Max. Time : $3\frac{1}{2}$ hrs. **Max. Marks : 200**

PHYSICS

1. For skywave propagation of a 10 MHz signal, what should be the minimum electron density in ionosphere ?

(1) $\approx 10^{22}\ m^{-3}$ (2) $\approx 10^{14}\ m^{-3}$

(3) $\approx 10^{6}\ m^{-3}$ (4) $\approx 1.2 \times 10^{12}\ m^{-3}$

2. Which of the following logic gates is an universal gate ?

(1) NAND (2) AND

(3) OR (4) NOT

3. What should be the maximum acceptance angle at the air core interface of an optical fibre if n_1 and n_2 are the refractive indices of the core and the cladding, respectively ?

(1) $\left[\tan^{-1}\ \frac{n_1}{n_2}\right]$ (2) $\sin^{-1}\ (n_2/n_1)$

(3) $\sin^{-1}\ \sqrt{n_1^2 - n_2^2}$ (4) $\left[\tan^{-1}\ \frac{n_2}{n_1}\right]$

4. A conducting ring of radius 1 metre is placed in an uniform magnetic field B of 0.01 tesla oscillating with frequency 100 Hz with its plane at right angle to B. What will be the induced electric field ?

(1) π volts/m (2) 62 volts/m

(3) 2 volts/m (4) 10 volts/m

5. Consider an n-p-n transistor amplifier in common emitter configuration. The current gain of the transistor is 100. If the collector current changes by 1 mA, what will be the change in emitter current ?

(1) 1.1 mA (2) 1.01 mA

(3) 10 mA (4) 0.01 mA

6. A telescope has an objective lens of focal length 200 cm and an eye piece with focal length 2 cm. If this telescope is used to see a 50 metre tall building at a distance of 2 km, what is the height of the image of the building formed by the objective lens ?

(1) 2 cm (2) 5 cm (3) 10 cm (4) 1 cm

7. The ground state energy of hydrogen atom is – 13.6 eV. What is the potential energy of the electron in this state ?

(1) 0 eV (2) – 27.2 eV

(3) 2 eV (4) 1 eV

8. Solid targets of different elements are bombarded by highly energetic electrons beams. The frequency (f) of the characteristic X-rays emitted from different targets varies with atomic number Z as

(1) $f \propto \sqrt{Z}$ (2) $f \propto Z^{3/2}$

(3) $f \propto Z$ (4) $f \propto Z^2$

9. Two infinitely long parallel conducting plates having surface charge densities $+\sigma$ and $-\sigma$ respectively, are separated by a small distance. The medium between the plates is vaccum. If ε_0 is the dielectric permitivity of vacuum, then the electric field in the region between the plates is

(1) $\sigma/2\ \varepsilon_0$ volt/metre (2) $\sigma/\ \varepsilon_0$ volt/metre

(3) $2\ \sigma/\ \varepsilon_0$ volt/metre (4) 0 volt/metre

10. In a semiconducting material the mobilities of electrons and holes are μ_e and μ_n respectively. Which of the following is true

(1) $\mu_e > \mu_n$ (2) $\mu_e < 0\ ;\ \mu_n > 0$

(3) $\mu_e < \mu_n$ (4) $\mu_e = \mu_n$

11. The magnetic moment (μ) of a revolving electron around the nucleus varies with principal quantum number n as

(1) $\mu \propto n$ (2) $\mu \propto n^2$

(3) $\mu \propto 1/n$ (4) $\mu \propto 1/n^2$

12. A radioactive material has a half-life of 10 days. What fraction of the material would remain after 30 days ?

(1) 0.125 (2) 0.33 (4) 0.25 (4) 0.5

13. According to Hubble's law, the red shift (z) of a receding galaxy and its distance r from earth are related as

(1) $z \propto r$ (2) $z \propto r^{3/2}$

(3) $z \propto 1/r^2$ (4) $z \propto 1/r$

14. When exposed to sunlight, thin films of oil on water often exhibit brilliant colours due to the phenomenon of

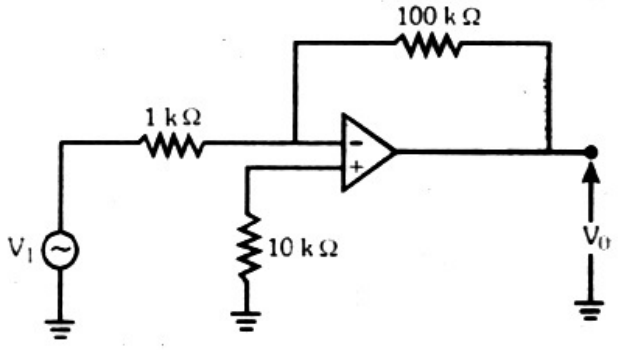
(1) interference (2) polarization

(3) diffraction (4) dispersion

15. "Parsec" is the unit of

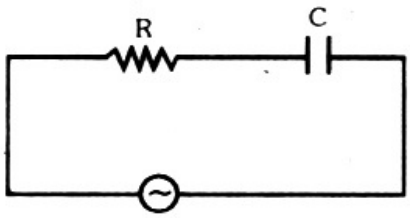
(1) time (2) frequency
(3) distance (4) angular acceleration

16. The voltage gain of the following amplifier is



(1) 10 (2) 9.9 (3) 100 (4) 1000

17. A 50 Hz a c. source of 20 volts is connected across R and C as shown in figure.



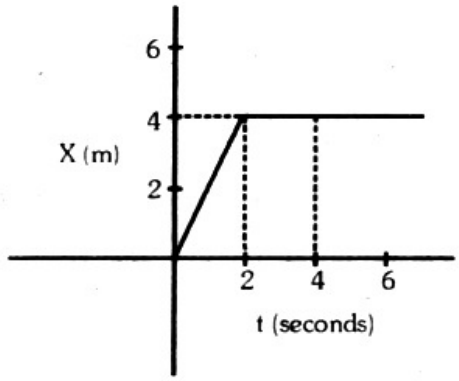
The voltage across R is 12 volt. The voltage across C is

(1) 10 V (2) 8 V (3) 16 V
(4) not possible to determine unless values of R and C are given

18. The pressure exerted by an electromagnetic wave of intensity I (watt/m^2) on a non reflecting surface is [c is the velocity of light]

(1) Ic (2) I/c^2 (3) Ic^2 (4) I/c

19. In the figure given, the position-time graph of a particle of mass 0.1 kg is shown. The impulse at t = 2 sec is



(1) – 0.2 kg m sec^{-1} (2) – 0.4 kg m sec^{-1}
(3) 0.2 kg m sec^{-1} (4) 0.1 kg m sec^{-1}

20. A block of mass 10 kg is moving in x-direction with a constant speed of 10 m/ sec. It is subjected to a retarding force F = – 0.1 x. joule/meter during its travel from x = 20 metre to x = 30 metre. Its final kinetic energy will be

(1) 250 joule (2) 475 joule
(3) 450 joule (4) 275 joule

21. Energy required to break one bond in DNA is approximately

(1) ≈ 2.1 e V (2) ≈ 0.01 eV
(3) ≈ 1 eV (4) ≈ 0.1 eV

22. The condition for a uniform spherical mass m of radius r to be a black hole is [G = gravitational constant and g = acceleration due to gravity]

(1) $\left(\frac{2Gm}{r}\right)^{1/2} \le c$ (2) $\left(\frac{2gm}{r}\right)^{1/2} = c$

(3) $\left(\frac{2Gm}{r}\right)^{1/2} \ge c$ (4) $\left(\frac{gm}{r}\right)^{1/2} \ge c$

23. Which of the following is an amorphous solid ?

(1) sugar (2) salt
(3) glass (4) diamond

24. For a constant hydraulic stress on an object, the fractional change in the object's volume ($\Delta V/V$) and its bulk modules (B) are related as

(1) $\frac{\Delta V}{V} \propto B^{-2}$ (2) $\frac{\Delta V}{V} \propto B^2$

(3) $\frac{\Delta V}{V} \propto \frac{1}{B}$ (4) $\frac{\Delta V}{V} \propto B$

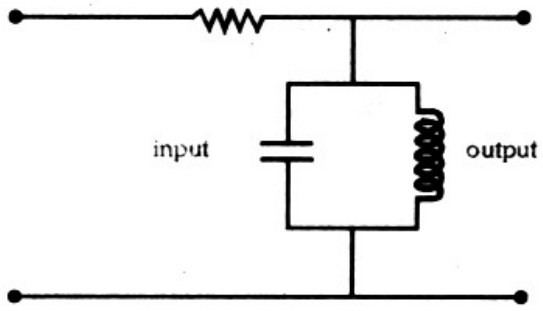
25. Which of the following functions represents a simple harmonic oscillation ?

