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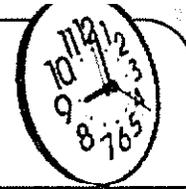Tel: 0120-4616-500

e Medical Prep

Model Test Paper-9

Time : 3½ hours.   *Maximum Marks : 200*

PHYSICS

1. The electron in a hydrogen atom makes a transition $n_1 \to n_2$ where n_1 and n_2 are the principal quantum numbers of the two states. Assume the Bohr model to be valid. The time period of the electron in the initial state is eight times that in the final state. What are the possible values of n_1 and n_2 ?
    (a) $n_1 = 1, n_2 = 3, n_1 = 2, n_2 = 6$ ...... and so on
    (b) $n_1 = 1, n_2 = 2, n_1 = 2, n_2 = 4$ ...... and so on
    (c) $n_1 = 2, n_2 = 1, n_1 = 4, n_2 = 2$ ...... and so on
    (d) $n_1 = 2, n_2 = 3, n_1 = 3, n_2 = 6$ ...... and so on

2. Two identical bar magnets each of length L and pole strength m are placed at right angles to each other with the north pole of one touching the south pole of the other. Magnetic moment of the system will be
    (a) $\dfrac{mL}{2}$ (b) $\dfrac{mL}{3}$
    (c) $\dfrac{mL}{\sqrt{2}}$ (d) $(\sqrt{2})\,mL$

3. A concave mirror of focal length 10 cm and a convex mirror of focal length 15 cm are placed facing each other 40 cm apart. A point object is placed between the mirrors, on their common axis and 15 cm from concave mirror. The position of image produced by the successive reflection first on concave mirror then at convex mirror is
    (a) 10 cm behind the convex mirror
    (b) 6 cm infront of the convex mirror
    (c) 6 cm behind the convex mirror
    (d) 10 cm infront of the convex mirror

4. A leaky parallel plate capacitor is filled completely with a material having dielectric constant $K = 5$ and electrical conductivity $\sigma = 7.4 \times 10^{-12}\ \Omega^{-1}m^{-1}$. If the charge on the plate at the instant $t = 0$ is $q = 8.85\ \mu C$, then the leakage current at the instant $t = 12$ sec will be
    (a) $1.23\ \mu A$ (b) $0.2\mu A$
    (c) $0.1\ \mu A$ (d) $1.56\ \mu A$

5. An AC source of angular frequency ω is fed across a resistor R and a capacitor C in series. The current registered is 1. If now the frequency of the source is changed to $\omega/3$ (but maintaining the same voltage), the current in the circuit is founded to be halved. The ratio of reactance to resistance at the original frequency ω will be
    (a) $\sqrt{\dfrac{5}{7}}$ (b) $\sqrt{\dfrac{6}{11}}$
    (c) $\sqrt{\dfrac{2}{9}}$ (d) $\sqrt{\dfrac{3}{5}}$

6. Two guns, situated on the top of a hill of height 10 m, fire one shot each with the same speed $5\sqrt{3}$ m/sec at some interval of time. One gun fired horizontally and other fires upward at an angle of 60° with the horizontal. The shots collide in air at point, the time interval between the firings is
    (a) 3 sec   (b) 2 sec
    (c) 1 sec   (d) 4 sec

7. What is increased in a step down transformer?
    (a) wattage   (b) current
    (c) voltage   (d) nothing

8. Lines of constant dip are called
    (a) isoclinic lines   (b) isodynamic lines

(c) isogonic lines   (d) isobaric lines

9. An electron and a proton of equal momentum enter a uniform magnetic field normal to the lines of force. If the radii of their paths be r_e and r_p respectively then

(a) $\dfrac{r_e}{r_p} = \sqrt{\dfrac{m_p}{m_e}}$ (b) $\dfrac{r_e}{r_p} = \dfrac{m_p}{m_e}$

(c) $\dfrac{r_e}{r_p} = 1$ (d) $\dfrac{r_e}{r_p} \sqrt{\dfrac{m_e}{m_p}}$

10. The e.m.f. of a cell is E volt and internal resistance is $r\,\Omega$. The resistance in external circuit is also $r\,\Omega$. The p.d. across the cell will be

(a) $2E$ (b) $\dfrac{E}{2}$

(c) E (d) $\dfrac{E}{4}$

11. In an achromatic doublet
    (a) convex lens is made of flint glass
    (b) concave lens is made of crown glass
    (c) convex lens is made of crown glass
    (d) both the lenses are made of the same glass

12. The horizontal range of a projectile is $4\sqrt{3}$ times its maximum height. The angle of projector is
    (a) 60°   (b) 45°
    (c) 30°   (d) none of these

13. The current gain of a transistor in common base circuit is 0.98. What change in collector current is to be produced in order to produce a change of 5 mA in emitter current ?
    (a) 4.9 mA   (b) 2.45 mA
    (c) 0.196 mA   (d) 5.1 mA

14. The binding forces in a metallic crystal are
    (a) magnetic forces
    (b) Van der Waal forces of attraction
    (c) electrostatic forces of attraction
    (d) covalent forces

15. The mass of helium nucleus is less than that of its constituent particles by 0.03 amu. The binding energy per nucleon of $_2He^4$ nucleus will be
    (a) 3.5 MeV   (b) 14 MeV
    (c) 7 MeV   (d) 21 MeV

16. A radiation worker receives a total dose equivalent of 450 μ S_v during a working week of 30 hour. Calculate the average dose equivalent rate
    (a) 15 μ S_v per hour   (b) 15 S_v per minute
    (c) 45 S_v per second   (d) none of these

