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WBJEE (Medical) : 2016

(Questions with Answer Keys)

Booklet Code

BIOLOGY

Category – I (Q.1 to Q.80)

Only one answer is correct. Correct answer will fetch full marks 1. Incorrect answser or any combination of more than one answer will fetch –¼ marks.

1. Parathion is a pesticide. In which one of the following categories it belongs ?

(A) Organochlorine (B) Synthetic pyrethroids

(C) Carbamate (D) Organophosphate

Solution : (D)

2. Chipko movement is concerned with :

(A) Conservation of water resources (B) Conservation of forest

(C) Conservation of tiger (D) Conservation of biodiversity

Solution : (B)

3. Which one of the following features is common to Earthworm, Butterfly, Spider and Prawn ?

(A) Setae (B) Antenae (C) Ventral nerve cord (D) Nephridia

Solution : (C)

4. Phenetic classification of organisms is based on :

(A) Observable characteristics of existing organisms

(B) The ancestral lineage of existing organisms

(C) Dendrogram based on DNA characteristics

(D) Sexual characteristics

Solution : (A)

5. Tautonym is :

(A) Unscientific explanation of a phenomenon (B) Common name used as scientific name

(C) Non-latinised name (D) Same name for genus and species

Solution : (D)

6. Phenomenon involved in increasing the concentration of non-degradable pollutants in a trophic level of an ecosystem is called :

(A) Biodegradation (B) Biomineralization (C) Bioaccumulation (D) Biomagnification

Solution : (D)

7. 'Ozone layer' is located in :

(A) Troposphere (B) Hydrosphere (C) Stratosphere (D) Lithosphere

Solution : (C)

8. Which one of the following combinations is wrong ?

(A) Ramsar Convention – Air pollution (B) Kyoto Protocal – Climate change

(C) Montreal Protocol – Ozone depletion (D) Rio Convention – Sustainable development

Solution : (A)

9. The genome of Influenza virus is a :

(A) Single–stranded RNA (–) (B) Single–stranded RNA (+)

(C) Double–stranded RNA (D) Single–stranded DNA

Solution : (A)

10. An immunoglobulin G molecule is composed of :

(A) two identical heavy chains and two identical light chains

(B) two identical heavy chains and two different light chains

(C) two different heavy chains and two identical light chains

(D) two different heavy chains and two different light chains

Solution : (A)

11. Which antibody is first to be released into blood following an infection ?

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

Solution : (C)

12. The uptake of naked DNA by bacteria is called :

(A) Conjugation (B) Transformation (C) Transfection (D) Transduction

Solution : (B)

13. Which one of the followings is an oncogenic virus ?

(A) *Human immunodeficiency virus type 2* (B) *Vesicular stomatitis Indiana virus*

(C) *Human herpesvirus 3* (D) *Epstein–Barr virus*

Solution : (D)

14. Who discovered the small-pox vaccine ?

(A) Louis Pasteur (B) Selman Waksman (C) Cesar Milstein (D) Edward Jenner

Solution : (D)

15. Viral genome incorporated into host DNA is called :

(A) Prophase (B) Prophage (C) Bacteriophage (D) None of these

Solution : (B)

16. Which of the following diseases is caused by virus and transmitted by mosquito :

(A) Typhus (B) Yellow fever (C) Plague (D) Filariasis

Solution : (B)

17. Bacterial resistance to antibiotics is a genetic trait, it is normally carried by the :

(A) Centromere (B) Plasmid (C) Chromosome (D) Intron

Solution : (B)

18. The DNA-joining enzyme, required in recombinant DNA technology, is :

(A) Transcriptase (B) DNA ligase (C) DNA helicase (D) DNA polymerase

Solution : (B)

19. The causal organism of Kala-azar is :

(A) *Plasmodium vivax* (B) *Leishmania donovani*

(C) *Tryponosoma lewsii* (D) *Wuchereria bancrofti*

Solution : (B)

20. In which of the following phase DNA / chromosome replication takes place ?

(A) G_1-phase (B) G_2-phase (C) S-phase (D) Prophase

Solution : (C)

21. Cells of certain species of animals have six pairs of chromosomes. How many molecules of DNA will remain in a nucleus of these animals during G_2 phase ?