(1) sin ωt + sin 2ω t (2) $\sin^2 \omega t$
(3) sin ωt – sin 2ω t (4) sin ω t – cos ω t

26. In case of linearly polarized light, the magnitude of the electric field vector

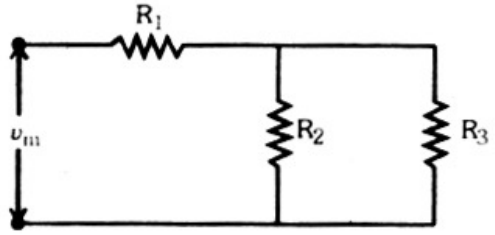
(1) increases and decreases linearly with time
(2) is parallel to the direction of propagation
(3) does not change with time
(4) varies periodically with time

27. The circuits shown below acts as



(1) high pass filter (2) low pass filter
(3) rectifier (4) tuned filter

28. For ensuring dissipation of same energy in all three resistors (R_1 , R_2 , R_3) connected as shown in figure, their values must be related as

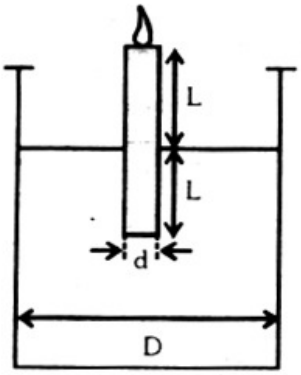


(1) $R_1 = R_2 + R_3$
(2) $R_2 = R_3$ and $R_1 = 1/4\ R_2$
(3) $R_1 = R_2 = R_3$
(4) $R_2 = R_3$ and $R_1 = 4\ R_2$

29. The apparent depth of water in cylindrical water tank of diameter 2R cm is reducing at the rate of x cm/minute when water is being drained out at a constant rate. The amount of water drained in c.c. per minute is (n_1 = refractive index of air, n_2 = refractive index of water).

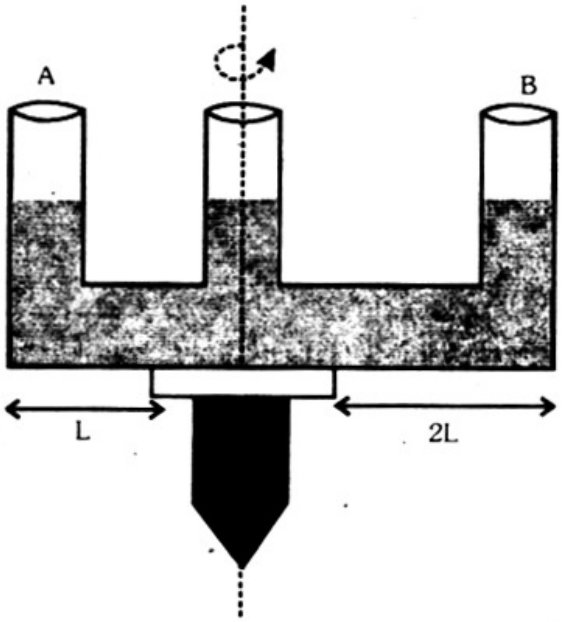
(1) $\pi R^2 x$ (2) $\frac{x \pi R^2 n_2}{n_1}$
(3) $\frac{x \pi R^2 n_1}{n_2}$ (4) $\frac{2 \pi R n_1}{n_2}$

30. A candle of diameter d is floating on a liquid in a cylindrical container of diameter D (D > > d) as shown in figure. If it is burning at the rate of 2 cm/hour then the top of the candle will



(1) go up at the rate 1 cm/hour
(2) fall at the rate of 2 cm/hour
(3) remain at the same height
(4) fall at rate of 1 cm/hour

31. A given shaped glass tube having uniform cross section is filled with water and is mounted on a rotatable shaft as shown in figure. If the tube is rotated with a constant angular velocity ω then



(1) water level in section A goes up and that in B comes
(2) water levels remain same in both sections
(3) water level in both sections A and B go up
(4) water level in section A comes down and that in B it goes up

32. When a ball is thrown up vertically with velocity v_0, it reaches a maximum height of h. If one wishes to triple the maximum height then the ball should be thrown with velocity

(1) $\sqrt{3}\ v_0$ (2) $3/2\ v_0$
(3) $9\ v_0$ (4) $3\ v_0$

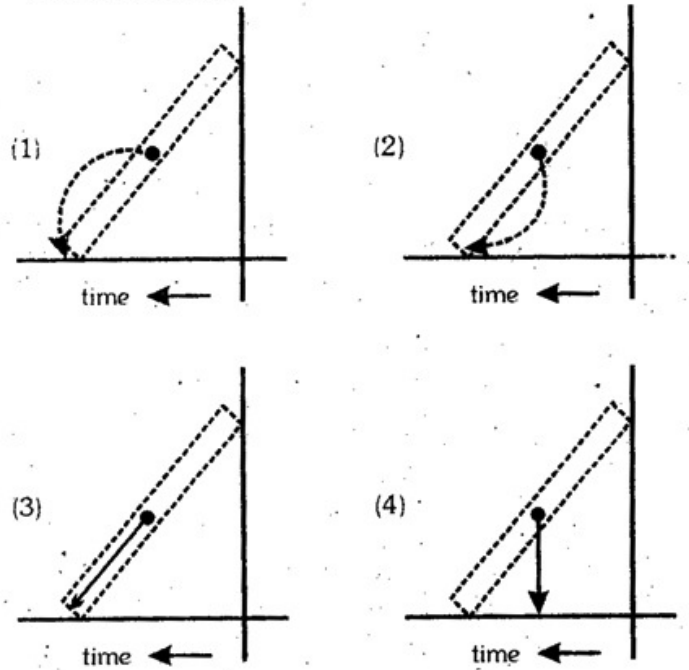
33. A solid sphere is rolling on a frictionless surface, shown in figure with a translational velocity v m/s. If it is to climb the inclined surface then v should be

(1) 2 gh (2) 10/7 gh
(3) $\geq \sqrt{2\ gh}$ (4) $\geq \sqrt{10/7\ gh}$

34. A horizontal platform is rotating with uniform angular velocity around the vertical axis passing through its centre. At some instant of time a viscous fluid of mass m is dropped at the centre and is allowed to spread out and finally fall. The angular velocity during this period

(1) increases continuously
(2) remains unaltered
(3) decreases continuously
(4) decreases initially and increases again

35. A ladder is leaned against a smooth wall and it is allowed to slip on a frictionless floor. Which figure represents trace of its centre of mass



36. A person is standing in an elevator. In which situation he finds his weight less ?

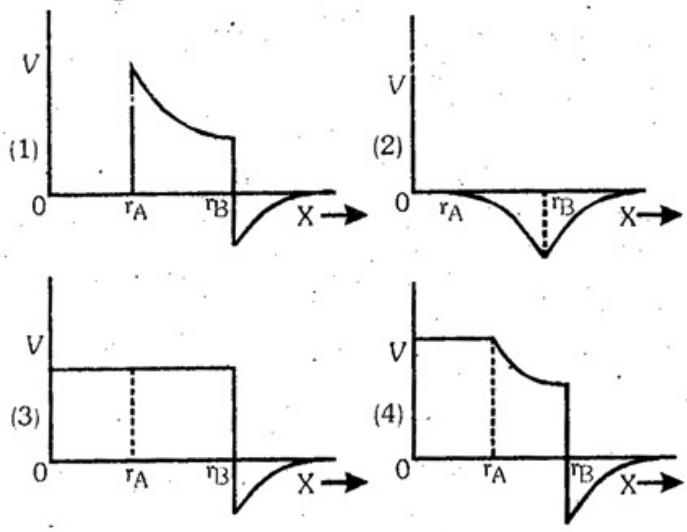
(1) when the elevator moves upward with uniform velocity