17. The ratio of the radii of sulphur and helium atoms in the ground state will be
    (a) $1 : \sqrt{8}$ (b) $1 : 4$
    (c) $1 : 8$ (d) $1 : 3$

18. The energy of a photon is 3×10^{-19} joule. Its momentum is
    (a) 10^{-11} kg-m/sec   (b) 9×10^{-11} kg-m/sec
    (c) 10^{-27} kg-m/sec   (d) 3×10^{7} kg-m/sec

19. In Millikan's oil drop experiment, a charged drop of mass 1.8×10^{-14} kg is stationary between the plates. The distance between the plates is 0.90 cm and potential difference between them is 2.0 kV. The number of electrons on the drop is
    (a) 5   (b) 50
    (c) 500   (d) 0

20. On increasing the length of microscope tube, its magnifying power will
    (a) decrease   (b) remain unchanged
    (c) increase   (d) become zero

21. The spectrum of the sun is
    (a) line emission and continuous absorption
    (b) line emission
    (c) line absorption
    (d) continuous emission and line absorption

22. A person can not see the objects beyond 50 cm. The power of a lens to correct this vision will be
    (a) + 5D   (b) − 2D
    (c) + 2D   (d) 0.5D

23. The frequency from 3×10^9 Hz to 3×10^{10} Hz is
    (a) metro high frequency band

(b) super high frequency band

(c) high frequency band

(d) very high frequency band

24. The average power dissipation in a pure capacitor in A.C. circuit is

(a) $2\,CV^2$ (b) zero

(c) $\dfrac{1}{2}CV^2$ (d) CV^2

25. A metal conductor of length 1m rotates vertically about one of its ends at angular velocity 5 radian per second. If the horizontal component of earth's magnetic field is 0.2×10^{-4} T, the e.m.f. developed between the two ends of the conductor is

(a) 50 mV   (b) 5×10^{-4} V

(c) 5 mV   (d) 50 µV

26. Research in nuclear and atomic physics caused the invention of

(a) nuclear bombs

(b) generators

(c) motors

(d) hydraulic machines

27. The value of $\dfrac{d}{dx}(x^2)$ is equal to

(a) $2x$ (b) $\dfrac{x}{2}$

(c) x (d) x^2

28. The mass and volume of a body are respectively 22.42 g and 4.7 cm^3 and the errors in their measurements are 0.01 g and 0.1 cm^3. The maximum error in the measurement of density will be

(a) 7%   (b) 2.17%

(c) 0.2%   (d) 10%

29. A car covers the first half of the distance between two places at a speed of 40 km/h and the other half at 60 km/h. The average speed of the car is

(a) 50 km/h   (b) 48 km/h

(c) 40 km/h   (d) 60 km/h

30. A helicopter is climbing vertically with a velocity of 15 ms^{-1}, when an object is released from it. If the object hits the ground 4s later, the velocity of the object as it hits the ground is

(a) 55 ms^{-1} downwards

(b) 25 ms^{-1} downwards

(c) 0

(d) none of the above

31. The resultant of $\vec{A} \times \vec{0}$ will be equal to

(a) zero vector   (b) zero

(c) A   (b) unit vector

32. The angle between the two vectors $\vec{A} = 3\,\hat{i} + 4\,\hat{j} + 5\,\hat{k}$ and $\vec{B} = 3\,\hat{i} + 4\,\hat{j} - 5\,\hat{k}$ will be

(a) 90°   (b) 45°

(c) zero   (d) 180°

33. A rod of mass 5 kilogram is used to push from rest a block of mass 15kg on a frictionless surface. The block moves a distance of 2 metre in 2 second. The net force acting on the stick is

(a) 15 newton

(b) 10 newton

(c) 5 newton

(d) 20 newton

34. When an elevator cabin falls down, the cabin and all the bodies fixed in the cabin are accelerated with respect to

(a) man standing in the cabin

(b) ceiling of the elevator

(c) floor of the elevator

(d) man standing on the earth

35. A particle of mass 4.65×10^{-26} kg moving towards the wall of a vessel with a velocity of 600 m/s. strikes the wall of the vessel at an angle 60° to the normal and rebounds at the same angle at the same speed. Find the impulse of the force received by the wall during the impact

(a) 2.79×10^{-25} newton

(b) 2.79×10^{-23} newton-sec

(c) zero

(d) 4×10^{-20} newton-sec

36. Machine of a constant power makes a body move on a straight path. The distance s travelled in t second is proportional to
 (a) $t^{3/2}$
 (b) t^3
 (c) $t^{1/2}$
 (d) t^2

37. The mass of an electron is 9.1×10^{-31} kg. Positron also has the same mass. On meeting they compose a photon by annihilation. What is the energy of photon ? ($c = 3 \times 10^8$ m/s)
 (a) 100 eV
 (b) 10 MeV
 (c) 1 keV
 (d) 1.02 MeV

38. If the value of g at the surface of the earth is 9.8 m/s², then the value of g at a place 480 km above the surface of the earth will be (Radius of the earth is 6400 km)
 (a) 7.2 m/s²
 (b) 9.8 m/s²
 (c) 8.4 m/s²
 (d) 4.2 m/s²

39. The intensity of earth's gravitational field at a point situated at a distance of 7400 km from the centre of the earth is 1.5 newton/kg. What is the gravitational potential at the point ?
 (a) $+1.11 \times 10^7$ joule kg⁻¹
 (b) 5×10^6 joule kg⁻¹
 (c) 10×10^7 joule kg⁻¹
 (d) -1.11×10^7 joule kg⁻¹

