Dated : 05-05-2023

M.L. Syal's Helix Institute

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Test Booklet Code

A

MM : 720

Test Series [Option-1] for NEET-2023

Time : 3 hrs. 20 min.

Mock Test

PHYSICS : SECTION-A

All questions are compulsory in section A

1. An electron is moving around a nucleus. The number of de-Broglie waves present in its circular orbit can be
   (1) 1.5
   (2) 2.3
   (3) 0.5
   (4) 2

2. Three particles, each having a charge of 10 μC are placed at the corners of an equilateral triangle of side 10 cm. The electrostatic potential energy of the system is
   (1) Zero
   (2) Infinite
   (3) 27 J
   (4) 100 J

3. Two springs of spring constants 1500 N/m and 3000 N/m respectively are stretched with same force. They will have potential energies in the ratio
   (1) 4 : 1
   (2) 1 : 4
   (3) 2 : 1
   (4) 1 : 2

4. According to Huygen's theory which of the following is correct?
   (1) All particles on one wave front vibrate in same phase
   (2) Rays propagate perpendicular to wave front
   (3) All rays take same time in going from one wave front to next
   (4) All of these

5. A progressive wave is represented by the equation $y = 8 \sin 2\pi (2x - 12t)$
   where x and y are in cm and t is in seconds. At any instant, phase difference between two particles separated by 0.0625 cm in x-direction is
   (1) 30°
   (2) 36°
   (3) 45°
   (4) 72°

6. A ball of mass 'm' moves with speed 'v'. It strikes normally with a wall and is reflected back with same speed. If its time of contact with wall is 't', find the force exerted by the ball on the wall.
   (1) $\frac{2mv}{t}$
   (2) $\frac{mv}{t}$
   (3) mvt
   (4) $\frac{mv}{2t}$

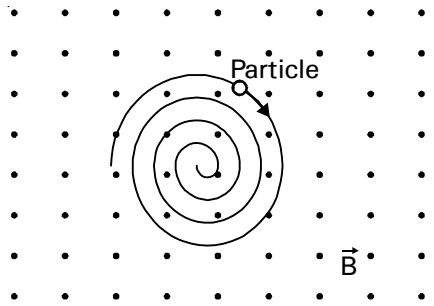
7. Temperature of hot and cold end of a 20 cm long uniform rod in thermal steady state are at 100°C and 20°C respectively. Temperature at the centre of the rod, assuming no loss from curved surface of rod is
   (1) 50°C
   (2) 60°C
   (3) 40°C
   (4) 20°C

8. 100 cells each of emf 5 V and internal resistance 1 Ω are to be arranged so as to produce maximum current in a 25 Ω resistance. Each row is to contain equal number of cells. The number of rows should be
   (1) 2
   (2) 4
   (3) 5
   (4) 10

9. A monkey of mass 27 kg climbs up a tree with an acceleration 1 m/s^2. The coefficient of friction between its hands and the tree is 0.9. The minimum force with which it should press its hands against the tree is
   (1) 360 N
   (2) 420 N
   (3) 330 N
   (4) 270 N

10. A closed pipe and an open pipe have their first overtones identical in frequency. Their lengths are in the ratio

(1) 1 : 2
(2) 2 : 3
(3) 3 : 4
(4) 4 : 5

11. 

A uniform magnetic field is directed out of the page. A charged particle, moving in the plane of the page, follows a clockwise spiral of decreasing radius as shown. Then the charge is

(1) positive and slowing down
(2) negative and slowing down
(3) positive and speeding up
(4) negative and speeding up

12. A public park, in the form of a square, has an area of $(100 \pm 0.2)\ m^2$. The side of park is

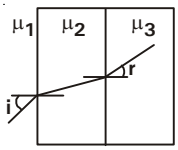
(1) (10 ± 0.01) m
(2) (10 ± 0.1) m
(3) (10 ± 0.04) m
(4) (10 ± 0.2) m

13. The r.m.s. value of an ac of 50 Hz is 10 A. The time taken by the alternating current in reaching from zero to maximum value and the peak value of current will be

(1) 2×10^{-2} sec and 14.14 A
(2) 1×10^{-2} sec and 7.07 A
(3) 5×10^{-3} sec and 7.07 A
(4) 5×10^{-3} sec and 14.14 A

14. A body of mass 'm' is situated at a height equal to radius of earth (R). Gravitational potential energy of the body - earth system is [g is the acceleration due to gravity on the surface of earth]

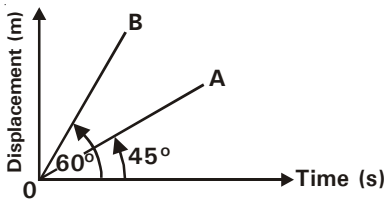
(1) $-\frac{1}{2}mgR$
(2) $\frac{1}{2}mgR$
(3) $-mgR$
(4) $-2mgR$

15. 