(2) when the elevator moves downward with uniform velocity

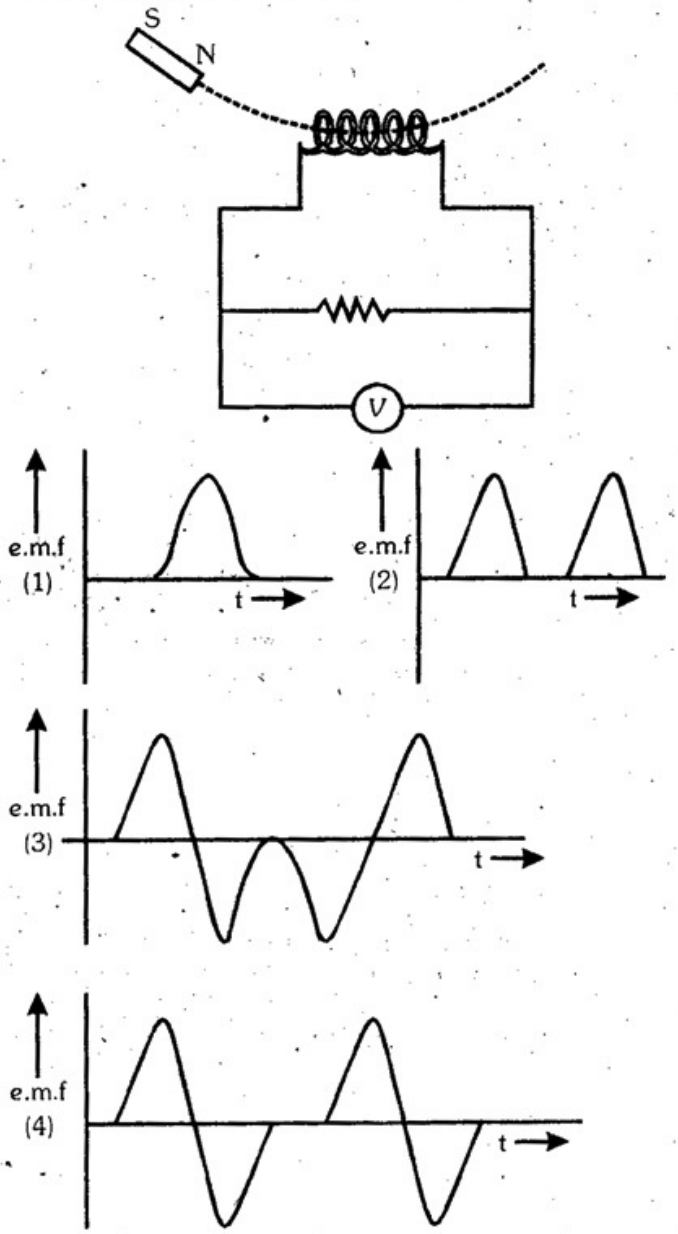
(3) when the elevator moves upward with constant acceleration

(4) when the elevator moves downward with constant acceleration

37. Two concentric conducting thin spherical shells A and B having radii r_A and r_B ($r_B > r_A$) are charged to Q_A and $-Q_B$ ($|Q_B| > |Q_A|$). The electrical field along a line, (passing through the centre is)



38. A magnet is made to oscillate with a particular frequency, passing through a coil as shown in figure. The time variation of the magnitude of e. m. f. generated across the coil during one cycle is



39. Dimension of electrical resistance is

(1) $ML^{-1}L^3T^3A^2$ (2) $ML^3T^{-3}A^{-2}$

(3) $ML^2T^{-3}A^{-1}$ (4) $ML^2T^{-3}A^{-2}$

40. Four point + ve charges of same magnitude (Q) are placed at four corners of a rigid square frame as shown in figure. The plane of the frame is perpendicular to Z-axis. If a – ve point charge is placed at a distance z away from the above frame ($z << L$) then

(1) it passes through the frame only once

(2) it moves away from the frame

(3) – ve charge oscillates along the Z-axis

(4) it moves slowly towards the frame and stays in the plane of the frame

§ *Directions for questions 41 – 60 : In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statements of Reason (R) just below it. Of the statements, mark the correct answer as*

(1) If both assertion and reason are true and reason is the correct explanation of assertion

(2) If both assertion and reason are true but reason is not the correct explanation of assertion

(3) If assertion is true but reason is false

(4) If both assertion and reason are false

41. Assertion : Specific gravity of a fluid is a dimensionless quantity.

Reason : It is the ratio of density of fluid to the density of water

42. Assertion : Frictional forces are conservative forces.

Reason : Potential energy can be associated with frictional forces

43 Assertion : By roughening the surface of a glass sheet its transparency can be reduced

Reason : Glass sheet with rough surface absorbs more light.

44. Assertion : A diode lasers are used as optical sources in optical communication

Reason : Diode lasers consume less energy

45. Assertion : Diamond glitters brilliantly

Reason : Diamond does not absorb sunlight

46. Assertion : The energy (E) and momentum (p) of a photon are related by $p = E/c$.

Reason : The photon behaves like a particle

47. Assertion : The clouds in sky generally appear to be whitish

Reason : Diffraction due to clouds is efficient in equal measure at all wavelengths

48. Assertion : Television signals are received through sky-wave propagation

Reason : The ionosphere reflects electromagnetic waves of frequencies greater than a certain critical frequency.

49. Assertion : The logic NOT can be built using diode

Reason ; The output voltage and the input voltage of the diode have 180° phase difference

50. Assertion : The resolving power of a telescope is more if the diameter of the objective lens is more

Reason : Objective lens of large diameter collects more light.

51. Assertion : Reversible systems are difficult to find in real world

Reason : Most processes are dissipative in nature

52. Assertion. For a system of particles under central force field, the total angular momentum is conserved.

Reason : The torque acting on such a system is zero.

53. Assertion : Air quickly leaking out of a balloon becomes cooler.

Reason : The leaking air undergoes adiabatic expansion

54. Assertion : It is not possible to use ^{35}Cl as the fuel for fusion energy.

Reason : The binding energy ^{35}Cl is too small

55. Assertion : The number of electrons in a p-type silicon semiconductor is less than the number of electrons in a pure silicon semiconductor at room temperature.

Reason : It is due to law of mass action

56. Assertion : In a common emitter transistor amplifier the input current is much less than the output current.

Reason : The common emitter transistor amplifier has very high input impedance.

57. Assertion : A body that is a good radiator is also a good absorber of radiation at a given wavelength

Reason : According to Kirchoff's law the absorptivity of a body is equal to its emissivity at a given wavelength

58. Assertion : In pressure temperature (P – T) phase diagram of water, the slope of the melting curve is found to be negative

Reason : Ice contracts on melting to water

59. Assertion : For higher temperatures the peak emission wavelength of a black body shifts to lower wavelengths

Reason : Peak emission wavelengths of a blackbody is proportional to the fourth power of temperature

60. Assertion : For Reynold number $R_e > 2000$, the flow of fluid is turbulent

Reason : Inertial forces are dominant compared to the viscous forces at such high Reynold numbers.

CHEMISTRY

61. Among the following molecules

(i) $\ddot{X}eO_3$ (ii) $\ddot{X}eOF_4$ (iii) $\ddot{X}eF_6$

Those having same number of lone pairs on Xe are

(1) (i) and (ii) only (2) (i) and (iii)

