10-BSC-MFS - Provisional Answer Key

1. Which hormone stimulates spermatogenesis by acting on Sertoli cells?
   (A) LH (B) FSH
   (C) GnRH (D) Prolactin
2. Which structure connects embryo to placenta?
   (A) Amniotic sac (B) Yolk sac
   (C) Umbilical cord (D) Chorion
3. Which event is unique to angiosperms?
   (A) Syngamy (B) Fertilisation
   (C) Double fertilisation (D) Pollination
4. Where are the testes located in human males?
   (A) Abdominal cavity (B) Scrotum
   (C) Pelvic cavity (D) Perineum
5. Which surgical method in males prevents further conception?
   (A) Tubectomy (B) Vasectomy
   (C) Coitus interruptus (D) Withdrawal method
6. DNA is a polymer of which monomer units?
   (A) Amino acids (B) Nucleotides
   (C) Nucleocides (D) Sugars
7. The length of E. coli DNA is approximately:
   (A) 1.36 mm (B) 2.2 m
   (C) 0.34 nm (D) 3.3×10^9 bp
8. Which codon acts as the start codon?
   (A) AUG (B) UAA
   (C) UGA (D) UAG
9. Which RNA carries amino acids to the ribosome?
   (A) mRNA (B) rRNA
   (C) tRNA (D) hnRNA
10. When two genes are located close together on the same chromosome, they are said to be:
    (A) Segregated (B) Assorted
    (C) Linked (D) Recombined
11. Which scientist developed the technique of DNA fingerprinting?
    (A) Alec Jeffreys (B) Watson
    (C) Meselson (D) Sanger
12. Which mosquito is the vector for malaria?
    (A) Culex (B) Aedes
    (C) Anopheles (D) Tabanus
13. Which protozoan causes amoebiasis?
    (A) Giardia lamblia (B) Entamoeba histolytica
    (C) Plasmodium vivax (D) Trypanosoma

