculosis

85. Which of the following clotting factors is called as fibrin stabilizing factor?

(A) Factor XI
(B) Factor VIII
(C) Factor VII
(D) Factor XIII

86. Which gland is responsible for acromegaly?

(A) Thyroid gland
(B) Adrenal gland
(C) Pituitary gland
(D) Parathyroid gland

87. Inflammation of the fallopian tube is called

(A) Orchitis
(B) Hernia
(C) Salpingitis
(D) Uterine prolapsed

88. Hemophilia is caused due to the deficiency of the clotting factor

(A) VII
(B) VIII
(C) X
(D) XII

89. Filariasis is caused by

(A) Ring worm
(B) Round worm
(C) Flat worm
(D) Ribbon worm

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90. How many aminoacids are present in human insulin molecule?

(A) 27
(B) 31
(C) 47
(D) 51

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Subject Name: 104 MSc BIOLOGY					
SI No.	**Key**	**SI No.**	**Key**	**SI No.**	**Key**
1	C	31	B	61	A
2	B	32	C	62	C
3	D	33	A	63	A
4	A	34	A	64	D
5	A	35	A	65	B
6	C	36	C	66	B
7	D	37	A	67	D
8	A	38	B	68	A
9	B	39	D	69	D
10	B	40	C	70	C
11	C	41	C	71	A
12	B	42	A	72	C
13	D	43	C	73	B
14	B	44	A	74	A
15	C	45	A	75	A
16	A	46	C	76	B
17	B	47	A	77	A
18	D	48	A	78	C
19	C	49	C	79	C
20	B	50	A	80	D
21	C	51	B	81	A
22	B	52	C	82	D
23	D	53	A	83	B
24	B	54	A	84	B
25	B	55	B	85	D
26	A	56	C	86	C
27	B	57	C	87	C
28	C	58	A	88	B

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29	B	59	C	89	B
30	B	60	C	90	D

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