(3) (ii) and (iii) only (4) (i), (ii) and (iii) only

62. An aqueous solution of $CoCl_2$ on addition of excess of concentrated HCl turns blue due to formation of

(1) $[Co(H_2O)_4\ Cl_2]$ (2) $[Co(H_2O)_2\ Cl_4]^{2-}$

(3) $[CoCl_4]^{2-}$ (4) $[Co(H_2O)_2\ Cl_2]$

63. In which of the following pairs both the complexes show optical isomerism ?

(1) *cis*- $[Cr\ (C_2O_4)_2\ Cl_2]^{3-}$, *cis*- $[Co\ (NH_3)_4\ Cl_2]$

(2) $[Co\ (en)_3]\ Cl_3$, *cis*- $[Co\ (en)_2Cl_2]Cl$

(3) $[PtCl\ (dien)]Cl$, $[NiCl_2Br_2]^{2-}$

(4) $[Co(NO_3)_3\ (NH_3)_3]$, *cis*- $Pt(en)_2\ Cl_2]$

64. The diamagnetic species is

(1) $[Ni\ (CN)_4]^{2-}$ (2) $[NiCl_4]^{2-}$

(3) $[CoCl_4]^{2-}$ (4) $[Co\ F_6]^{2-}$

65. In the balanced chemical reaction

$IO_3^- + aI^- + bH^+ \rightarrow cH_2O + d\ I_2$

a, b, c and d respectively correspond to

(1) 5, 6, 3, 3 (2) 5, 3, 6, 3

(3) 3, 5, 3, 6 (4) 5, 6, 5, 5

66. Among the following pairs of ions, the lower oxidation state in aqueous solution is more stable than the other, in

(1) Tl^+ , Tl^{3+} (2) Cu^+ , Cu^{2+}

(3) Cr^{2+} , Cr^{3+} (4) V^{2+} , VO^{2+}

67. The number of P – O – P bridges in the structure of phosphorus pentoxide and phosphorus trioxide are respectively

(1) 6, 6 (2) 5, 5 (3) 5, 6 (4) 5, 6

68. In diborane, the two H – B – H angles are nearly

(1) 60°, 120° (2) 95°, 120°

(3) 95°, 150° (4) 120°, 180°

69. Which of the following gives propyne on hydrolysis

(1) Al_4C_3 (2) Mg_2C_3

(3) B_4C (4) La_4C_3

70. The pair of amphoteric hydroxides is

(1) $Al(OH)_3$, LiOH

(2) $Be(OH)_2$, $Mg(OH)_2$

(3) $B(OH)_3$, $Be(OH)_2$

(4) $Be(OH)_2$, $Zn(OH)_2$

71. Which of the following is a carbonate ore ?

(1) pyrolusite (2) malachite

(3) diaspore (4) cassiterite

72. $^{238}_{92}U$ emits 8 α-particles and 6 β-particles. The neutron proton ratio in the product nucleus is

(1) 60/41 (2) 61/40 (3) 62/41 (4) 61/42

73. The correct order for the wavelength of absorption in the visible region is

(1) $[Ni\ (NH_3)_6]^{2+} < [Ni\ (H_2O)_6]^{2+} < [Ni\ (NO_2)_6]^{4-}$

(2) $[Ni(NO_2)_6]^{4-} < [Ni\ (NH_3)_6]^{2+} < [Ni\ (H_2O)_6]^{2+}$

(3) $[Ni(H_2O)_6]^{2+} < [Ni(NH_3)_6]^{2+} < [Ni(NO_2)_6]^{4-}$

(4) $[Ni\ (NO_2)_6]^{4-} < [Ni(H_2O)_6]^{2+} < [Ni(NH_3)_6]^{2+}$

74. F_2 formed by reacting K_2MnF_6 with

(1) MnF_4 (2) SbF_5 (3) MnF_3 (4) $KSbF_6$

75. The isoelectronic pair is

(1) ClO_2^- , ClF_2^- (2) IF_2^- , I_3^-

(3) Cl_2O , ICl_2^- (4) ICl_2^- , ClO_2

76. Which of the following chemicals are used to manufacture methyl isocyanate that caused "Bhopal Tragedy"

(i) methylamine (ii) phosgene

(iii) phosphine (iv) dimethylamine

(1) (ii) and (iv) (2) (i) and (iii)

(3) (iii) and (iv) (4) (i) and (ii)

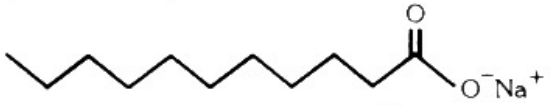
77. α – Particles can be detected using

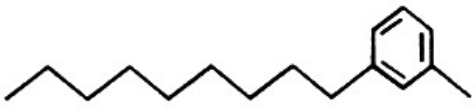
(1) gold foil (2) barium sulphate

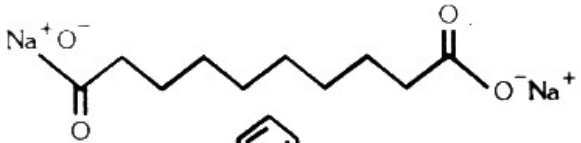
(3) thin aluminium sheet

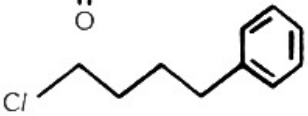
(4) zinc sulphide screen

78. Which of the following molecules is most suitable to disperse benzene in water ?

(1) 

(2) 

(3) 

(4) 

79. The chemical reaction,

$2\,AgCl_{(s)} + H_{2\,(g)} \longrightarrow 2\,HCl_{(aq)} + 2\,Ag_{(s)}$

taking place in a galvanic cell is represented by the rotation

(1) $Pt_{(s)} | H_{2\,(g)}$. 1 bar | 1 M $HCl_{(aq)}$ | $AgCl_{(s)}$ | $Ag_{(s)}$

(2) $Pt_{(s)} | H_{2\,(g)}$. 1 bar | 1 M $HCl_{(aq)}$ | 1 M $Ag_{(aq)}$ | $Ag_{(s)}$

(3) $Pt_{(s)} | H_{2\,(g)}$. 1 bar | 1 M $HCl_{(aq)}$ | $Ag_{(s)}$ | $AgCl_{(s)}$ |

(4) $Pt_{(s)} | H_{2\,(g)}$. 1 bar | 1 M $KCl_{(aq)}$ | $AgCl_{(s)}$ | $Ag_{(s)}$

80. If Z is the number of atoms in the unit cell that represents the closest packing sequence . . . A B C A B C . . . , the number of tetrahedral voids in the unit cell is equal to

(1) Z (2) Z/4 (3) Z-2 (4) 2Z

81. ΔH_f° (298 K) of methanol is given by the chemical equation

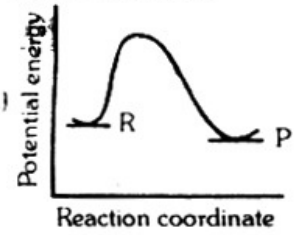
(1) C (diamond) + $\frac{1}{2}O_{2\,(g)}$ + 2 $H_{2\,(g)} \rightarrow CH_3OH\,(l)$

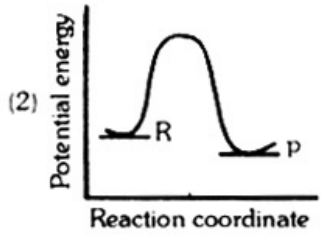
(2) $CH_{4\,(g)} + \frac{1}{2}O_{2\,(g)} \rightarrow CH_3OH_{(g)}$

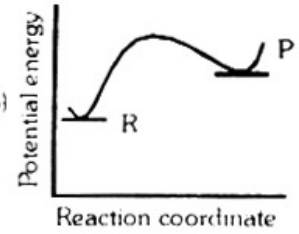
(3) $CO_{(g)} + 2\,H_{2\,(g)} \rightarrow CH_3OH_{(l)}$

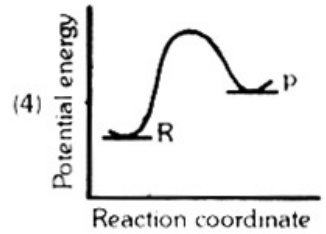
(4) C (graphite) + $\frac{1}{2}O_{2\,(g)}$ + 2 $H_{2\,(g)} \rightarrow CH_3OH_{(l)}$

82. An endothermic reaction with high activation energy for the forward reaction is given by the diagram

(1) 

(2) 

(3) 

(4) 

83. When 10 ml of 0.1 M acetic acid (pK_a = 5.0) is titrated against 10 ml of 0.1 M ammonia solution (pK_b = 5.0), the equivalence point occurs at pH

(1) 9.0 (2) 6.0 (3) 5.0 (4) 7.0

84. The most probable radius (in pm) for finding the electron in He^+ is

(1) 26.5 (2) 105.8 (3) 0.0 (4) 52.9

85. For the reaction of one mole of zinc dust with one mole of sulphuric acid in a bomb calorimeter, ΔU and w corresponds to

(1) $\Delta U > 0$, $w > 0$ (2) $\Delta U < 0$, $w = 0$

(3) $\Delta U < 0$, $w < 0$ (4) $\Delta U > 0$, $w = 0$

86. For reaction $aA \rightarrow xP$, when [A] = 2.2 mM, the rate was found to be 2.4 mM s^{-1}. On reducing concentration of A to half, the rate changes to 0.6 mM s^{-1}. The order of reaction with respect to A is

(1) 1.5 (2) 2.5 (3) 3.0 (4) 2.0

87. For reaction 2 $NOCl_{(g)} = 2\,NO_{(g)} + Cl_{2\,(g)}$, K_C at 427° C is 3×10^{-6} L. mol^{-1}. The value of K_p is nearly