(A) 12 (B) 48 (C) 6 (D) 24

Solution : (D)

22. The enzyme, which helps to cut one strand of DNA duplex to release tension of colling of two strands is :

(A) DNA ligase (B) DNA polymerase - I (C) Topoisomerase (D) Helicase

Solution : (C)

23. Cytoskeletal network of a cell is built by a process called :

(A) Triphasic polymerization (B) Biphasic polymerization

(C) Trendmilling (D) Dynamic instability

Solution : (C)

24. During cell division the process that causes failure of separation of sister chromatids is called :

(A) Coincidence (B) Interference (C) Non-disjunction (D) Complementation

Solution : (C)

25. Nuclear membrane is formed around the groups of daughter chromosomes during the telophase by

(A) Endoplasmic reticulum (B) Lysosomes

(C) Golgi apparatus (D) Microbodies

Solution : (A)

26. Which of the following is not true for meiosis ?

(A) Production of genetic variability

(B) Maintaining constancy of chromosome number during sexual reproduction

(C) Reduction of chromosome number to one half

(D) Production of diploid cell

Solution : (D)

27. Which of the following pair of amino acids are acidic ?

(A) Glycine and glutamate (B) Aspartate and valine

(C) Alanine and methionine (D) Glutamate and aspartate

Solution : (D)

28. Which of the following is used as the mitotic spindle poison ?

(A) Ca^{++} (B) Mg^{++} (C) Tubulin (D) Colchicine

Solution : (D)

29. In which animal cells polytene chromosomes are noticed ?

(A) Man (B) Reptiles (C) Bird (D) *Drosophila*

Solution : (D)

30. Which cell organelle is present in both prokaryotic and eukaryotic cells ?

(A) Endoplasmic reticulum (B) Mitochondria

(C) Nucleus (D) Ribosome

Solution : (D)

31. Which one of the following is stored in lysosome ?

(A) Secretory glycoproteins (B) Hydrolytic enzymes

(C) RNA and protein (D) Fat, sugar, ATP

Solution : (B)

32. 'Peroxisome' is the microbody of a cell that helps in :

(A) Removal of electron and associated hydrogen (B) Removal of proton

(C) Conversion of carbohydrate into fat (D) Conversion of carbohydrate into protein

Solution : (B)

33. Nucleosome core is intimately associated with

(A) 160 bp of DNA (B) 210 bp of DNA (C) 250 bp of DNA (D) 100 bp of DNA

Solution : (A)

34. Histone proteins are rich in

(A) Alanine and glycine (B) Arginine and lysine

(C) Histidine and serine (D) Tyrosine and cysteine

Solution : (B)

35. Companion cells are associated with

(A) Axial parenchyma (B) Ray parenchyma (C) Seive tubes (D) Seive cells

Solution : (C)

36. Marriage between persons having AB blood groups would produce

(A) Offsprings with AB blood group only (B) Offsprings with A, B and AB blood groups

(C) Offsprings with A and B blood groups only (D) Offsprings with A, B, AB and O blood groups

Solution : (B)

37. Test Cross involves :

(A) Cross between two F_1 progenies

(B) Crossing F_1 progeny with double recessive parental progeny

(C) Crossing genotypes with recessive traits

(D) Crossing two genotypes with dominant traits

Solution : (B)

38. In metamale *Drosophila*, chromosome combination is

(A) 3X : 2A (B) 3X : 3A (C) XY : 3A (D) XY : 2A

Solution : (C)

39. Which one is xex-linked disease in man ?

(A) Polio (B) Alzheimer's disease (C) Hemophilia (D) Beriberi

Solution : (C)

40. Initiation of DNA strand synthesis is performed by

(A) DNA polymerase I (B) DNA Helicase

(C) DNA Primase (D) DNA Topoisomerase

Solution : (B); [RNA primer synthesized by the help of RNA primase. 1st initiation of polymerization of the DNA nucleotide takes place by DNA pol III after the activity of helicase. But here, both (RNA primer and DNA pol III) are absent, so here appropriate option is DNA helicase. DNA pol I helps in polymerisation after the destruction of RNA primer]