In the figure shown, $\frac{\sin i}{\sin r} =$

(1) $\frac{\mu_2^2}{\mu_3 \mu_1}$
(2) $\frac{\mu_3}{\mu_1}$
(3) $\frac{\mu_3 \mu_1}{\mu_2^2}$
(4) $\frac{\mu_1}{\mu_3}$

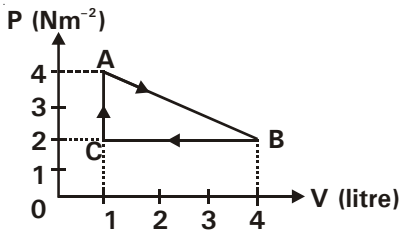
16. The displacement-time graphs for two bodies moving on the same straight line are shown. What is the relative velocity of B with respect to A?



(1) 1 m/s
(2) $\sqrt{2}$ m/s
(3) $(\sqrt{3}-1)$ m/s
(4) $\sqrt{3}$ m/s

17. The temperature at which the average translational kinetic energy of a molecule becomes double of its value at 10°C is

(1) 20°C
(2) 293°C
(3) 40°C
(4) depends on nature of gas

18. 

P-V diagram for a cyclic process is a triangle ABC drawn in order. Heat supplied to the gas in complete cycle is

(1) 6×10^{-3} J
(2) 9×10^{-3} J
(3) zero
(4) 3×10^{-3} J

19. A bullet is fired horizontally with a speed of 200 m/s aiming at a target 100 m away. It misses the target by
(1) 0.5 m
(2) 0.75 m
(3) 1.25 m
(4) 2.5 m

20. **Assertion** : For the planets orbiting around the sun, angular speed, kinetic energy changes with time but angular momentum remains constant.
Reason : Gravitational force is central force and so does not cause any torque.
(1) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(2) Assertion is true statement but Reason is false
(3) Assertion is false
(4) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

21. Two wheels A and B are mounted on the same axle. A is rotating at 60 rpm and B is at rest. If the two are brought into contact, then they together rotate at 20 rpm. If moment of inertia of A is I_0, that of B is
(1) $2I_0$
(2) I_0
(3) $3I_0$
(4) $0.5\ I_0$

22. The equation E = pc is valid
(1) for an electron as well as for a photon
(2) for an electron but not for a photon
(3) for a photon but not for an electron
(4) neither for an electron nor for a photon.

23. A stone gets detached from a balloon that is descending at a uniform rate of 10 m/s. The displacement of the stone from the point of release after 3 second is
(1) 75 m
(2) 60 m
(3) 45 m
(4) 100 m

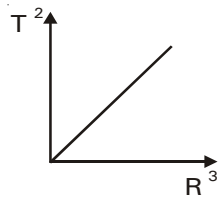
24. A convex lens forms a three-fold magnified real image of a real object. The distance from the object to image is 2.4 m. What is the focal length of the lens?
(1) 45 cm
(2) 60 cm
(3) 90 cm
(4) 30 cm

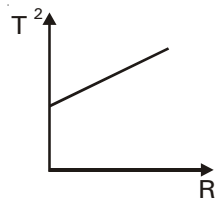
25. If length of a wire is doubled under the influence of a normal stress of 9×10^9 N/m^2, its Young's modulus is
(1) 4.5×10^9 N/m^2
(2) 1.8×10^{10} N/m^2
(3) 1.8×10^9 N/m^2
(4) 9×10^9 N/m^2

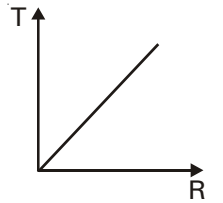
26. A body of mass 2 kg attached to a string is whirled in a vertical circle of radius 4.5 m. The minimum speed of the body at lowest point so that the cord does not slacken even at the highest point is
(1) 10 m/s
(2) 15 m/s
(3) 6.7 m/s
(4) 11.6 m/s

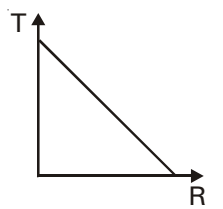
27. A monkey is climbing up a tree at a constant velocity. A dog runs towards the tree with a constant velocity. What is the trajectory of monkey as seen by the dog?
(1) A straight line
(2) A parabola
(3) An ellipse
(4) A circle

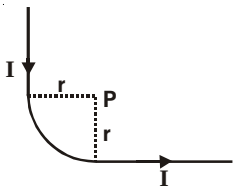
28. Which of the following graphs shows variation of time period T with radius of orbit R for a planet revolving around the sun?