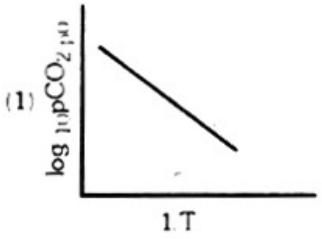
(1) 1.75×10^{-4} (2) 7.50×10^{5}

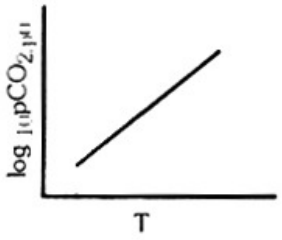
(3) 2.50×10^{-5} (4) 2.50×10^{-4}

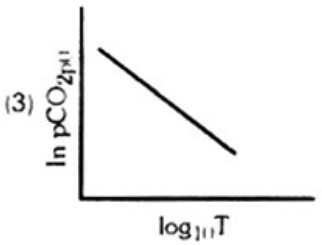
88. For the chemical equilibrium,

$CaCO_{3\,(s)} \rightleftharpoons CaO_{(s)} + CO_{2\,(g)}$,

ΔH_r° can be determined from which one of the following

(1) 

(2) 

(3) 

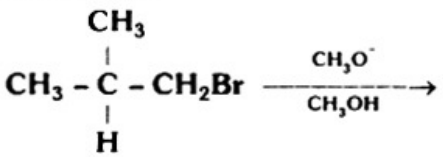
(4) 

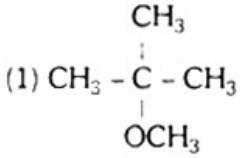
89. Among the following the strongest nucleophile is

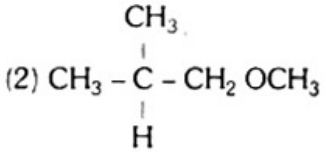
(1) CH_3NH_2 (2) C_2H_5SH

(3) $NCCH_2^-$ (4) CH_3COO^-

90. The major product formed in the following reaction is



(1) 

(2) 

(3) $CH_3 - CH - CH_2CH_3$

OCH_3

CH_3

(4) $CH_3 - C - CH_3$

91. The major product obtained on treatment of $CH_3CH_2CH(F)CH_3$ and CH_3O^-/CH_3OH is

(1) $CH_3CH_2CH_2CH_2OCH_3$

(2) $CH_3CH_2CH(OCH_3)CH_3$

(3) $CH_2=CH-CHCH_3$ (4) $CH_3CH_2CH=CH_2$

92. Among the following the most stable compound is

(1) *trans*- 1, 3-cyclohexanediol

(2) *cis*- 1, 2 cyclohexanediol

(3) *trans*- 1, 2-cyclohexanediol

(4) *cis*- 1, 3-cyclohexenediol

93. 3-Phenylpropene on reaction with HBr gives (as a major product)

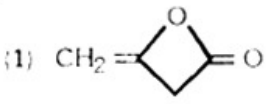
(1) $C_6H_5CH(Br)CH=CH_2$

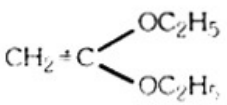
(2) $C_6H_5CH_2CH(Br)CH_3$

(3) $C_6H_5CH(BR)CH_2CH_3$

(4) $C_6H_5CH_2CH_2CH_2Br$

94. $CH_3CO_2C_2H_5$ on reaction with sodium ethoxide in ethanol gives A, which on heating in the presence of acid gives B. Compound B is

(1) 

(2) 

(3) CH_3COCH_3 (4) CH_3COCH_2COOH

95. Among the following which one does not act as an intermediate in Hofmann rearrangement ?

(1) RNC (2) RNCO

(3) RCON (4) RCONHBr

96. Pyridine is less basic than triethylamine because

(1) in pyridine, lone pair of nitrogen is delocalised

(2) pyridine is a cyclic system

(3) pyridine has aromatic character

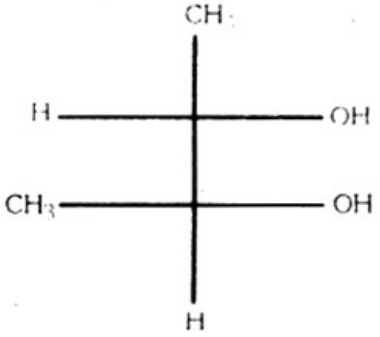
(4) nitrogen in pyridine is sp^2 hybridised

97. Which one of the following biomolecules is insoluble in water ?

(1) ribonuclease (2) adenine

(3) haemoglobin (4) α-keratin

98. Correct configuration of the following is



(1) 1R, 2R (2) 1S, 2R

(3) 1S, 2S (4) 1R, 2S

99. Which one of the following statements is true for protein synthesis (translation) ?

(1) only one codon codes for an amino acid

(2) amino acids are directly recognized by m-RNA

(3) the third base of the codon is less specific

(4) every t-RNA molecule has more than one amino acid attachment

100. $C_6H_5CONHCH_3$ can be converted into $C_6H_5CH_2NHCH_3$ by

(1) Zn-Hg/HCl (2) $NaBH_4$

(3) $LiAlH_4$ (4) H_2 - Pd/C

§ ***Directions for questions 101 – 120 : In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statements of Reason (R) just below it. Of the statements, mark the correct answer as***

(1) If both assertion and reason are true and reason is the correct explanation of assertion

(2) If both assertion and reason are true but reason is not the correct explanation of assertion

(3) If assertion is true but reason is false

(4) If both assertion and reason are false

101. Assertion : Reaction of SO_2 and H_2S in the presence of Fe_2O_3 catalyst gives elemental sulphur

Reason : SO_2 is a reducing agent.

102. SiF_6^{2-} is known but $SiCl_6^{2-}$ is not.

Reason : Size of fluorine is small and its lone pair of electrons interacts with d-orbitals of Si strongly.

103. Assertion : Borax bead test is not suitable for Al(III)

Reason : Al_2O_3 is insoluble in water

104. Assertion : Ozone is a powerful oxidising agent in comparison to O_2.

Reason : Ozone is diamagnetic but O_2 is paramagnetic.

105. Assertion : Potassium ferrocyanide is diamagnetic whereas potassium ferricyanide is paramagnetic

Reason : Crystal field splitting in ferricyanide ion is greater than that of ferricyanide ion.

106. Assertion : Addition of NH_4OH to an aqueous solution of $BaCl_2$ in the presence of NH_4Cl (excess) precipitates $Ba(OH)_2$.

Reason : $Ba(OH)_2$ is insoluble in water

107. Assertion : $SeCl_4$ does not have a tetrahedral structure.

Reason : Se in $SeCl_4$ has two lone pairs

108. Assertion : The molecular weight of acetic acid determined by depression in freezing point method in benzene and water was found to be different

Reason : Water is polar and benzene is non polar.

109. Assertion : Compressibility factor for hydrogen varies with pressure with positive slope at all pressures.

Reason : Even at low pressures, repulsive forces dominate hydrogen gas.

110. Assertion : First ionisation energy for nitrogen is lower than oxygen

Reason : Across a period effective nuclear charge decreases.

111. Assertion : B_2 molecule is diamagnetic

Reason : The highest occupied molecular orbitals is of σ type

112. Assertion : Rate of hydrolysis of methyl chloride to methanol is higher in DMF than in water.

Reason : Hydrolysis of methyl chloride follows second order kinetics

113. Assertion : Galvanized iron does not rust.

Reason : Zinc has a more negative electrode potential than iron.

114. Assertion : Extraction of iron metal from iron oxide ore is carried out by heating with coke.

Reason : The reaction

$Fe_2O_{3\,(s)} \rightarrow Fe_{(s)} + 3/2\ O_{2\,(g)}$ is a spontaneous process.

115. Assertion : Rates of nitration of benzene and hexadeuterobenzene are different

Reason : C – H bond is stronger than C – D bond.

116. Assertion : t-Butyl methyl ether is not prepared by the reaction of t-butyl bromide with sodium methoxide

Reason : Sodium methoxide is a strong nucleophile.