40. How much of heat is required to heat 2 mole of a monoatomic ideal gas from 0°C to 100°C if no mechanical work is done during heating. The specific heat of gas at constant pressure is 2.5 R, R is the universal gas constant
 (a) 378.6 cal
 (b) 728.2 cal
 (c) 592.8 cal
 (d) 417.1 cal

Instructions for Q. No. 41 to 60
Directions : Each of the questions given below consists of two statements, an assertions (A) and reason (R). Select the number corresponding to the appropriate response in the answer sheet as follows.
 (a) *If both assertion and reason are true and the reason is a correct explanation of the assertion*
 (b) *If both assertion and reason are true but the reason is not a correct explanation of the assertion*

 (c) *If the assertion is true, but the reason is false*
 (d) *If both assertion and reason are falses*

41. *Assertion (A) :* If a convex lens of glass is immersed in water its power decreases.
 Reason (R) : In water it behaves as a concave lens.

42. *Assertion (A) :* The power factor in a series resonance circuit is unity.
 Reason (R) : In case of series resonance the inductive and capacitive reactances are equal.

43. *Assertion (A) :* When a current is drawn from a cell, there is a fall in potential differences across its terminals.
 Reason (R) : Every cell has internal resistance.

44. *Assertion (A) :* Ammeter is always connected in series with a circuit to measure the current flowing through it.
 Reason (R) : Ammeter has very low resistance.

45. *Assertion (A) :* During boiling, if an amount dQ of heat is absorbed, pdV is the work done by the system, then $dQ = pdV$
 Reason (R) : Boiling is an isothermal process, So $dU = 0$ in equation $dQ = dU + pdV$, which is based on first law of thermodynamics.

46. *Assertion (A) :* When one mole of an ideal gas expands under adiabatic condition so that its state changes from (P_1, V_1, T_1) to (P_2, V_2, T_2), the work done by the gas is given by $\Delta W = C_v (T_1 - T_2)$.
 Reason (R) : During adiabatic expansion $\Delta Q = 0$ and $\Delta U = C_v(T_2 - T_1)$ in the expression $\Delta Q = \Delta U + \Delta W$.

47. *Assertion (A) :* A beam of light which emerges from a convex lens must be convergent.
 Reason (R) : A convex lens is a converging lens while a concave lens is diverging lens, whatever may be the medium in which they are placed.

48. *Assertion (A) :* When light passes from one medium to another of different density the only quantity which is unchanged is its wavelength.
 Reason (R) : The wavelength of light is not related to the refractive index of the medium.

49. *Assertion (A) :* α-particles produce more intense ionization than β-particles.
 Reason (R) : α-particles are positively charged.

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50. *Assertion (A) :* Lightning conductors protect buildings from damage.
Reason (R) : These send off the charge to earth.

51. *Assertion (A) :* Two bodies of unequal masses dropped from the same height hit the ground with equal kinetic energies.
Reason (R) : The force gravity acting on them are equal.

52. *Assertion (A) :* If the law of gravitation becomes inverse cubelaw even then a line joining the Sun and the planet sweeps equal areas in equal time intervals.
Reason (R) : A planet moves in an elliptical path.

53. *Assertion (A) :* A telescopic objective is rendered achromatic by cementing a convex lens of crown glass and a concave lens of flint glass.
Reason (R) : A convex lens produces greater chromatic aberration than a concave lens.

54. *Assertion (A) :* A solid floats in a liquid so that it is just submerged. When the liquid is heated the solid sinks to the bottom.
Reason (R) : Weight of the solid increases with the rise in temperature.

55. *Assertion (A) :* The resistance of a platinum wire increases as temperature is raised.
Reason (R) : This is because the length of the wire increases as the temperature is raised.

56. *Assertion (A) :* When a dielectric medium is filled between the plates of a condenser, its capacitance increases.
Reason (R) : The dielectric medium reduces the potential difference between the plates of the condenser.

57. *Assertion (A) :* A thin polythene bag weighs the same when empty and when filled with air at atmospheric pressure.
Reason (R) : Air is weightless.

58. *Assertion (A) :* A balloon stops rising after attaining a certain maximum height.
Reason (R) : Upthrust due to air decreases with height till it just balances the weight of the balloon.

59. *Assertion (A) :* In series A.C. circuit, the voltage across the combination of capacitor and inductor is zero at resonance.

Reason (R) : At series resonance the current in the circuit is zero.

60. *Assertion (A) :* It is necessary to use artificial satellite for long distance TV transmission.
Reason (R) : Ionospheric disturbances are minimised by satellite communication.

CHEMISTRY

61. The radius of the nucleus is related to the mass number A by
(a) $R = R_0 A^2$
(b) $R = R_0 A$
(c) $R = R_0 A^{1/2}$
(d) $R = R_0 A^{1/3}$
where $R_0 = 10^{-13}$ cm

62. Which of the following species has the highest ionisation energy ?
(a) Al^+
(b) Mg^+
(c) Li^+
(d) Ne

63. As per the modern periodic law the physical and chemical properties of elements are periodic function of their
(a) atomic weight
(b) electronic configuration
(c) atomic volume
(d) atomic size

64. The pH of a solution is increased from 3 to 6. Its H^+ ion concentration will be
(a) reduced by 1000 times
(b) doubled
(c) reduced to half
(d) increased by 1000 times