(1) 

(2) 

(3) 

(4) 

29. 

Find the magnetic field at point P due to two semi-infinite wires joined by quarter of a circle as shown in the above diagram.

(1) $\frac{\mu_0}{2\pi}\frac{I\left(1-\frac{\pi}{4}\right)}{r}\odot$

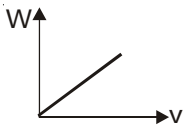
(2) $\frac{\mu_0}{2\pi}\frac{I\left(1+\frac{\pi}{4}\right)}{r}\otimes$

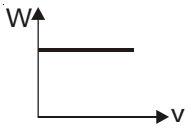
(3) $\frac{\mu_0}{4\pi}\frac{I\left(1+\frac{\pi}{4}\right)}{r}\otimes$

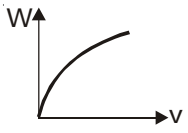
(4) $\frac{\mu_0}{2\pi}\frac{I\left(1+\frac{\pi}{4}\right)}{r}\odot$

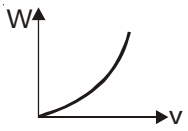
30. A reactor using $_{92}U^{235}$ generates 1.6 MW power. Given that energy released due to fission of each nucleus of uranium atom U^{235} is 200 MeV, number of fissions taking place per second in the reactor is
(1) 1×10^{16}
(2) 3×10^{16}
(3) 5×10^{16}
(4) 6×10^{16}

31. Some forces are acting on a body lying in free space. The correct graph between total work done (W) on the body and the speed of the body (v) is

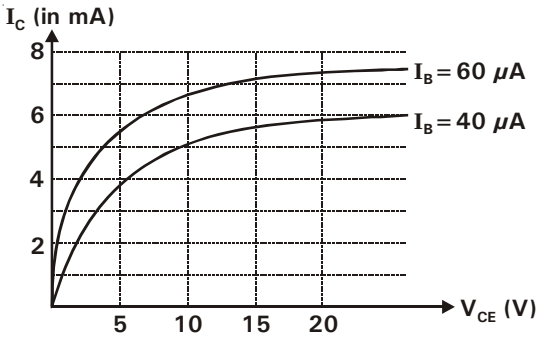
(1) 

(2) 

(3) 

(4) 

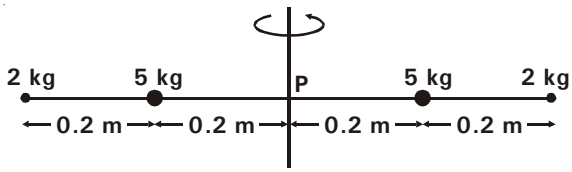
32. A certain n-p-n transistor has the common emitter output characteristics as shown.



Find β_{AC} at $V_{CE} = 10$ V.
(1) 60
(2) 100
(3) 75
(4) 50

33. A compound microscope produces a magnification of 300. Magnification produced by objective lens is 25. If final image is at infinity, focal length of the eye-piece is
(1) 2.1 cm
(2) 3.4 cm
(3) 4.3 cm
(4) 5.2 cm

34. Four masses are fixed on a massless rod as shown in figure. The moment of inertia about the axis P is about



(1) 2 kg m^2
(2) 1 kg m^2
(3) 0.5 kg m^2
(4) 0.3 kg m^2

35. The time period of a particle executing S.H.M. is $\frac{2\pi}{\omega}$ and its velocity at a distance 'b' from mean position is $\sqrt{3}\,b\,\omega$. Its amplitude is
(1) 2 b
(2) 3 b
(3) 4 b
(4) b

PHYSICS : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

36. A mass of 10 gm moving horizontally with a velocity of 1m/s strikes a pendulum bob of mass 10 gm hanging in equilibrium position. The two masses stick together. The maximum height reached by this pendulum now is

(1) Zero
(2) 5 cm
(3) 2.5 cm
(4) 1.25 cm

37. A current passes through a wire of non-uniform cross-section. Which of the following quantities are independent of the cross-section?

a. the charge crossing in a given time interval
b. drift speed
c. current density
d. free-electron density

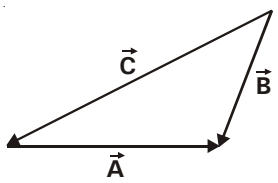
(1) a, c & d
(2) b, c & d
(3) a & d
(4) a, b, c & d

38. **Statement-I** : As excitation of hydrogen atom increases, value of minimum energy required to free the electron from the excited atom decreases.