117. Assertion : Maltose is a reducing sugar which gives two moles of D-glucose on hydrolysis

Reason : Maltose has a 1,4-β-glycosidic linkage

118. Assertion : p– $O_2N - C_6H_5COCH_3$ is prepared by Friedel Crafts acylation of nitrobenzene.

Reason : Nitrobenzene easily undergoes electrophilic substitution reaction

119. Assertion : Alkyl isocyanides in acidified water give alkyl formamides

Reason : In isocyanides, carbon first acts as a nucleophile and then as an electrophile

120. Assertion : Cyclopentadienyl anion is much more stable than allyl anion

Reason : Cyclopentadienyl anion is aromatic in character.

BIOLOGY

121. Based on cellular mechanisms there are two major types of regeneration found in the animals. Which one of the following is the correct example of the type mentioned ?

(1) Epimorphosis – Regeneration of crushed and filtered out pieces of a Planaria into as many new Planarians.

(2) Morphallaxis – Regeneration of two transversely cut equal pieces of a Hydra into two small Hydras

(3) Epimorphosis – Replacement of old and dead erythrocytes by the new ones.

(4) Morphallaxis – Healing up of a wound in the skin.

122. Which one of the following four secretions is correctly matched with its source, target and nature of action ?

	Secretion	Source	Target	Action
(1)	Gastrin	Stomach lining	Oxyntic cells	Production of HCl
(2)	Inhibin	Sertoli cells	Hypothalamus	Inhibition of secretion of gonadotropin releasing hormone
(3)	Enterokinase	Duodenum	Gall bladder	Release of bile juice
(4)	Atrial Natriuretic Factor (ANF)	Sinu atrial node (SAN)	Juxtaglomerular apparatus (JGA)	Inhibition of release of renin

123. Which one of the following four glands is correctly matched with the accompanying description ?

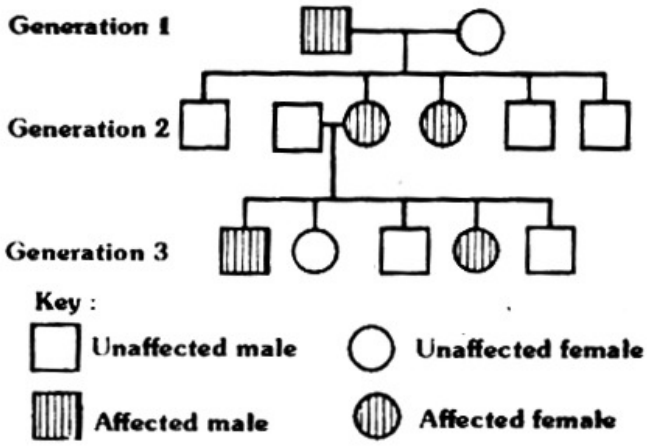
(1) Pancreas – Delta cells of the Islets of Langerhans secrete a hormone which stimulates glycolysis in liver.

(2) Parathyroid – Secretes parathormone which promotes movement of calcium ions from blood into bones during calcification

(3) Thymus - starts undergoing atrophy after puberty

(4) Thyroid – hyperactivity in young children causes cretinism

124. Given below is a pedigree chart showing the inheritance of a certain sex linked trait in humans.



The trait traced in the above pedigree chart is

(1) recessive Y– linked (2) dominant Y– linked

(3) dominant X– linked (4) recessive X – linked

125. A cross section at the midpoint of the middle piece of a human sperm will show

(1) 9 + 2 arrangement of microtubules only.

(2) mitochondria and 9 + 2 arrangement of microtubules

(3) centriole, mitochondria and 9 + 2 arrangement of microtubules

(4) centriole and mitochondria

126. Which one of the following is a correct statement ?

(1) The anticoagulant hirudin is being produced from transgenic *Brassica napus* seeds

(2) "Flavr Savar" variety of tomato has enhanced the production of ethylene which improves its taste

(3) "Bt" in "Bt-cotton" indicates that it is a genetically modified organism produced through biotechnology

(4) Somatic hybridisation involves fusion of two complete plant cells carrying desired genes.

127. An insect bite may result in inflammation of that spot. This is triggered by the alarm chemicals such as :

(1) interferons and histones

(2) histamine and kinins

(3) histamine and dopamine

(4) interferons and opsonin

128. Which one of the following pairs of geographical areas show maximum biodiversity in our country ?

(1) Kerala and Punjab

(2) Sunderbans and Rann of Kutch

(3) Eastern Ghats and West Bengal

(4) Eastern Himalaya and Western Ghats

129. Genetic diversity in agricultural crops is threatened by :

(1) intensive use of biopesticides

(2) extensive intercropping

(3) intensive use of fertilizers

(4) introduction of high yielding varieties

130. One of the ex situ conservation methods for endangered species is

(1) national parks (2) cryopreservation

(3) wildlife sanctuaries (4) biosphere reserves

131. Formation of non-functional methaemoglobin causes blue-baby syndrome. This is due to

(1) deficiency of iron in food

(2) excess of arsenic concentration in drinking water

(3) increased methane content in the atmosphere

(4) excess of nitrates in drinking water

132. Two of the body parts which do not appear in MRI may be :

(1) scapula and canines

(2) molar teeth and eye lens

(3) tendons and premolars

(4) ligaments and ribs

133. A young drug addict used to show symptoms of depressed brain activity, feeling of calmness, relaxation and drowsiness. Possibly he was taking

(1) marijuana (2) amphetamine

(3) valium (4) pethidine

134. Antigen binding site in an antibody is found between

(1) two heavy chains

(2) one heavy and one light chain

(3) two light chains

(4) either between two light chains or between one heavy and one light chain depending upon the nature of antigen

135. Which one of the following events is correctly matched with the time period in a normal menstrual cycle ?

(1) endometrium secretes nutrients for implantation : 11– 18 days

(2) endometrium regenerates : 5 – 10 days

(3) release of egg : 5th day

(4) rise in progesterone level : 1 – 15 days

136. A tumor inducing plasmid widely used in the production of transgenic plants is that of

(1) *Agrobacterium tumefaciens*

(2) *Escherichia coli* (3) *Bacillus thuringiensis*

(4) *Staphylococcus aureus*

137. Which one of the following statement pertaining to pollutants is correct ?

(1) methylmercury in water may cause "Itai itai" disease.

(2) excess fluoride in drinking water causes osteoporosis

(3) excess cadmium in drinking water causes black foot disease

(4) DDT is a non-biodegradable pollutant

138. Which one of the following statements is correct with respect to salt water balance inside the body of living organisms ?

(1) The body fluids of fresh water animals are generally hypotonic to surrounding water.

(2) Salmon fish excretes lot of stored salt through gill membrane when in fresh water.

(3) *Paramecium* discharge concentrated salt solution by contractile vacuoles

(4) when water is not available camels do not produce urine but store urea in tissues.

139. The " cri - du- chat" syndrome in caused by change in chromosome structure involving

(1) translocation (2) deletion

(3) duplication (4) inversion

140. The family containing mustard and its main characters are

(1) Solanaceae – Pentamerous flowers, five stamens, bicarpellary gynoecium, berry type fruit

(2) Brassicaceae – Tetramerous flowers, six stamens, bicarpellary gynoecium, siliqua type fruit

(3) Poaceae – Trimerous flowers, three stamens, monocarpellary gynoecium, caryopsis type of fruit.

(4) Brassicaceae – pentamerous flowers, many stamens, pentacarpellary gynoecium, capsule type fruit

141. Grain colour in wheat is determined by three pairs of polygenes. Following the cross AABBCC (dark colour) x aabbcc (light colour), in F_2 generation what proportion of the progeny is likely to resemble either parent ?

(1) half (2) none

(3) less than 5 percent (4) one third

142. Which one of the following statements pertaining to plant structure is correct ?

(1) sieve tube elements possess cytoplasm but no nuclei

(2) cork lacks stomata, but lenticels carry out transpiration

(3) the shoot apical meristem has a quiescent centre.

(4) passage cells help in transfer of food from cortex to.phloem

143. When synapsis is complete all along the chromosome, the cell is said to have entered a stage called

(1) diakinesis (2) diplotene

(3) zygotene (4) pachytene

144. Primary source of allelic variation is

(1) mutation

(2) recombination

(3) polyploidy

(4) independent assortment

145. Many cells function property and divide mitotically even though they do not have

(1) plasma membrane (2) plastids

(3) mitochondria (4) cytoskeleton

146. Three of the following statements regarding cell organelles are correct while one is wrong. Which one is wrong ?

(1) Sphaerosomes are single membrane bound and are associated with synthesis and storage of lipids

(2) Lysosomes are double membraned vesicles budded off from Golgi apparatus and contain digestive enzymes

(3) Endoplasmic reticulum consists of a network of membranous tubules and helps in transport, synthesis and secretion.