41. Which of the following is a potent weedicide ?

(A) IPA (B) TIBA (C) BAP (D) 2,4-D

Solution : (D)

42. Conversion of nitrate to ammonia is a/an :

(A) Amination process (B) Deamination process

(C) Oxidative process (D) Reductive process

Solution : (D)

43. Kupffer cell is present in :

(A) Liver (B) Pancreas (C) Kidney (D) Intestine

Solution : (A)

44. In which stage of meiosis homologous chromosomes are segregated ?

(A) Metaphase I (B) Anaphase II (C) Anaphase II (D) Metaphase II

Solution : (B)

45. Seed dormancy can be broken by :

(A) ABA and GA_3 (B) GA_3 and ethylene (C) IAA and ABA (D) ABA and IPA

Solution : (B)

46. Plants which disregard the requirement of a definite day length for the following are called :

(A) Short day plants (B) Long day plants

(C) Day neutral plants (D) Long short-day plants

Solution : (C)

47. Vernalization is the effect of low temperature on :

(A) Delaying of flowering (B) Inhibition of flowering

(C) Acceleration of fruit ripening (D) Acceleration of flowering

Solution : (D)

48. Stomata remain open at night in

(A) C_3 plants (B) C_4 plants (C) CAM plants (D) Hydrophytic plants

Solution : (C)

49. The movement of solvent molecules into the region of higher solute concentration through semipermiable membrane is called

(A) Imbibition (B) Diffusion (C) Osmosis (D) Plasmolysis

Solution : (C)

50. Turgor pressure of a plant cell increases due to

(A) Endosmosis (B) Exosmosis

(C) Wall pressure (D) Diffusion pressure deficit

Solution : (A)

51. The empirical formula of 'chlorophyll a' is :

(A) $C_{55}H_{72}O_5N_4Mg$ (B) $C_{55}H_{70}O_6N_4Mg$ (C) $C_{55}H_{72}O_5N_4Fe$ (D) $C_{55}H_{72}O_4N_5Mg$

Solution : (A)

52. In plants opening of stomata is regulated by :

(A) Red light (B) Blue light (C) Far-red light (D) Ultraviolet light

Solution : (B)

53. The enzyme nitrogenase is extremely sensitive to

(A) Oxygen (B) Nitrogen (C) Hydrogen (D) Helium

Solution : (A)

54. Pollination which occurs in closed condition of flowers is called

(A) Allogamy (B) Cleistogamy (C) Protandry (D) Protogyny

Solution : (B)

55. Incipient plasmolysis is

(A) Last stage of plasmolysis (B) Mid stage of plasmolysis

(C) Zero hour for inception of plasmolysis (D) Initial stage of plasmolysis

Solution : (D)

56. Which of the following forms of soil-water is commonly absorbed by plants ?

(A) Hygroscopic water (B) Capillary water (C) Gravitational water (D) Free water

Solution : (B)

57. In plant 'transpiration pull' theory for ascent of sap was first proposed by :

(A) Dixon (B) Dixon and Jolly (C) J.C Bose (D) Strasburger

Solution : (B)

58. Cerebrum is part of :

(A) Mesencephalon (B) Metencephalon (C) Prosencephalon (D) Myelencephalon

Solution : (C)

59. Which of the following metabolites enter the TCA cycle during glucose oxidation?

(A) Oxaloacetic acid (B) Pyruvic acid (C) Acetyl CoA (D) Malic acid

Solution : (C)

60. Photorespiratory reactions are operated in :

(A) Chloroplasts, ribosomes and peroxisomes (B) Chloroplasts, mitochondria and peroxisomes

(C) Mitochondria, peroxisomes and lysosomes (D) Mitochondria, chloroplasts and ribosomes

Solution : (B)

61. Which of the following can fix nitrogen in nonleguminous plants?

(A) *Rhodospirillum* (B) *Azotobacter* (C) *Frankia* (D) *Rhizobium*

Solution : (C)

62. In the muscles carbohydrates are stored in the form of :

(A) Glycolipid (B) Cellulose (C) Starch (D) Glycogen

Solution : (D)

63. Which white blood cell releases chemical to inhibit blood clotting?

(A) Monocyte (B) Eosinophil (C) Basophil (D) Neutrophil

Solution : (C)