Statement-II : In Bohr's model, frequency with which electron revolves around the hydrogen nucleus is inversely proportional to the principal quantum number

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

39.



From the figure, we can say that

(1) $\vec{A} + \vec{B} = \vec{C}$
(2) $\vec{B} + \vec{C} = \vec{A}$
(3) $\vec{C} + \vec{A} = \vec{B}$
(4) $\vec{A} + \vec{B} + \vec{C} = 0$

40. The Boolean equation for a NOR gate is

(1) $C = A + B$
(2) $C = \overline{A + B}$
(3) $C = A.B$
(4) $C = \overline{(A \cdot B)}$

41. If a rectangular area is rotated in a uniform electric field from the position where the maximum electric flux goes through it to an orientation where only half the maximum flux goes through it, what has been the angle of rotation?

(1) 30°
(2) 60°
(3) 45°
(4) 90°

42. Eddy currents are produced when

(1) a metal is kept in varying magnetic field
(2) a metal is kept in a steady magnetic field
(3) a circular coil is placed in a magnetic field
(4) current is passed through a circular coil

43. The phase difference between voltage and current in an ac circuit which is not consuming any power?

(1) 90°
(2) 45°
(3) 180°
(4) 60°

44. A refrigerator is to maintain eatables kept inside at 7°C. If room temperature is 27°C, then coefficient of performance is

(1) 11
(2) 18
(3) 28
(4) 14

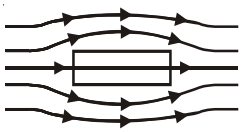
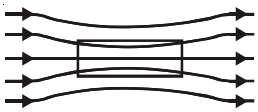
45. Unpolarized light is incident on a slab from air at an angle of incidence 60°. It is found that reflected light is plane polarised. Then refractive index of the material of slab is

(1) 1.5
(2) 1.732
(3) 1.414
(4) 0.577

46. A block of mass 'm' is placed on a smooth wedge of inclination 37°. The whole system is accelerated horizontally so that the block does not slip on the wedge. The acceleration of the wedge is

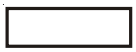
(1) 6 m/s^2
(2) 13.3 m/s^2
(3) 7.5 m/s^2
(4) 8 m/s^2

47. Match diagrams in column-I entries in column-II

Column I		**Column II**
a.		p. paramagnetic
b.		q. diamagnetic
c.		r. ferromagnetic

(1) a-r, b-p, c-q
(2) a-p, b-q, c-r
(3) a-q, b-r, c-p
(4) a-q, b-p, c-r

48. Figure represents vertical sections of four wings moving horizontally in air. In which case is the force due to pressure difference of air upwards?

(1) 
(2) 
(3) 
(4) 

49. The quantities transported by electromagnetic waves are

a. momentum
b. energy
c. charge

(1) a, b & c
(2) b & c
(3) a & c
(4) a & b

50. A particle of mass m is projected with a velocity 'u' making an angle 45° with the horizontal. The magnitude of the torque due to weight of the projectile, when the particle is at its maximum height, about the point of projection is

(1) mu^2
(2) $\frac{3}{4}mu^2$
(3) $\frac{1}{4}mu^2$
(4) $\frac{1}{2}mu^2$

CHEMISTRY : SECTION-A

All questions are compulsory in section A

51. Friedel-Crafts reaction of benzene with isobutyl chloride produces

(1) Isobutylbenzene
(2) tert-Butylbenzene
(3) n-Butylbenzene
(4) sec-Butylbenzene

52. The element with atomic number 35

(1) belongs to s-block
(2) belongs to group 18
(3) is a halogen
(4) is a pnicogen

53. Equivalent conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91 $ohm^{-1}\ cm^2$ respectively. The equivalent conductance of CH_3COOH at infinite dilution would be