(4) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesizing machinery..

147. In which one of the following would you expect to find glyoxysomes ?

(1) root hairs (2) endosperm of wheat

(3) palisade cells in leaf

(4) endosperm castor

148. Which one of the following correctly represents an organism and its ecological niche?

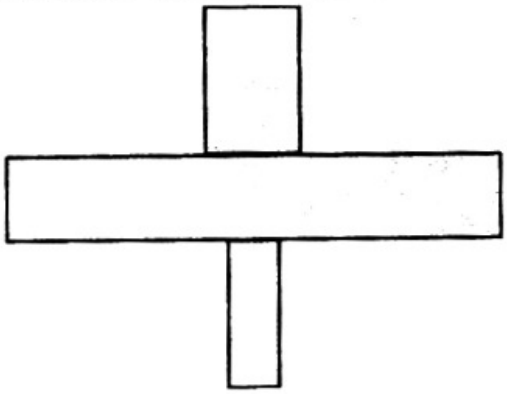
(1) vultures and dense forest

(2) vallisneria and pond

(3) plant lice (aphids) and leaf

(4) desert locust (schistocerca) and desert

149. Given below is one of the types of ecological pyramids. This type represents



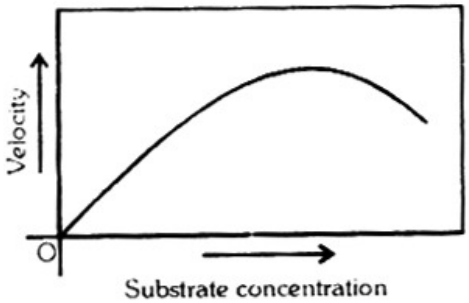
(1) pyramid of biomass in a lake

(2) pyramid of biomass in a fallow land

(3) pyramid of numbers in a grassland

(4) energy pyramid in a spring.

150.



The given graph shows the effect of substrate concentration on the rate of reaction of the enzyme green gram-phosphatase. What does the graph indicate?

(1) at higher substrate concentration the pH increases

(2) Formation of an enzyme-substrate compiex

(3) The rate of enzyme reaction is directly proportional to the substrate concentration

(4) Presence of an enzyme inhibitor in the reaction mixture

151. Which one of the following groups of structures/organs have similar function ?

(1) Incisors of rat, gizzard (proventriculus) of cockroach and tube feet of starfish

(2) Nephridia in earthworm, Malpighian tubules in cockroach and urinary tubules in rat.

(3) Antennae of cockroach, tympanum of frog and clitellum of earthworm

(4) Typhlosole in earthworm, intestinal villi in rat and contractile vacuole in Amoeba

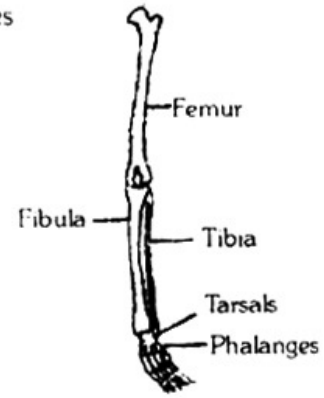
152. Given below is a diagram of the bones of the left human hindlimb as seen from front. It has certain mistakes in labeling. Two of the wrongly labelled bones are :

(1) fibula and phalanges

(2) femur and fibula

(3) tibia and tarsals

(4) tarsals and femur



153. Electroporation procedure involves :

(1) purification of saline water with the help of a membrane system

(2) making transient pores in the cell membrane to introduce gene constructs

(3) fast passage of food through sieve pores in phloem elements with the help electric stimulation

(4) opening of stomatal pores during night by artificial length

154. Somaclonal variation appears in

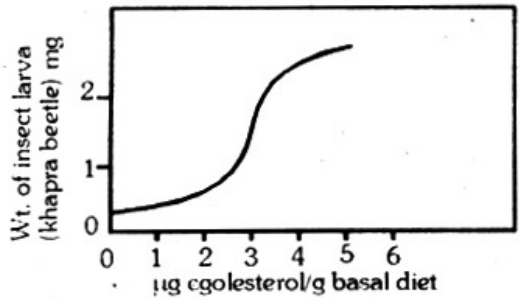
(1) organisms produced through somatic hybridisation

(2) plants growing in highly polluted conditions

(3) apomictic plants

(4) tissues culture raised plants

155. In an experiment freshly hatched larvae of an insect (Khapra beetle) were reared on a basal diet (complete diet without cholesterol) with increasing amounts of cholesterol. Results obtained are shown in the graph given in the below. The graph given indicates that :



(1) growth of khapra beetle is inhibited when cholesterol concentration exceeds 5 µ g/g diet

(2) cholesterol is an essential dietary requirement of khapra beetle

(3) growth of khapra beetle is directly proportional to cholesterol concentration

(4) cholesterol concentration of 2µ g/g diet is the optimum level

156. Which one of the following is correct matching of a plant, its habit and the forest type where it normally occurs ?

(1) Acacia catechu. tree coniferous forest

(2) Shorea robusta, herb, tropical rain forest

(3) Prosopis, tree scrub

(4) Saccharum, grass forest

157. cDNA probes are copied from the messenger RNA molecules with the help of

(1) DNA polymerase (2) restriction enzymes

(3) adenosine deaminase

(4) reverse transcriptase

158. Gibberellins cab promote seed germination because of their influence on

(1) rate of cell division

(2) synthesis of abscisic acid

(3) production of hydrolyzing enzymes

(4) absorption of water through hard seed coat

159. Which one of the following features is common in silverfish, scorpion, dragonfly and prawn ?

(1) Cephalothorax and tracheae

(2) Jointed appendages and chitinous exoskeleton

(3) Three pairs of legs and segmented body

(4) Chitinous cuticle and two pairs of antennae

160. Double fertilization involves

(1) fertilisation of the egg and the central cell by two sperms brought by the same pollen tube

(2) fertilization of two eggs in the same embryo sac by two sperms brought by one pollen tube

(3) fertilization of the egg by two male gametes

(4) fertilization of the egg and the central cell by two sperms brought by different pollen tubes

§ ***Directions for questions 161 – 180 : In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statements of Reason (R) just below it. Of the statements, mark the correct answer as***

(1) If both assertion and reason are true and reason is the correct explanation of assertion

(2) If both assertion and reason are true but reason is not the correct explanation of assertion

(3) If assertion is true but reason is false

(4) If both assertion and reason are false

161. Assertion : Senescence is the time when age associated defects are manifested.

Reason : Certain genes may be undergoing sequential switching on and off during one's life.

162. Assertion : In recombinant DNA technology, human genes are often transferred into bacteria (prokaryotes) or yeast (eukaryote).

Reason : Both bacteria and yeast multiply very fast to form huge populations which express the desired gene.

163. Assertion : Methane component of green house gases contributing to global warming is about 20 percent.

Reason : Introduction of multi-point fuel injection engines in automobiles has decreased methane content in the exhausts.

164. Assertion : Suspended particulate matter (SPM) is an important pollutant released by diesel vehicles.

Reason : Catalytic converts greatly reduce pollution caused by automobiles

165. Assertion : Interferons are a type of antibodies produced by body cells infected by bacteria

Reason : Interferons stimulate inflammation at the site of injury

166. Assertion : Organ transplantation patients are given immunosuppressive drugs

Reason : Transplanted tissue has antigens which stimulate the specific immune response of the recipient

167. Assertion : Persons suffering from haemophilia fail to produce blood clotting factor VIII

Reason : Prothrombin producing platelets in such persons are found in very low concentration

168. Assertion : In humans, the gamete contributed by the male determines whether the child produced will be male or female

Reason : Sex in humans is a polygenic trait depending upon a cumulative effect of some genes on X-chromosome and some Y-chromosome

169. Assertion : Mitochondria and chloroplasts are semiautonomous organelles

Reason : They are formed by division of preexisting organelles as well as contain DNA but lack protein synthesizing machinery.

170. Assertion : Replication and transcription occur in the nucleus but translation occurs in the cytoplasm

Reason : mRNA is transferred from the nucleus into the cytoplasm where ribosomes and amino acids are available for protein synthesis

171. Assertion : The fungi are widespread in distribution and they even live on or inside other plants and animals

Reason : Fungi are able to grow anywhere on land, water or on other organisms because they have a variety of pigments, including chlorophyll, carotenoids, fucooxanthin and phycoerythrin

172. Assertion : C_4 photosynthetic pathway is more efficient than the C_3 pathway

Reason : Photorespiration is suppressed in C_4 plants.