65. Silver chloride dissolves in excess of NH_4OH. The cation present in this solution is
(a) $[Ag(NH_3)_4]^+$
(b) $[Ag(NH_3)_2]^+$
(c) Ag^+
(d) $[Ag(NH_3)_6]^+$

66. Be^{2+} is isoelectronic with
(a) Li^+
(b) Na^+
(c) Mg^{2+}
(d) H^+

67. The cell reaction of a cell is
$Mg_{(s)} + Cu^2{}_{(aq)} \rightarrow Cu_{(s)} + Mg^{2+}{}_{(aq)}$
If the standard reduction potentials of Mg and Cu are – 2.37 and + 0.34 V respectively. The EMF of the cell is
(a) + 2.71 V
(b) – 2.03 V
(c) + 2.03 V
(d) – 2.71 V

68. 4.5 mole each of H_2 and I_2 are heated in a sealed ten litre vessel. At equilibrium 3 mole of HI were found. The equilibrium constant for

$H_2 + I_2 \rightleftharpoons 2HI$ is

(a) 5   (b) 10
(c) 1   (d) 0.33

69. Mortar is a mixture of
(a) $CaCO_3$ + Silica + H_2O
(b) slaked lime + plaster of paris + H_2O
(c) plaster of paris + silica
(d) slaked lime + silica + H_2O

70. The number of moles of AgCl precipitated when excess of $AgNO_3$ is added to one mole of $[Cr(NH_3)_4Cl_2]Cl$ is
(a) 2.0   (b) 1.0
(c) zero   (d) 3.0

71. A mixture contains four solid organic compounds A, B, C and D. On heating only C changes from solid to vapour state. C changes from solid to vapour state. C can be separated from rest in the mixture by
(a) fractional distillation
(b) sublimation
(c) distillation   (d) crystallisation

72. The homologue of ethyne is
(a) C_3H_8 (b) C_2H_6
(c) C_2H_4 (d) C_3H_6

73. By which of the following reactions can one get N-methyl aniline from aniline ?
(a) benzoylation   (b) acetylation
(c) alkylation   (d) bromination

74. When an alkyl halides reacts with an alkoxide the product is
(a) ether
(b) unsaturated hydrocarbon
(c) hydrocarbon   (d) alcohol

75. Acetaldehyde when treated with dilute NaOH gives

(a) CH_3CH—CH_2—CHO
          |
          OH

(b) CH_3COOH
(c) CH_3CH_2OH
(d) H_3C—CH_3

76. C_2H_5CHO and $(CH_3)_2CO$ can be distinguished by testing with
(a) fehling solution   (b) hydroxylamine
(c) phenyl hydrazine   (d) sodium bisulphite

77. Silica is soluble in
(a) H_2SO_4 (b) HNO_3
(c) HCl   (d) HF

78. The IUPAC name of

CH_3—C=C—CH—CH_2—C≡CH
              | | |
              Cl CH_3 C_2H_5

is
(a) 2-chloro-4-ethyl-3-methyl-hept-2-en-6-yne
(b) 6-chloro-4-ethyl-5-methyl-hept-1-yn-5-ene
(c) 6-chloro-4-ethyl-5-methyl-hept-5en-1-yne
(d) 2-chloro-4-ethyl-3-methyl-hept-6-yn-2-ene

79. Gammexane is
(a) chloral
(b) benzene hexachloride
(c) DDT
(d) hexachloro ethane

80. The ability of an ion to bring about coagulation of a given colloid depends upon
(a) magnitude of its charge
(b) sign of its charge alone
(c) its size
(d) both magnitude and sign of its charge

81. The compound obtained by heating a mixture of a primary amine and chloroform with ethanoic potassium hydroxide (KOH) is
(a) an amide
(b) an alkyl halide
(c) an alkyl isocyanide
(d) an amide and nitro compound

82. The function of enzymes in the living system is to
(a) catalyse biochemical reactions
(b) provide immunity
(c) transport oxygen
(d) provide energy

83. $_{92}U^{235} + _0n^1 \longrightarrow$ Fission products + Neutron + 3.20×10^{-11} J. The energy released, when 1 gram of $_{92}U^{235}$ finally undergoes fission is
(a) 8.21×10^5 kJ   (b) 18.60×10^9 kJ
(c) 12.75×10^8 kJ   (d) 6.55×10^6 kJ

84. Which one of the following is used to make 'non stick' cookware ?
    (a) polyethylene terephthalate
    (b) polystyrene
    (c) PVC
    (d) polytetrafluoroethene

85. Number of water molecules in Mohr's salt is
    (a) 5   (b) 6
    (c) 7   (d) 8

86. The poisonous gas that comes out with petrol burning in a car is
    (a) CO_2 (b) C_2H_6
    (c) CH_4 (d) CO

87. Philosopher's wool when heated with BaO at 1100°C gives a compound. Identify the compound
    (a) $BaCdO_2$ (b) $Ba + ZnO_2$
    (c) $BaZnO_2$ (d) $BaO_2 + Zn$

88. The lanthanide contraction is responsible for the fact that
    (a) Zr and Hf have about the same radius
    (b) Zr and Nb have similar oxidation state
    (c) Zr and Y have about the same radius
    (d) Zr and Zn have same oxidation state

89. Which of the following 0.1 m aqueous solutions will have the lowest f.p. ?
    (a) KI   (b) $C_5H_{10}O_5$
    (c) $Al_2(SO_4)_3$ (d) $C_{12}H_{22}O_{11}$