14. What is innate immunity?

(A) Specific and learned (B) Non-specific and inborn

(C) Only B-cell based (D) Present after infection

15. Which cells produce antibodies?

(A) T cells (B) B cells

(C) Monocytes (D) Macrophages

16. Which microbial enzyme is used as a 'clot buster'?

(A) Lipase (B) Amylase

(C) Streptokinase (D) Pectinase

17. Which gas is not a major component of biogas?

(A) Methane (B) CO_2

(C) H_2 (D) SiO_2

18. Plasmids and bacteriophages are used as:

(A) Hormones (B) Vectors

(C) Enzymes (D) Vaccines

19. Which enzyme is responsible for synthesising DNA in PCR?

(A) Taq polymerase (B) RNA polymerase

(C) DNA ligase (D) Endonuclease

20. Which vector is used for transforming plant cells?

(A) Plasmid pBR322 (B) λ phage

(C) Ti plasmid (D) Cosmid

21. What is the correct term for a group of individuals of the same species living in a defined geographical area?

(A) Community (B) Ecosystem

(C) Population (D) Habitat

22. Which parameter represents the maximum number of individuals a habitat can support?

(A) Density (B) Growth rate

(C) Carrying capacity (K) (D) Population size

23. Which component of an ecosystem performs decomposition?

(A) Phytoplankton (B) Herbivores

(C) Fungi and bacteria (D) Insects and birds

24. What do sacred groves represent in biodiversity conservation?

(A) Man-made conservation parks

(B) Legally protected forests

(C) Areas protected due to religious traditions

(D) Agricultural zones

25. Which of the following organisms does not belong to the same genus?

(A) Panthera leo (B) Panthera tigris

(C) Panthera pardus (D) Felis domesticus

26. Who discovered the nucleus?

(A) Robert Hooke (B) Robert Brown

(C) Antonie van Leeuwenhoek (D) Schleiden

27. What is formed at the end of meiosis?

(A) Two diploid cells (B) Four haploid cells

(C) Two haploid cells (D) Four diploid cells

28. The light reaction produces:

(A) Sugars (B) Oxygen, ATP, and NADPH

(C) Water (D) CO_2

29. Which hormone delays senescence and promotes nutrient mobilization?

(A) Auxin (B) Cytokinin

(C) Ethylene (D) ABA

30. What is the basic unit of gas exchange in the lungs?

(A) Bronchiole (B) Alveolus

(C) Trachea (D) Bronchus

31. Which nitrogenous waste is most toxic?

(A) Urea (B) Uric acid

(C) Ammonia (D) Creatinine

32. Which part of the brain controls voluntary movement?

(A) Cerebellum (B) Cerebrum

(C) Medulla (D) Thalamus

33. What is the function of erythropoietin secreted by the kidneys?

(A) Controls blood pressure (B) Stimulates red blood cell production

(C) Stimulates digestion (D) Inhibits gastric secretion

34. What is the dimension of energy?

(A) $[M\ L\ T^{-2}]$ (B) $[M\ L^2\ T^{-2}]$

(C) $[M^0\ L^2\ T^{-2}]$ (D) $[M\ L^2\ T^{-3}]$

35. Which of the following quantities is a vector?

(A) Speed (B) Distance

(C) Displacement (D) Mass

36. What does the slope of a velocity vs time graph indicate?

(A) Displacement (B) Acceleration

(C) Speed (D) Jerk

37. The trajectory of a projectile is _____ under gravitational pull & normal air pressure.

(A) Linear (B) Circular

(C) Parabolic (D) Hyperbolic

38. What is the condition for mechanical energy conservation?

(A) Only conservative forces act on a system (B) Only non-conservative forces act on a system

(C) Net force is zero (D) No force acts

39. **Which law of thermodynamics defines internal energy?**

(A) Zeroth law (B) First law

(C) Second law (D) Third law

40. **The average kinetic energy of a gas molecule is directly proportional to:**

(A) Pressure (B) Volume

(C) Temperature (D) Density

41. **The time period of a simple pendulum depends on:**

(A) Amplitude (B) Mass

(C) Length (D) Tension

42. **What is the phase difference between displacement and acceleration in SHM?**

(A) 0 (B) $\pi/2$

(C) $\pi/3$ (D) π

43. **A wave has a frequency of 500 Hz and wavelength 0.68 m. Its speed is:**

(A) 340 m/s (B) 3.4 m/s

(C) 0.34 m/s (D) 680 m/s

44. **Ohm's law is valid for:**

(A) Semiconductors (B) Gases

(C) Metallic conductors only (D) All materials

45. **Kirchhoff's second law is based on conservation of:**

(A) Charge (B) Energy

(C) Mass (D) Momentum

46. **A charged particle moving perpendicular to a magnetic field moves in:**

(A) Straight line (B) Elliptical path

(C) Parabolic path (D) Circular path

47. **Which is a perfect diamagnet?**

(A) Steel (B) Water

(C) Bismuth (D) Superconductor

48. **A current flowing in a coil due to a changing magnetic field is:**

(A) Electromagnetic current (B) Static current

(C) Induced current (D) Displacement current

49. **Polarisation proves the _____ nature of light.**

(A) Corpuscular (B) Longitudinal

(C) Transverse (D) Ray

50. **Which experiment confirmed the particle nature of light?**

(A) Single slit experiment (B) Double slit experiment

(C) Photoelectric effect (D) Polarisation

51. **In a p-type semiconductor, the majority carriers are:**

(A) Electrons (B) Protons

(C) Neutrons (D) Holes

52. What is the radius of the nth orbit of hydrogen atom proportional to?

(A) n^2 (B) n

(C) $1/n^2$ (D) 1/n

53. The energy of an electron in hydrogen atom is:

(A) Positive (B) Zero

(C) Negative (D) Infinite

54. An electron moves in a magnetic field of 0.2 T with velocity 3×10^6 m/s perpendicular to field. Force on it is:

(A) 9.6×10^{-14} N (B) 6.3×10^{-14} N

(C) 1.4×10^{-14} N (D) 3.6×10^{-14} N

55. A body falls from 20 m height. Time taken to reach the ground is ($g = 10$ m/s^2):

(A) 1 s (B) 2 s

(C) 3 s (D) 4 s

56. A mass of 5 kg is dropped from a height of 10 m. What is its initial potential energy?

(A) 500 J (B) 100 J

(C) 50 J (D) 5 J

57. In a logic circuit, the NOT gate gives output:

(A) Same as input (B) Opposite of input

(C) Zero always (D) One always

58. A wire of resistance 4 Ω is doubled in length. Its new resistance is:

(A) 2 Ω (B) 4 Ω

(C) 8 Ω (D) 16 Ω

59. Which of the following particles does not experience magnetic force?

(A) Moving charge (B) Stationary charge

(C) Proton in motion (D) Electron in motion

60. If the refractive index of air (≈ 1.0) and refractive index of glass (typically ≈ 1.5) the critical angle for glass–air interface is about:

(A) 29° (B) 61°

(C) 89° (D) 42°

61. Which of these cannot be deflected by electric or magnetic field?

(A) Alpha rays (B) Beta rays

(C) Gamma rays (D) Electrons

62. Which is not a feature of Bohr's atomic model?

(A) Stationary orbits (B) Electron spiral motion

(C) Quantised angular momentum (D) Radiation during transition

63. The work done in moving a unit positive charge around a closed loop in electric field is:

(A) Maximum (B) Minimum

(C) Infinite (D) Zero

64. **Two planets have masses M and 2M and radii R and 2R respectively. The ratio of acceleration due to gravity on the surface of the two planets is:**

(A) 1 : 1 **(B) 1 : 2**

(C) 4 : 1 **(D) 2 : 1**

65. **Which of the following is conserved in projectile motion?**

(A) Vertical velocity **(B) Horizontal velocity**

(C) Speed **(D) Acceleration**

66. **Impulse has the same dimensions as:**

(A) Force **(B) Energy**

(C) Momentum **(D) Velocity**

67. **What is the oxidation state of Mn in the compound $KMnO_4$?**

(A) +2 **(B) +4**

(C) +6 **(D) +7**

68. **If the standard electrode potential (E°) for a redox reaction is positive, what does it tell us about the reaction?**

(A) ΔG° is positive and equilibrium constant (K) is less than 1

(B) ΔG° is negative and equilibrium constant (K) is greater than 1

(C) ΔG° is negative and equilibrium constant (K) is less than 1

(D) ΔG° is positive and equilibrium constant (K) is greater than 1

69. **Faraday's law of electrolysis is concerned with which of the following?**

(A) Atomic number of the cation **(B) Movement speed of the cation**

(C) Movement speed of the anion **(D) Equivalent weight of the electrolyte**

70. **Which of the following compounds is commonly known as laughing gas?**

(A) NO_2 **(B) CO_2**

(C) N_2O **(D) NO**

71. **Which of these is a very good conductor of electricity and heat?**

(A) Charcoal **(B) Graphite**

(C) Anthracite coke **(D) Diamond**

72. **What is the main component of ordinary glass?**

(A) Calcium silicate **(B) Sodium carbonate**

(C) Silicon dioxide (SiO_2) **(D) Boron trioxide (B_2O_3)**

73. **Driniking which of the following alcohol causes eye-blindness ?**

(A) Methanol **(B) Ethanol**

(C) Propanol **(D) Butanol**

74. **Picricacid is a yellow coloured compound. It's chemical name is**

(A) m-nitrobenzoic acid **(B) 2, 4, 6-trinitropheriol**

(C) 2, 4, 6-tribromophenol **(D) p-nitrophenol**

75. What type of reaction occurs when phenol reacts with chloroform in the presence of aqueous sodium hydroxide (NaOH)?

(A) Nucleophilic substitution reaction (B) Electrophilic addition reaction

(C) Electrophilic substitution reaction (D) Nucleophilic addition reaction

76. When you mix an aldehyde or ketone with zinc and concentrated hydrochloric acid, which reaction happens?

(A) Clemmensen reduction (B) Cannizzaro reaction

(C) Wolff-Kishner reduction (D) Rosenmund reduction

77. Which of the following compounds will give a positive Fehling's test?

(A) Glucose (B) Acetone

(C) Benzaldehyde (D) Sucrose

78. What is the role of the magnesium metal in the Grignard reaction?

(A) It acts as a catalyst for the reaction

(B) It donates electrons to generate the Grignard reagent

(C) It stabilizes the Grignard reagent by coordinating with it

(D) It reacts with the carbonyl compound to form a new bond

79. What is invert sugar?

(A) A kind of cane sugar (B) A sugar that does not rotate light

(C) A mix of glucose and galactose (D) A mix of equal amounts of glucose and fructose