64. The adrenal cortex synthesizes only :

(A) Steroid hormones (B) Peptide hormones

(C) Glycopeptide hormones (D) Catecholamines

Solution : (A)

65. Oxytocin is synthesized in :

(A) Adenohypophysis (B) Neurohypophysis (C) Hypothalamas (D) Epiphysis

Solution : (C)

66. CO_2 is carried in blood by hemoglobin in the form of :

(A) Sodium bicarbonate (B) Potassium bicarbonate

(C) Carbamino compound (D) Methaemoglobin

Solution : (C)

67. Fatty substances are emulsified by :

(A) Lipase enzyme (B) Bilirubin and biliverdin

(C) HCl

(D) Sodium salts of glycocholic and taurocholic acids

Solution : (D)

68. Which cells in the retina recognize colour?

(A) Rod cells (B) Cone cells

(C) Both Rod and Cone cells (D) Epithelial cells

Solution : (B)

69. Trypsinogen is activated by :

(A) HCl (B) Enterokinase (C) Bile (D) Chymotrypsin

Solution : (B)

70. Acetylcholine is a :

(A) Hormone (B) Brain peptide (C) Neurotransmitter (D) Digestive enzyme

Solution : (C)

71. Release of pancreatic juice is stimulated by :

(A) Enterokinase (B) Secretin (C) Trypsinogen (D) Cholecystokinin

Solution : (D); [Secretin stimulate secretion of bicarbonate ion and water, where as pancreatic enzyme secretion is stimulated by Cholecystokinin if question is pancreatic enzyme based then option (D) is correct where as if question is based on water part of pancreatic juice then option (B) is correct]

72. Which one of the following cranial nerves is a parasympathetic nerve?

(A) Facial (B) Auditory (C) Abducens (D) Vagus

Solution : (A); [A and D both are correct but within the head region its facial]

73. Vagus nerve is a :

(A) V^{th} cranial nerve (B) VI^{th} cranial nerve (C) IX^{th} cranial nerve (D) X^{th} cranial nerve

Solution : (D)

74. In human, fertilization usually occurs at :

(A) Vagina (B) Cervix (C) Fallopian tube (D) Oviduct

Solution : (C)

75. Which of the following hormone is not chemically glycoprotein?

(A) Growth hormone (B) Prolactin (C) Luteinizing hormone (D) Estrogen

Solution : (D)

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

(A) Wild life sanctuary (B) Seed bank (C) Sacred groves (D) National Park

Solution : (B)

77. The fovea of eye

(A) has the lowest light threshold (B) is the region of highest visual activity

(C) contains only green and red cones (D) contains only rods

Solution : (B)

78. Which one of the following is not related with bone disorder?

(A) Arthritis (B) Osteoporosis (C) Atherosclerosis (D) Ricket

Solution : (C)

79. Where is Brunner's gland located?

(A) Submucosa of duodenum (B) Submucosa of stomach

(C) Mucosa of oesophagus (D) Mucosa of ileum

Solution : (A)

80. Ecotone is :

(A) A zone between two ecosystems (B) An ecological study

(C) Vertical zonation of an ecosystem (D) Horizontal zonation of an ecosystem

Solution : (A)

Category – II (Q.81 to Q.105)

Only one answer is correct. Correct answer will fetch full marks 2. Incorrect answser or any combination of more than one answer will fetch –½ marks.

81. Seed dormancy can be broken by the following combination of chemicals :

(A) GA_3, IAA and ABA (B) KNO_3, GA_3 and Ethylene chlorohydrin

(C) NAA, 2, 4, 5-T and IAA (D) ABA, BAP and GA_3

Solution : (B)

82. Seedless fruits can be induced by :

(A) ABA and IAA (B) ABA and Zeatin (C) IAA and GA_3 (D) Ethylene and ABA

Solution : (C)

83. The entire reactions of C_4 pathway takes place in :

(A) Mesophyll and bundle sheath (B) Vascular bundle and palisade tissue

(C) Mitochondria and peroxisome (D) Bundle sheath and endoplasmic reticulum

Solution : (A)

84. Which of the following statements on human kidney is false?

(A) Renal plasma flow is normally 660 ml/minute.