90. Which of the following is redox reaction ?
    (a) nitrogen oxides from nitrogen and oxygen by lightning
    (b) in atmosphere, O_3 from O_2 by lightning
    (c) H_2SO_4 with NaOH
    (d) evaporation of water

91. In a reaction

    $$CH_2 = CH_2 \xrightarrow[\text{acid}]{\text{Hypochlorous}} M$$

    $$\xrightarrow{R} \begin{array}{c} CH_2OH \\ | \\ CH_2OH \end{array}$$

    M = Molecule, R = Reagent, M and R are
    (a) CH_3CH_2OH and HCl
    (b) CH_2Cl—CH_2OH and aq. $NaHCO_3$
    (c) CH_3CH_2Cl and NaOH

(d) CH_2—CH_2 and heat
    \ O /
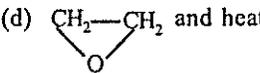
92. Who developed long form of periodic table ?
    (a) Mendeleev   (b) Niels Bohr
    (c) Lothar Mayer   (d) Moseley

93. The product D of the reaction
    $$CH_3Cl \xrightarrow{KCN} (A) \xrightarrow{H_2O} (B)$$
    $$\xrightarrow{NH_3} (C) \xrightarrow{\Delta} (D) \text{ is}$$
    (a) $HCONH_2$ (b) CH_3CN
    (c) $CH_3CH_2NH_2$ (d) CH_3CONH_2

94. The IUPAC name of $K_3[Fe(CN)_6]$
    (a) potassium ferrohexacyanate (II)
    (b) potassium hexaferrocyanate (III)
    (c) potassium ferrocyanide (II)
    (d) potassium hexacyanoferrate (III)

95. Among the following compound which have more than one type of hybridisation for carbon atom?
    (i) CH_3—CH_2—CH_2—CH_3
    (ii) H_3C—$CH\!=\!CH$—CH_3
    (iii) $H_2C\!=\!CH$—$C\!\equiv\!CH$
    (iv) H—$C\!\equiv\!C$—H
    (a) (iii) and (iv)   (b) (i)
    (c) (ii) and (iii)   (d) (iv)

96. If the equilibrium constant for the reaction
    $$2AB \rightleftharpoons A_2 + B_2 \text{ is } 49.$$
    What is the value of equilibrium constant for
    $$AB \rightleftharpoons \frac{1}{2}A_2 + \frac{1}{2}B_2 \ ?$$
    (a) 7   (b) 2401
    (c) 49   (d) 0.02

97. The reagent used for converting ethanoic acid to ethanol is
    (a) PCl_3 (b) BH_3
    (c) $LiAlH_4$ (d) $K_2Cr_2O_7/H^+$

98. Compound A reacts with PCl_5 to get B which on treatment with KCN followed by hydrolysis gave propionic acid. What are A and B respectively?
    (a) C_2H_5Cl and $C_2H_5Cl_2$
    (b) C_2H_6 and C_2H_5Cl

(c) C_3H_8 and C_3H_7Cl
(d) C_2H_5OH and C_2H_5Cl

99. In Wurtz reaction the reagent used is
(a) Na/dry ether   (b) Na/liq. NH_3
(c) Na   (d) Na/dry alcohol

100. Which one of the following reactions is an example for calcination process ?
(a) $2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$
(b) $2Zn + O_2 \rightarrow 2ZnO$
(c) $2Ag + 2HCl + (O) \rightarrow 2AgCl + H_2O$
(d) $MgCO_3 \rightarrow MgO + CO_2$

Instructions for Q. No. 101 to 120

Directions : Each of the questions given below consists of two statements, an assertions (A) and reason (R). Select the number corresponding to the appropriate response in the answer sheet as follows.

(a) *If both assertion and reason are true and the reason is a correct explanation of the assertion*
(b) *If both assertion and reason are true but the reason is not a correct explanation of the assertion*
(c) *If the assertion is true, but the reason is false*
(d) *If both assertion and reason are falses*

101. *Assertion (A) :* In case of degenerate orbitals if two electrons with opposite spins are placed in the same orbital, a state of high stability will be obtained.
Reason (R) : The most stable electronic arrangement is one in which there is maximum number of paired electrons in the degenerate set of orbitals.

102. *Assertion (A) :* In transition elements *ns* orbital is filled up first and $(n-1)d$ afterwards, during ionization *ns* electrons are lost prior to $(n-1)$ *d* electrons.
Reason (R) : The effective nuclear charge felt by $(n-1)d$ electrons is higher as compared to that by *ns* electrons.

103. *Assertion (A) :* The carbonic acid is stronger acid than phenol.
Reason (R) : The hybrid of bicarbonate ion has two equivalent contributing structures, while hybrid of phenoxide ion does not contain such equivalent contributing structures.

104. *Assertion (A) :* Water has greater dipole-dipole attraction than hydrogen sulphide.
Reason (R) : Oxygen has higher electronegativity than sulphur.

105. *Assertion (A) :* When 20 ml of ethanol is mixed with 20 ml of water, the volume of resulting solution will be less that 40 ml.
Reason (R) : They hydrogen bond between water and alcohol molecules is weaker than hydrogen bond between the like molecules.

106. *Assertion (A) :* Ortho-nitrophenol has much lower boiling point and lower solubility in water than meta and para isomers.
Reason (R) : Ortho-nitrophenol involves intramolecular hydrogen bonding and the possibility of association of the molecules is absent.

107. *Assertion (A) :* All molecules which have polar bonds have zero dipole moment.
Reason (R) : Asymmetrical molecules with polar bonds have zero dipole moment.