(1) 101.38 $ohm^{-1}\ cm^2$
(2) 253.62 $ohm^{-1}\ cm^2$
(3) 390.71 $ohm^{-1}\ cm^2$
(4) 678.90 $ohm^{-1}\ cm^2$

54. Which of the following molecule has no sp^2 hybridised carbon?

(1) $CH_3CH=CH_2$
(2) $CH_3C\equiv N$
(3) $H_3C-CH=CH-CH_3$
(4) $HC\equiv C-CH=CH_2$

55. The term polymer is defined as very large molecules having molecular mass

(1) 10^3-10^7u
(2) $10^{-3}-10^{-7}u$
(3) $10^{-1}-10^{-7}u$
(4) $10^{-3}-10^7u$

56. Highest rate of esterification with alcohols will be given by

(1) HCOOH
(2) $(CH_3)_2CHCOOH$
(3) $(CH_3)_3CCOOH$
(4) CH_3COOH

57. Orbital angular momentum depends on

(1) ℓ
(2) n and ℓ
(3) n and m
(4) m and s

58. The kinetic theory of gases states that volume of molecules of gas is negligible w.r.t. total volume of the gas. This explains the
(1) pressure exerted by the gas
(2) indefinite volume of the gas
(3) expansion of the gas
(4) compressibility of the gas

59. The dehydration of alcohol involves which intermediate?
(1) free radical
(2) carbanion
(3) carbocation
(4) benzyne

60. A colloidal solution can be purified by
(1) Filtration
(2) Peptization
(3) Coagulation
(4) Dialysis

61. A reagent that takes away an electron pair is called _____ i.e. electron seeking and the reaction is called _____.
(1) nucleophile, nucleophilic
(2) nucleophile, electrophilic
(3) electrophile, electrophilic
(4) electrophile, nucleophilic

62. Match the entries in column I with their corresponding entries in column II

	Column-I		Column-II
a.	CO_2	i.	sink of CO_2
b.	Rain water	ii.	ammonium salts
c.	Plants	iii.	pH = 5.6
d.	Atmospheric haze	iv.	green house gas

(1) a-ii, b-iii, c-i, d-iv
(2) a-iv, b-ii, c-i, d-iii
(3) a-iii, b-iv, c-ii, d-i
(4) a-iv, b-iii, c-i, d-ii

63. In a transition series, as the atomic number increases paramagnetism
(1) increases gradually
(2) decreases gradually
(3) first increases to a maximum and then decreases
(4) first decreases to a minimum and then increases

64. Which would exhibit ionisation isomerism?
(1) $[Cr(NH_3)_6]Cl_3$ (2) $[Co(NH_3)_5Br]SO_4$
(3) $[Cr(en)_2Cl_2]$ (4) $[Cr(en_3Cl_3]$

65. Ionic hydrides react with water to give
(1) acidic solutions
(2) basic solutions
(3) hydride ion
(4) protons

66. By electrolysis of potassium acetate, what is formed at anode?
(1) methane
(2) ethane
(3) H_2
(4) propane

67. **Assertion** : Atomic radius of Gallium is less than that of Aluminium.
Reason : The presence of additional 10 d-electrons offer only poor screening effect for the outer electrons from the increased nuclear charge in Gallium
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

68. A mixture of O-nitrophenol & p-nitrophenol can be seperated by
(1) sublimation
(2) steam distiliation
(3) fractional crystallization
(4) distillation

69. **Statement-I** : Aspirin finds use in prevention of heart attack due to its antiblood clotting action
Statement-II : Aspirin speeds up the synthesis of chemicals known as prostaglandins.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is incorrect but statement-II is correct
(4) Statement-I is correct but statement-II is incorrect

70. Which of the following is not a state function?
(1) Heat
(2) Enthalpy
(3) Entropy
(4) Gibb's free energy

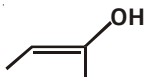
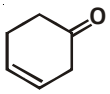
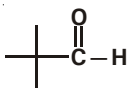
71. Mixture of HCHO and $(CH_3)_3C-CHO$ on reaction with NaOH give the mixture of HCOONa and $(CH_3)_3CCH_2OH$. This reaction is called
(1) Aldol reaction
(2) Gattermann-koch
(3) Kolbe reaction
(4) Cannizaro reaction

72. Which of the following is colourless explosive solid and has pyramidal structure?
(1) XeO_3
(2) $XeOF_2$
(3) $XeOF_4$
(4) XeF_6