(B) Blood flow in the cortex is greater than that in the medulla.

(C) Reabsorption of ions and water occurs mainly in the distal convoluted tubules.

(D) The renal blood flow is decreased in dehydration.

Solution : (A)

85. The function of our visceral organs are controlled by :

(A) Sympathetic and somatic nervous system

(B) Sympathetic and parasympathetic nervous system

(C) Central and somatic nervous system

(D) None of the above

Solution : (B)

86. Which of the following hormones contains iodine?

(A) Inhibin (B) FSH (C) Prolactin (D) Thyroxine

Solution : (D)

87. The basilar membrane of the cochlea

(A) Is unaffected by movement of fluid in the scala vestibule.

(B) Covers the oval window and round window.

(C) vibrates in a pattern determined by the form of the travelling wave in the fluids of the choclea.

(D) vibrates when body is subjected to linear acceleration.

Solution : (A)

88. Where majority of the reabsorption takes place ?

(A) Renal capsule (B) Proximal convoluted tubule

(C) collecting duct (D) Ascending limbs of the loop of Henle

Solution : (B)

89. In homeotherms the brain centre which regulate body temperature is located in :

(A) Cerebrum (B) Cerebellum (C) Medulla oblongata (D) Hypothalamus

Solution : (D)

90. 'Edge effect' is observed in case of :

(A) Ecozone (B) Ecotone (C) Biotope (D) Ecosphere

Solution : (B)

91. Which one of the following matching pairs is WRONG ?

(A) Bacterial cell wall – cellulose (B) Bacterial ribosome – 16s rRNA

(C) Bacterial flagella – protein (D) Bacterial glycocalyx – cellulose

Solution : (D); [Out of A and D, (D) is more appropriate because Glycocalyx of bacteria means slime layer and capsule, slime layer composed of Glycoprotein, capsule composed of polysaccharide. Bacterial cell wall composed of peptidoglycan where β 1, 4 linkage present as like cellulose.]

92. Community dynamics is related to :

(A) Population growth in an ecosystem (B) Recycling of nutrients in an ecosystem

(C) Flow of energy in an ecosystem (D) Ecological succession

Solution : (D)

93. A renewable exhaustible natural resource is :

(A) Coal (B) Petroleum (C) Minerals (D) Forest

Solution : (D)

94. Which one of the following micro-organisms is used as a biofertilizer ?

(A) *Bacillus* (B) *Azospirillum* (C) *Pseudomonas* (D) *Saccharomyces*

Solution : (B)

95. The symptoms of an allergic reaction develop in response to :

(A) Interferons (B) Interleukins (C) Histamine (D) Complement

Solution : (C)

96. In plants, both cellulose and hemicellulose are major components of which one of the following?

(A) Plasma membrane (B) Cell wall

(C) Nuclear membrane (D) Mitochondrial membrane

Solution : (B)

97. When does replication of centriole occur ?

(A) Interplase (B) Prophase (C) Late prophase (D) Late telophase

Solution : (A)

98. Match the following items in column-I with those in column-II and choose the correct answer :

Column - I	Column - II
P. Plasma membrane mainly contains	i. Hemicellulose
Q. Middle lamella mainly composed of	ii. Calucium pectate
	iii. Proteinaceous filaments
	iv. Proteins embedded in phospholipid bilayer

(A) P-ii, Q-i (B) P-i, Q-ii (C) P-iv, Q-ii (D) P-iii, Q-iv

Solution : (C)

99. Select the correct combination of statements for DNA fingerprinting :

i. It is an ELISA based technique ii. It is a PCR based technique

iii. It is used by forensic scientists iv. It is based on the fingerprint of an individual.

v. It is a test for paternity

(A) i, ii, iii (B) ii, iii, v (C) i, iv, v (D) i, iii, iv

Solution : (B)

100. In terms of evolutionary origin, which one of the following is correct ?

(A) Birds are closer to mammals. (B) Birds are closer to reptiles.

(C) Both bats and birds originated from the same ancestor group.