108. *Assertion (A) :* In the covalent compounds of hydrogen, the hydrogen atom has the electronic configuration analogous to that of hydride ion.
Reason (R) : Hydride ion is formed when hydrogen atom loses an electron.

109. *Assertion (A) :* The bond order of helium is always zero.
Reason (R) : The number of electrons in bonding molecular orbital and antibonding molecular orbital is equal

110. *Assertion (A) :* The H—N—H bond angle in NH_3 molecule is much greater than the H—As—H bond angle in AsH_3.
Reason (R) : Formation of NH_3 molecule involves sp^3 hybridisation, while no hybridisation occurs in AsH_3.

111. *Assertion (A) :* Cyclobutane is less stable than cyclopentane.
Reason (R) : The presence of bent bonds causes loss of orbital overlap.

112. *Assertion (A) :* A spectral line will be seen for the transition *2px* to *2py*.
Reason (R) : Energy is released in the form of

wave of light when the electron drops from *2px* to *2py* orbital.

113. *Assertion (A)* : Sodium ions are discharged in preference of hydrogen ions at mercury cathode.
Reason (R) : The nature of the cathode affects the order of discharge of ions.

114. *Assertion (A)* : Among halogens fluorine can oxidise an element to its highest oxidation state.
Reason (R) : Due to small size of fluoride ion it is difficult to oxidise fluoride ion to fluorine. Hence reverse reaction takes place more easily.

115. *Assertion (A)* : A triester of glycerol and palmitic acid on boiling with aqueous sodium hydroxide gives a solid cake having soapy touch.
Reason (R) : Free glycerol is liberated which is a greasy solid.

116. *Assertion (A)* : When an atom in group 1A of the periodic table undergoes radioactive decay by emitting a positron, the resulting element belongs to zero group.
Reason (R) : When an atom emits a positron, its atomic number increases by one unit.

117. *Assertion (A)* : A certain element X, forms three binary compounds with chlorine containing 59.68%, 68.95% and 74.75% chlorine respectively. These data illustrate the law of multiple proportions.
Reason (R) : According to law of multiple proportions, the relative amounts of an element combining with some fixed amount of a second element in a series of compounds are the ratios of small whole numbers.

118. *Assertion (A)* : The name butanol is not specific, whereas the name butanone represents one specific compound.
Reason (R) : Alcohols show phenomenon of isomerism where as ketones do not show isomerism.

119. *Assertion (A)* : Alkenes and cycloalkanes series of hydrocarbons have same general formula.
Reason (R) : Either insertion of a double bond or formation of a ring reduce the number of hydrogen atoms of corresponding alkane by 2.

120. *Assertion (A)* : The carbon atoms of the benzene ring may be numbered for identification of substituent groups, just as a continuous chains of carbon atoms are numbered.
Reason (R) : Smallest set of numbers designating the substituents is the preferred set.

BIOLOGY

121. Pollination by snail and slug is known as
  (a) ornithophilous   (b) chiropterophilous
  (c) entomophilous   (d) malacophilous

122. Single filament of *Nostoc* without mucilage sheath is known as
  (a) mycelium   (b) colony
  (c) trichome   (d) hyphae

123. Which of the following is dissolved in water for making Bordeaux mixture?
  (a) calcium chloride   (b) copper sulphate
  (c) sodium chloride   (d) none of these

124. Phytotron is a device by which
  (a) mutations are produced in plants
  (b) plants are grown in controlled environment
  (c) protons are liberated
  (d) leaf fall occurs on abscission layer

125. Middle piece of a mammalian sperm contains
  (a) nucleus   (b) centriole
  (c) mitochondria   (d) vacuole

126. Antiserum contain
  (a) antigens   (b) leucocytes
  (c) antibodies   (d) none of these

127. Mechanism of uric acid excretion, in a nephron, is
  (a) osmosis   (b) diffusion
  (c) secretion   (d) ultrafiltration

128. Secretion of which of the following is under neurosecretory nerve axons ?
  (a) pineal
  (b) adrenal cortex
  (c) anterior pituitary   (d) posterior pituitary.

129. Galapagos islands are associated with the name of
  (a) Wallace   (b) Malthus
  (c) Darwin   (d) Lamarck

130. Malathion, parathion belong to group of
(a) triazines
(b) carbamates
(c) pyrethenoids
(d) organophosphates

131. In sweet peas, genes C and P are necessary for colour in flowers. The flowers are white in the absence of either or both the genes. What will be the percentage of coloured flowers in the offspring of the cross Ccpp × ccPp?
(a) 25%
(b) 50%
(c) 75%
(d) 100%

132. The plants in desert, in order to tolerate water stress, have
(a) no stomata
(b) long root system to reach the water level
(c) stipular spines
(d) stems which are converted into leaf type

133. Positive pollution of soil is due to
(a) reduction in soil productivity
(b) addition of wastes on soil
(c) excessive use of fertilizers
(d) all of these

134. The lining of bone marrow cavity is called
(a) endosteum
(b) endomyosium
(c) endoneurium
(d) endothelium

135. Which of the following is an example of sex-linked inheritance ?
(a) anaemia
(b) cretinism
(c) night-blindness
(d) colour-blindness

136. If the rate of addition of new members increases with respect to the individual host of the same population, then the graph obtained has
(a) declined growth
(b) exponential growth
(c) zero population growth
(d) none of these

137. Plants which can withstand wide range of temperature tolerance are called
(a) stenothermic
(b) eurythermic
(c) monothermic
(d) mesothermic