73. The method of zone refining of metals is based on the principle of
(1) greater mobility of pure metal than that of the impurity
(2) higher melting point of the impurity than that of the pure metal
(3) greater noble character of the solid metal than that of the impurity
(4) greater solubility of the impurity in the molten state than in the solid

74. Which of the following does not exist as a solid?
(1) $NaHCO_3$
(2) Na_2CO_3
(3) $LiHCO_3$
(4) K_2CO_3

75. The final pH when 0.5 L of water is added to 0.5 L of 0.1 M $Ba(OH)_2$.
(1) 13 (2) 1
(3) 12 (4) 11

76. Which of the following compound does not show tautomerism ?
(1) 
(2) 
(3) 
(4) 

77. Which form of sulphur is paramagnetic?
(1) S_2
(2) rhombic sulphur
(3) monoclinic sulphur
(4) cyclo-S_6

78. p-nitro benzoic acid on reaction with NH_3, then heating it and then finally adding Br_2/NaOH would produce
(1) p-nitrobenzamide
(2) p-nitroaniline
(3) nitrobenzene
(4) Benzylamine

79. Which of the following compounds corresponds Van't Hoff factor 'i' to be equal to 2 for dilute solution?
(1) K_2SO_4 (2) $MgCl_2$
(3) Sugar (4) $MgSO_4$

80. The number of molecules in 4.25 g of ammonia is approximately
(1) 3.5×10^{23} (2) 1.5×10^{23}
(3) 0.5×10^{23} (4) 2.5×10^{23}

81. The rate constant of the reaction at 400 K is 10 times of the rate constant at 200 K. E_a of reaction is
(1) 1842.4 R
(2) 921.2 R
(3) 460.6 R
(4) 230.3 R

82. Which of the following is hydrogen bonded molecular solid?
(1) $NH_3(s)$
(2) dry ice
(3) HCl(s)
(4) AlN

83. $C_6H_{12}O_6 + Br_2(water) \rightarrow A$. A is?
(1) Gluconic acid
(2) Saccharic acid
(3) Sulphonic acid
(4) glyceric acid

84. At 500 K, the equilibrium constant for the reaction, cis-$C_2H_2Cl_2 \rightleftharpoons$ trans-$C_2H_2Cl_2$ is 0.6. At the same temperature the equilibrium constant for the reaction, trans-$C_2H_2Cl_2 \rightleftharpoons$ cis-$C_2H_2Cl_2$ will be
(1) 0.6 (2) 1.67
(3) 1.76 (4) 3.64

85. Which of the following is an outer orbital complex?
(1) $[Mn(CN)_6]^{3-}$
(2) $[MnCl_6]^{3-}$
(3) $[Fe(CN)_6]^{3-}$
(4) $[Cr(NH_3)_6]^{3+}$

CHEMISTRY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

86. Which of the following is not soluble in $NaHCO_3$?
(1) Phenol
(2) Acetic acid
(3) Formic acid
(4) 2,4,6-trinitrophenol

87. $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$
2 mole of H_2S and 11.2 L of SO_2 at STP react to form 'x' mol of sulphur. The value of 'x' is
(1) 3
(2) 1.5
(3) 11.2
(4) 6

88. T_c for CO_2 is 31.1°C & for CH_4 is −81.9°C respectively. Then
(1) CH_4 can be more easily liquified
(2) magnitude of dispersion forces is higher for CO_2
(3) CH_4 shows higher magnitude of london forces
(4) at room temperature both will get liquified

89. The oxidation numbers of each sulphur atom in $Na_2S_4O_6$ are
(1) +2 each
(2) +5,0,0,+5
(3) +2, 0, 0, +2
(4) +6, 0, 0, +6

90. **Assertion :** Aryl halides are extremely less reactive towards nucleophilic substitution reactions.