(D) Birds originated from animals like flying lizards

Solution : (B)

101. Progression of cell cycle is regulated by the concentration of which type of molecule ?

(A) Centrosomes (B) Cyclin-dependent kinases

(C) Cyclins (D) Microtubules

Solution : (B)

102. When a colour blind female offspring is born ?

(A) Father is colour blind but mother is carrier. (B) Father is colour blind but mother is normal.

(C) Father and mother both are normal. (D) Father is normal but mother is carrier.

Solution : (A)

103. Kranz type of leaf anatomy is observed in :

(A) C_3 plants (B) C_4 plants (C) C_3 and C_4 plants (D) Hydrophytic plants

Solution : (B)

104. Synthesis of glucose from sources other than carbohydrate is called :

(A) Glycolysis (B) Glycogenesis (C) Gluconeogenesis (D) Glycogenolysis

Solution : (C)

105. Which of the following equations is correct in respect of osmotic phenomenon ?

(A) DPD = OP – TP (B) DPD = OP + TP (C) DPD = OP × TP (D) DPD = OP ÷ TP

Solution : (A)

Category – III (Q.106 to Q.115)

One or more answer(s) is (are) correct. Correct answer(s) will fetch marks 2. Any combination containing one or more incorrect answer will fetch 0 marks. If all correct answers are not marked and also no incorrect answer is marked then score = 2 × number of correct answers marked / actual number of correct answers.

106. Which of the following statements on the Red blood cells in human is/are True?

(A) Measures about 15 μm in diameter

(B) Do not contain mitochondria

(C) Have a life span of 120 days in the circulation

(D) Are released from the bone marrow as mature red blood cells

Solution : (B,C,D); [2% to 3% reticulocyte directly mix with blood vessel, rest 97-98% erythrocyte].

107. Photosynthesis cannot be operated in

(A) Red light (B) Yellow light (C) Green light (D) Blue light

Solution : (C)

108. Which of the followings can bring about the denaturation of proteins?

(A) Reaction to salts of heavy metals (B) Reaction to acid and bases

(C) Reaction to inorganic neutral salts (D) Preservation at a temperature below –5°C

Solution : (B)

109. In embryo sac double fertilization means :

(A) Formation of double zygote

(B) Fusion between egg and male gamete

(C) Formation of perisperm

(D) Fusion between secondary nucleus and male gamete

Solution : (B,D)

110. Which cells of the ovary are involved in the synthesis of estrogen?

(A) Theca interna cells (B) Granulosa cells

(C) Interstitial cells (D) Theca external cells

Solution : (A,B)

111. Select the correct statement (s) pertaining to transpiration process in plants

(A) It is a necessary evil for plants.

(B) Loss of water takes place through hydathodes in vapour form.

(C) It may also occur through lenticels.

(D) The process is active during night in C_3 plants.

Solution : (A,C)

112. Select the correct combination of statements for the neurotransmitters

(A) Acetylcholine is inactivated mainly by presynaptic reuptake

(B) Tyrosine is essential for the formation of dopamine.

(C) Adrenaline is formed by methylation of the noradrenaline.

(D) Serotonin is synthesized from phenylalanine.

Solution : (B,C)

113. Which of the following statement(s) is/are correct?

(A) Silicosis is the result of exposure to silica that causes permanent lung damage and death.

(B) Transportation of gases and digested food materials in the body of higher animals causes muscle weakness and fatigue.

(C) ADH is a neurohypophysial hormone that regulates body water

(D) Myasthenia gravis is a neuromuscular disease that is mediated by circulatory system

Solution : (A,C)

114. Which of the following statement(s) is/are correct about *Macropus* spp.?

(A) They are metatherian mammals. (B) They are only found in Austria.

(C) They have true placenta (D) External ears are present.

Solution : (A,D)

115. Match the items in Column-I with those in Column-II and choose the correct answer :

Column-I	Column-II
P. PCR	i. Insertion of a vector into target cell
Q. Transformation	ii. Post-transcriptional modification of protein
R. DNA ligation	iii. Replication of DNA
S. Ribozyme action	iv. Creation of recombinant DNA

(A) P–ii, Q–iv, R–i, S–iii (B) P–iii, Q–i, R–iv, S–ii

(C) P–iii, Q–i, R–ii, S–iv (D) P–iv, Q–iii, R–i, S–ii

Solution : (B)