138. Starch and cellulose are the compounds of many units of
(a) glycerol
(b) fatty acids
(c) amino acids
(d) simple sugars

139. Which of the following is most convincing reasons for increasing population growth in a country?
(a) high birth rate
(b) low mortality rate
(c) low population of old people
(d) high population of young children

140. Where does the conversion of harmful prussic acid into potassium sulphocyanide takes place?
(a) spleen
(b) liver
(c) bone marrow
(d) lymph glands

141. Knock-knee disease is due to
(a) hormonal imbalance
(b) genetical abnormality in males
(c) deficiency in tyrosine amino acid
(d) excess fluoride concentration in water body

142. In mammals, the digestion of starch starts from
(a) mouth
(b) stomach
(c) oesophagus
(d) duodenum

143. The major constituent of vertebrate bone is
(a) sodium chloride
(b) calcium phosphate
(c) potassium hydroxide
(d) calcium carbonate

144. The amphids are cuticular elevations on the ventro-lateral lips of *Ascaris*. These are
(a) chemoreceptors
(b) tangoreceptors
(c) tactoreceptors
(d) olfactoreceptors

145. Polyploidy leads to rapid formation of new species, because of
(a) genetic recombination
(b) mutation therapy
(c) isolation behaviour
(d) development of multiple sets of chromosomes

146. During interphase, RNAs and proteins are synthesized in
(a) G_1-phase
(b) S-phase
(c) G_2-phase
(d) all of these

147. Photosynthetic pigments in chloroplast are embedded in the membrane of
    (a) matrix   (b) photoglobin
    (c) thylakoids   (d) chloroplast envelope

148. Bulliform cells are present in
    (a) mesophyll   (b) epidermis
    (c) bundle sheath   (d) vascular bundles

149. Preganglionic sympathetic fibres are
    (a) adrenergic   (b) cholinergic
    (c) synergic   (d) hypergognic

150. Enzymes with two sites are called
    (a) apoenzyme   (b) holoenzyme
    (c) allosteric enzyme (d) conjugate enzyme

151. Meroblastic cleavage refers to which type of division of eggs ?
    (a) total   (b) spiral
    (c) incomplete   (d) horizontal

152. Glycosidic bond is broken during the digestion of
    (a) protein   (b) starch
    (c) lipid   (d) all of these

153. The presence of continuous phenotypic variation in an F_1-generation suggests that a character is inherited by
    (a) epistasis
    (b) recombination
    (c) gene linkage
    (d) polygenic inheritance

154. 'Genera Plantarum' was written by
    (a) Bessey
    (b) Linnaeus
    (c) Hutchinson
    (d) Bentham and Hooker

155. Zonula adherens is a kind of
    (a) desmosome   (b) mesosome
    (c) filament   (d) membrane

156. Schuffner's dots are seen in red blood corpuscles of man due to which of the following disease ?
    (a) kala-azar   (b) filaria
    (c) malaria   (d) diabetes

157. In *Selaginella*, reduction division occurs during the formation of
    (a) sperms   (b) microspores only
    (c) megaspores only (d) both (b) and (c).

158. The process of the escape of liquid from the tip of uninjured leaf is called
    (a) guttation   (b) transpiration
    (c) evaporation   (d) evapo-transpiration.

159. Diabetes insipidus occurs due to hyposecretion of
    (a) oxytocin   (b) vasopressin
    (c) thymosine   (d) insulin

160. Which of the following RNAs picks up specific amino acid from amino acid pool in the cytoplasm to ribosome during protein synthesis ?
    (a) *t*-RNA   (b) *m*-RNA
    (c) *r*-RNA   (d) all of these

Instructions for Q. No. 161 to 180
Directions : Each of the questions given below consists of two statements, an assertions (A) and reason (R). Select the number corresponding to the appropriate response in the answer sheet as follows.
    (a) If both assertion and reason are true and the reason is a correct explanation of the assertion
    (b) If both assertion and reason are true but the reason is not a correct explanation of the assertion
    (c) If the assertion is true, but the reason is false
    (d) If both assertion and reason are falses

161. *Assertion (A) :* Smoke reduces photosynthesis.
Reason (R) : Smoke contains SO_2 and oxides of nitrogen and hydrocarbons.

162. *Assertion (A) :* Putrefying bacteria decompose proteins of dead plants and animals to ammonia.
Reason (R) : Nitrosomonas and *Nitrobacter* perform the process of ammonification.

163. *Assertion (A) :* A tree growing near Bombay does not show prominent annual rings.
Reason (R) : Annual rings are not seen in dicot root though secondary growth occur in them.

164. *Assertion (A) :* Long day plants and short day plants are misnomers.
Reason (R) : Short day plant and long day plant growing in same location could not flower on the same day.

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165. *Assertion (A) :* Blue and red both the lights are used directly for light reactions of photosynthesis.
Reason (R) : The absorption spectrum represents the graph plotted between the amount of CO_2 consumed and different wavelength of light absorbed by the same pigment.

166. *Assertion (A) :* Carbohydrates are more suitable to provide energy in the body than fat and proteins.
Reason (R) : Wheat and rice are the source of carbohydrates.

167. *Assertion (A) :* Oxygen enters the blood from alveolar air while carbon dioxide leaves the blood to enter the alveolar air.
Reason (R) : This is due to difference in the partial pressure of the gases.

168. *Assertion (A) :* Pulse can be feel on veins in each heart beat.
Reason (R) : Veins are deeply seated in the body.

169. *Assertion (A) :* Insulin is an anabolic hormone.
Reason (R) : It affects antagonistic to glucagon.