Reason : Because of the possible repulsion, it is more likely for the electron rich nucleophile to approach electron deficient arenes.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

91. $CuSO_4$ solution is electrolysed using inert electrodes. If 3.5F charge is passed, then number of equivalents of Cu deposited at cathode will be

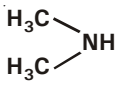
(1) 3.5

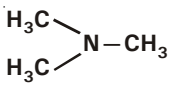
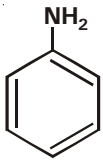
(2) 0

(3) 7.0

(4) 1.75

92. Which of the following is most basic in aqueous solution ?

(1) CH_3-NH_2 (2) 

(3)  (4) 

93. The species having pyramidal shape is

(1) SO_3

(2) BrF_3

(3) PCl_3

(4) SiO_3^{2-}

94. Atoms of element B form *hcp* lattice and those of the element A occupy 2/3rd of tetrahedral voids. The formula of the compound formed by the elements A and B is

(1) A_3B_2

(2) A_2B_3

(3) A_4B_3

(4) A_3B_4

95. Which of the following is not an oxoacid of nitrogen?

(1) $H_2N_2O_2$

(2) HNO_2

(3) HNO_3

(4) HNO_5

96. **Statement-I** : The valence shell is taken as a sphere with the electron pairs localising on the spherical surface at maximum distance from one another.

Statement-II : When two or more resonance structures can represent a molecule, the VSEPR model is only applicable to the most stable structure.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

97. Which of the following is not true regarding Solvay Process?

(1) Sodium carbonate is generally prepared by this process

(2) Advantage is taken of the high solubility of $NaHCO_3$ whereby it gets precipitated in the reaction of NaCl with NH_4HCO_3.

(3) NH_4HCO_3 is prepared by passing CO_2 to a concentrated solution of NaCl saturated with ammonia.

(4) In this process NH_3 is recovered when the solution containing NH_4Cl is treated with $Ca(OH)_2$.

98. General oxidation state of actinoids is

(1) +4 (2) +5

(3) +3 (4) +7

99. Match the entry in column-I with corresponding entry in column-II

Column-I	Column-II
A. Grignard regent	1. H_2/Pd-$BaSO_4$
B. Clemmensen's reduction	2. N_2H_4/KOH/glycol
C. Rosenmund's reduction	3. CH_3MgX
D. Wolff—Kishner reduction	4. Zn-Hg/conc.HCl
	5. H_2/Ni

(1) A–3, B–4, C–1, D–2

(2) A–3, B–4, C–2, D–1

(3) A–2, B–1, C–4, D–5

(4) A–5, B–3, C–2, D–1

100. Which of the following ligands is unidentate?

(1) Isothiocyanate

(2) Glycinate ion

(3) Acetyl acetanato

(4) Ethane-1,2-diamine

ZOOLOGY : SECTION-A

All questions are compulsory in section A

101. Which of the following is a correct sequence of steps in PCR (Polymerase Chain Reaction) ?
   (1) Annealing, Denaturation, Extension
   (2) Denaturation, Annealing, Extension
   (3) Denaturation, Extension, Annealing
   (4) Extension, Denautration, Annealing

102. Identify the incorrect statement
   (1) The progeny of cross breeding can not be used for commercial production .
   (2) In artificial insemination , the semen can be frozen for later use
   (3) Controlled breeding experiments are carried out by using artificial insemination and MOET
   (4) Hisardale is a cross breed of sheep

103. Transition state structure formed is
   (1) stable and permanent
   (2) unstable and permanent
   (3) stable and temporary
   (4) unstable and temporary

104. Which of the following exclusively endoparasitic protozoan is most notorious and has staggering effect on human population?
   (1) *Paramecium*
   (2) *Amoeba*
   (3) *Plasmodium*
   (4) *Trypanosoma*

105. Having become an expert on gel electrophoresis, you are asked to examine a gel for a colleague. Where would you find the smallest segment of DNA?
   (1) Near the positive electrode, farthest away from the wells
   (2) Near the negative electrode, close to the wells
   (3) Near the well, near the negative pole
   (4) Near the middle, they tend to slow down after first few minutes

106. Persistent notochord is present in
   (1) Bony fish
   (2) Amphibians
   (3) Cephalochordata
   (4) Hemichordata

107. We have the ability to increase the strength of inspiration & expiration with the help of
   (1) diaphragm muscles
   (2) inspiratory muscles
   (3) ciliary muscles
   (4) abdominal muscles

108. **Assertion** : In PCR, DNA polymerase isolated from *Thermus aquaticus* bacterium is used.