173. Assertion : Presently the global atmosphere is warming up.

Reason : The depletion of stratospheric ozone layer has resulted in increase in ultraviolet radiations reaching the earth.

174. Assertion : Human ancestors never used their tails and so the tail expressing gene has disappeared in them.

Reason : Lamarck's theory of evolution is popularly called theory continuity of germ plasm

175. Assertion : Comparative biochemistry provides a strong evidence in favour of common ancestry of living beings

Reason : Genetic code is universal

176. Assertion : Darwin's finches show a variety of beaks suited for eating large seeds, flying insects and cactus seeds

Reason : Ancestral seed- eating stock of Darwin's finches radiated out from South American mainland to different geographical areas of the Galapagos Islands, where they found competitor-free new habitats.

177. The atmospheric concentration of CO_2 at which photosynthesis just compensates for respiration is referred to as CO_2 compensation point.

Reason : The CO_2 compensation point is reached when the amount of CO_2 uptake is less than heat generated through respiration because the level of CO_2 in the atmosphere is more than that required for achieving CO_2 compensation point.

178. Assertion : The age -sex structure of human population in countries like France and Germany gives a steep pyramid.

Reason : In countries like Sudan and India the population is increasing at a rapid rate.

179. Assertion : The duck-billed Platypus and the spiny ant-eater, both are egg-laying animals yet they are grouped under mammals.

Reason : Both of them have seven cervical vertebrae and 12 pairs of cranial nerves

180 Assertion : *Agrobacterium tumefaciens* is popular in genetic engineering because this bacterium is associated with the roots of all cereal and pulse crops

Reason : A gene incorporated in the bacterial chromosomal genome gets automatically transferred to the crop with which the bacterium is associated

General Knowledge

181. Metaphysics refers to :

(1) Analysis of human body at atomic level

(2) A branch of philosophy concerned with the rational query of reality

(3) A branch of physics concerned with investigation of reality

(4) Meta-analysis of physics for the purpose of theory of relativity

182. Who is called as numismatist ?

(1) An expert on mathematics

(2) An expert on numerology

(3) A person who studies coins

(4) A numerator

183. Anjali Bhagwat is related to which field :

(1) Athletics (2) Lawn tennis

(3) Badminton (4) Shooting

184. Who received Stains International award for Religion Harmony ?

(1) Bharatiya Vidya Bhavan

(2) Pope John Paul

(3) Teesta Setalvad (4) Kuldeep Nayar

185. A 'dirty' nuclear bomb means :

(1) It involves low grade fission reaction

(2) It has small amount of cobalt 60

(3) It involves small Ce – 137

(4) It involves low grade fusion reaction

186. National Inland Navigation Institute (NINI) is situated in :

(1) Goa (2) Kolkata

(3) Gomukh, Uttranchal

(4) Patna

187. 'Blogs' means :

(1) Big logs used to cross the river in hills

(2) On line journals where cyber -diarists unreveal their stories

(3) Big blocks of land used for grazing animals

(4) Black spots in somebody's life

188. What is the colour of Black Box, that is found in aircraft ?

(1) Blue (2) Black

(3) Orange (4) Red

189. Which author was a Bengali writer and an Oscar-winning film director ?

(1) Chhabi Biswas

(2) Bankimchandra Chatterjee

(3) Rabindranath Tagore

(4) Satyajit Ray

190. What is the symbol of Laloo Prasad Yadav's RJD party ?

(1) Palm (2) Lantern

(3) Tea Leaves (4) Elephant

191. Where is the Tibetan government-in-exile based ?

(1) London (2) Delhi

(3) Dharamsala (4) Phomphenh

192. What is true of Leonardo da Vinci's Mona Lisa ?

(1) He dreamt her in the night

(2) He painted without a model

(3) The modal was unmarried women

(4) The modal was the wife of client

193. Which is the annual pilgrimage that every Muslims should make once in the lifetime ?

(1) Jihad (2) Zakat

(3) Haj (4) Sharhah

194. What is the term used in e-mail and on-line conversations to convey mood along with the words ?

(1) Emoticon (2) Flames

(3) Smiley (4) Pictures

195. Whose quote is " I hear and I forget. I see and I remember. I do and I understand"

(1) Mickey Mantle (2) Confucious

(3) Arthur Schopenhauer

(4) Caskie Stinnet

196. Whose autobiography is 'Sunny Day's" ?

(1) Sunil Shetty (2) Sunny Deol

(3) Sunil Gavaskar (4) Geofrey Boycott

197. Which age in Indian history is referred to as the "Golden Age" ?

(1) Ancient (2) Mughal

(3) Mayura (4) Gupta

198. Which novel of Amitav Ghosh is called *Esteremi Orient in its Italian version* ?

(1) The Circle of Reason

(2) In An Antique Land

(3) The shadow lines

(4) Dancing in Cambodia

199. Which of the following is President A. P. J. Abdul Kalam's autobiography ?

(1) Crossroads

(2) My Experiment with Truth

(3) Wings of Fire

(4) Ignited Minds: Unleashing the Power

200. Which of the following units of measurement in not named after a person ?

(1) Apgar (2) Barleycorn

(3) Curie (4) Hertz

Answers

1.(4) 2.(1) 3.(3) 4.(3) 5.(2) 6.(2) 7.(2) 8.(4) 9.(2) 10.(1) 11.(1) 12.(1) 13.(1) 14.(1) 15.(3) 16.(3) 17.(3) 18.(4) 19.(3) 20.(2) 21.(3) 22.(3) 23.(3) 24.(3) 25.(4) 26.(4) 27.(4) 28.(2) 29.(2) 30.(4) 31.(3) 32.(1) 33.(4) 34.(4) 35.(4) 36.(4) 37.(4) 38.(4) 39.(4) 40.(3) 41.(1) 42.(4) 43.(3) 44.(2) 45.(2) 46.(1) 47.(3) 48.(4) 49.(4) 50.(1) 51.(1) 52.(1) 53.(1) 54.(3) 55.(1) 56.(3) 57.(1) 58.(1) 59.(2) 60.(1)

61.(4) 62.(3) 63.(2) 64.(1) 65.(1) 66.(1) 67.(1) 68.(2) 69.(2) 70.(4) 71.(2) 72.(3) 73.(2) 74.(2) 75.(1) 76.(4) 77.(4) 78.(2) 79.(2) 80.(4) 81.(4) 82.(4) 83.(4) 84.(1) 85.(2) 86.(4) 87.(1) 88.(1) 89.(2) 90.(1) 91.(3) 92.(1) 92.(1) 94.(1) 95.(1) 96.(1) 97.(4) 98.(3) 99.(3) 100.(1) 101.(2) 102.(1) 103.(2) 104.(2) 105.(3) 106.(4) 107.(3) 108.(1) 109.(1) 110.(4) 111.(4) 112.(1) 113.(1) 114.(4) 115.(4) 116.(2) 117.(3) 118.(4) 119.(1) 120.(1)

121.(2) 122.(4) 123.(3) 124.(3) 125.(2) 126.(1) 127.(2) 128.(4) 129.(4) 130.(2) 131.(4) 132.(1) 133.(3) 134.(2) 135.(2) 136.(1) 137.(4) 138.(4) 139.(2) 140.(2) 141.(3) 142.(1) 143.(4) 144.(2) 145.(2) 146.(2) 147.(4) 148.(3) 149.(1) 150.(4) 151.(2) 152.(1) 153.(2) 154.(4) 155.(2) 156.(3) 157.(4) 158.(3) 159.(2) 160.(1) 161.(1) 162.(1) 163.(2) 164.(2) 165.(4) 166.(1) 167.(3) 168.(3) 169.(3) 170.(1) 171.(3) 172.(1) 173.(2) 174.(4) 175.(2) 176.(1) 177.(3) 178.(2) 179.(2) 180.(1)

181.(3) 182.(3) 183.(1,4) 184.(3) 185.(3,4) 186.(1,4) 187.(4) 188.(3) 189.(4) 190.(2) 191.(3) 192.(4) 193.(3) 194.(1) 195.(2) 196.(3) 197.(4) 198.(1) 199.(3,4) 200.(2)