170. *Assertion (A) :* A man is unable to pass on a sex linked gene to his son.
Reason (R) : Sex linked genes are present on X-chromosome only.

171. *Assertion (A) :* Coenzyme is a non-protein group without which certain enzymes are inactive or incomplete.
Reason (R) : Coenzymes not only provide a point of attachment for the chemical group being transformed but also influence the properties of the group.

172. *Assertion (A) :* Transmission of the nerve impulse across a synapse is accomplished by neurotransmitters.
Reason (R) : Transmission across a synapse usually requires neurotransmitters because there is small space, the synaptic cleft, that separates one neuron from another.

173. *Assertion (A) :* It is the brain, not the sense organs, that interprets the stimulus.

Reason (R) : Sense organs are transducers; they transform the energy of a stimulus to the energy of nerve impulses.

174. *Assertion (A) :* Cartilage (protein matrix) and bone (calcium matrix) are rigid connective tissues.
Reason (R) : Blood is connective tissue in which plasma is the matrix.

175. *Assertion (A) :* Hair cells on the basilar membrane (the organ of Corti) are responsible for hearing.
Reason (R) : Pressure waves, which begin at the oval window, cause the basilar membrane to vibrate so that the cilia of the hair cells touch the tectorial membrane. This causes the hair cells to initiate nerve impulses, which are carried by the auditory nerve to the brain.

176. *Assertion (A) :* The gramineous type of stomata are commonly found in graminae and cyperaceae.
Reason (R) : The gramineous stomata possess guard cells of which the middle portions are much narrower than the ends so that cells appear in surface view like dumbbells.

177. *Assertion (A) :* The innermost distinct layer of the cortex is known as endodermis.
Reason (R) : The cells of endodermis are non-living and characterised by the presence of casparian strips.

178. *Assertion (A) :* Adenine can not pair with cytosine.
Reason (R) : Because there would be two hydrogen atoms near one of the bonding positions and none at the other.

179. *Assertion (A) :* Either megasporophyllous or microsporophyllous leaves occur in gymnosperms.
Reason (R) : The megasporophyllous leaves are small and less developed whereas microsporophyllous leaves are large, scaly and well developed.

180. *Assertion (A) :* Flagella found in green algae are of whiplash type.
Reason (R) : The flagella found in green algae have a smooth surface and are called tinsel or acronematic.

GENERAL KNOWLEDGE

181. Who gave the slogan 'Inquilab Zindabad'
(a) Mahatma Gandhi
(b) S.C.Bose
(c) Shaheed Bhagat Singh
(d) Lok Manya Tilak

182. Name the website which broke the cricket match fixing story earlier this year?
(a) bazee.com   (b) tehelka.com
(c) tazaakhabar.com   (d) goforcricket.com

183. 'Sati' was abolished by
(a) Lord William Bentinck
(b) Lord Cavin
(c) Lord Mountbatten
(d) none of these

184. The Kaziranga Wild Life Sanctuary is reserved for which animal
(a) great Indian bustard
(b) rhinoceros
(c) white elephants
(d) white tiger

185. The first feature film (talkie) to be produced in India was
(a) Hatimtai   (b) Alam Ara
(c) Pundalik   (d) Harish Chandra

186. The first writer to use Urdu as the medium of poetic expression was
(a) Amir Khusru   (b) Mirza Ghalib
(c) Faiz   (d) Bahadur Shah Zafar

187. Name the director of Indian origin who has become a celebrity after his film. The 'Sixth Sense' became a hit?
(a) Mira Nair   (b) Shabana Azmi
(c) Girish Karnad   (d) Manoj Shyamalan

188. The Alamatti dam is on the river
(a) godavari   (b) krishna
(c) mahanadi   (d) cauvery

189. Which one of the following dances involves solo performance
(a) bharatnatyam   (b) kuchipudi
(c) mohiniattam   (d) odissi

190. Tricolour was adopted as the National Flag in the
(a) Lahore congress
(b) Belgaum congress
(c) Allahabad congress
(d) Haripura congress

191. Which two states has a common High Court?
(a) Himachal Pradesh and Uttar Pradesh
(b) Haryana and Punjab
(c) Gujarat and Maharashtra
(d) Kerala and Tamil Nadu

192. Who is called the father of white revolution?
(a) Dr. Kurien Verghese
(b) Manjunda Swamy
(c) M.S.Swaminathan
(d) U.K.Rao

193. Which state has the highest number of illiterates in India?
(a) Bihar   (b) Andhra Pradesh
(c) Orissa   (d) Uttar Pradesh

194. The soil group which covers the largest area in India is the
(a) alluvial soil   (b) black soil
(c) red soil   (d) laterite soil

195. Teacher's day is celebrated in memory of
(a) Nehru   (b) Rajaji
(c) Dr. Radhakrishnan (d) Kamaraj

196. The incidence of collapse of World Trade Tower took place on
(a) 11 September   (b) 11 October
(c) 13 May   (d) 13 September

197. The head of all the three defence field is
(a) Admiral   (b) Air Chief Marshell
(c) General   (d) President

198. The variety of coffee largely grown in India is
(a) old chicks   (b) coorgs
(c) Arabica   (d) kents

199. An atomic pile is used for
(a) producing X-rays
(b) conducting nuclear fission
(c) conducting thermonuclear fusion
(d) accelerating atoms

200. Who amongst the following won the Nobel Prize at least twice
(a) Winston Churchill (b) Octavio Paz
(c) Madame Curie   (d) George Choupak