80. Which one of the following molecules has the greatest bond angle?

(A) CH_4 (B) NH_3

(C) H_2O (D) CO_2

81. Which of the following aqueous solutions will have highest pH?

(A) NaCl (B) CH_3COONa

(C) Na_2CO_3 (D) NH_4Cl

82. The numerical value of universal gas constant R depends on

(A) Temperature of Gas (B) Volume of Gas

(C) Number of Moles of Gas (D) Units of Volume,Temperature and Pressure

83. A drug which acts as both an antipyretic (reduces fever) and an analgesic (relieves pain) is

(A) chloroquine (B) penicillin

(C) chlorodiazepoxide (D) 4-acetamidophenol

84. Why do lanthanide atoms get smaller as you go from left to right in the series?

(A) More outer electrons (B) Bigger atoms

(C) Stronger pull from the nucleus (D) Higher atomic number

85. Cr^{3+} ion is more stable than Cr^{2+} ion because

(A) Cr^{3+} has a higher charge, so it is always more stable

(B) Cr^{2+} has a $3d^4$ configuration while Cr^{3+} has a $3d^3$ configuration

(C) Cr^{2+} ions are larger in size than Cr^{3+} ions

(D) Cr^{3+} ions are coloured, so they are more stable

86. Which of the following is an ambidentate nucleophile?

(A) OH^- (B) CN^-

(C) NH_4^+ (D) Cl^-

87. The alkyl halide is converted into an alcohol by

(A) elimination (B) dehydrohalogenation

(C) addition (D) substitution

88. Which of the following is a heterocyclic compound?

(A) Benzene (B) Pyridine

(C) Cyclohexane (D) Toluene

89. Lassaigne's test is used to detect which of the following elements in an organic compound?

(A) Carbon and hydrogen (B) Nitrogen, sulphur, halogens, and phosphorus

(C) Oxygen and carbon (D) Only nitrogen

90. Which one of the following is an electrophilic reagent?

(A) $AlCl_3$ (B) NH_3

(C) CH_4 (D) H_2O

91. Composition of Ziegler-Natta catalyst is

(A) $(Et_3)_3Al \cdot TiCl_2$ (B) $(Me)_3Al \cdot TiCl_2$

(C) $(Et)_3Al \cdot TiCl_4$ (D) $(Et)_3Al \cdot PtCl_4$

92. Which monomers are used to prepare Nylon-6?

(A) Adipic acid and hexamethylene diamine

(B) Terephthalic acid and ethylene glycol

(C) Caprolactam

(D) Urea and formaldehyde

93. What is the monomer unit of natural rubber?

(A) Ethene (B) Isoprene

(C) Styrene (D) Vinyl chloride

94. What is the molarity of a solution containing 0.5 moles of NaOH dissolved in 500 mL of water?

(A) 1 M (B) 0.1 M

(C) 1.0×10^{-3} M (D) 2 M

95. The relationship between solubility of a gas in liquid and pressure is indicated by

(A) Raoult's law (B) Henry's law

(C) Lowering of vapour pressure (D) Van't Hoff law

96. The number of moles present in 18 grams of water (H_2O) is:

(A) 1 (B) 2

(C) 0.5 (D) 3

97. The magnetic quantum number specifies

(A) Size of orbitals (B) Shape of orbitals

(C) Orientation of orbitals (D) Nuclear Stability

98. Which one of the following will not exhibit the Tyndall effect

(A) Milk **(B) Starch in water**

(C) Aqueous salt solution **(D) Smoke**

99. Third law of thermodynamics provides a method to evaluate which property?

(A) Absolute Energy **(B) Absolute Enthalpy**

(C) Absolute Entropy **(D) Absolute Free Energy**

100. When the temperature increases, which type of chemical reaction speeds up?

(A) Only exothermic reactions

(B) Only endothermic reactions

(C) Both exothermic and endothermic reactions

(D) Neither type of reaction