   Reason : The enzyme remains active at high temperature required for denaturation of ds-DNA.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

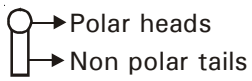
109. Tobacco plants resistant to nematode have been developed by introduction of DNA into host cell that produces.
   (1) a particular toxic protein to kill the pest
   (2) only sense strand
   (3) both sense and anti-sense RNA
   (4) particular hormone for proliferation of cells

110. Following are the examples showing similar habitat that resulted in selection of similar adaptive features in different groups of organisms and towards the same function except
   (1) fins of fish and flippers of dolphin
   (2) wings of butterfly and birds
   (3) eyes of octopus and mammals
   (4) forelimbs of horse and whale

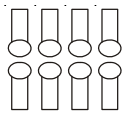
111. Acetabulum is formed at the point of fusion of
   (1) Ilium and ischium
   (2) Ischium and pubis
   (3) Ilium, ischium and pubis
   (4) Ilium and pubis

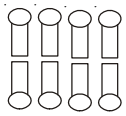
112. Which of the following is a correct match?
   (1) PTH - Hypocalcemic hormone
   (2) Cortisol - Activates immune response
   (3) Glucagon - Hypoglycemic hormone
   (4) Growth factors - Hormones secreted by non-endocrine tissues

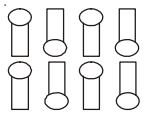
113. The lipid molecules present in plasma membrane have polar heads and non polar tails

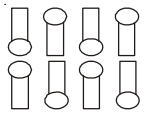


Which figure represents the correct arrangement of lipids in lipid bilayer ?

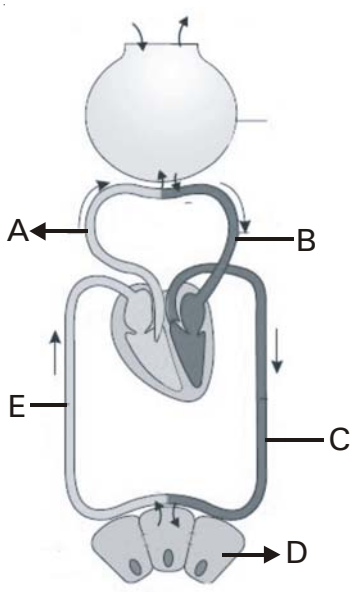
(1) 

(2) 

(3) 

(4) 

114. In which of the following sites pCO_2 is 45 mm of Hg & pO_2 is 40 mm Hg respectively?



(1) A and B
(2) B and E
(3) D and E
(4) A and C

115. PCR is used to amplify DNA to

(1) detect HIV in suspected AIDS patients
(2) detect mutations in genes in suspected cancer patients
(3) identify many genetic disorders
(4) all of these

116. Which of the following statements is incorrect?

(1) Contraction of diaphragm increases volume of thoracic chamber in antero-posterior axis
(2) Contraction of external intercostal muscles increases volume of thoracic chamber in dorsoventral axis
(3) Overall increase in thoracic volume causes increase in pulmonary volume
(4) Decrease in pulmonary volume decreases intra pulmonary pressure

117. Which of the following is incorrect match ?

(1) GIFT – *In Vivo* fertilisation
(2) AI – Introduction of semen into uterus or vagina artificially
(3) IUI – Embryo transfer into uterus
(4) Multiload 375 – supresses sperm motility

118. Which of the following is an incorrect match for biocontrol agents?

(1) Dragon flies - control mosquitoes
(2) *Trichoderma* - free living fungi
(3) *Baculoviruses* - broad spectrum applications
(4) Lady bird beetles - control Aphids

119. Which of the following is incorrect matching pair w.r.t. various sites on pBR322 cloning vector?

(1) Selectable marker :antibiotic resistant genes
(2) Cloning sites : many restriction sites for single RE
(3) Origin of replication : controls copy number
(4) Rop : codes for proteins involved in replication of the plasmid

120. Which of the following statement/s is/are correct ?

(1) Colostrum provides passive immunity to infant
(2) Cleavage divisions are mitotic divisions in zygote
(3) By three months, all the major organ systems of the foetus are formed
(4) All of these

121. In anaerobic sludge digesters, which of the following mixture of gases are produced ?

(1) CH_4, H_2S, CO_2, H_2
(2) CO_2, H_2S, SO_2
(3) H_2S, SO_2 , H_2, O_2
(4) CH_4, O_2, CO_2, H_2

122. Which of the following character(s) is/are shown by *Labeo, Clarias & Pterophyllum* ?

(1) 2-chambered heart
(2) Single circulation
(3) Poikilothermous
(4) All of the above

123. Fill in the blanks and select the correct option

A. An antiviral protein called _____is released by the_____infected cell
B. _____ immune response is also known as secondary immune response
C. _____ in the saliva prevents microbial growth

	A	B	C
(1)	interferon, viral	Anamnestic	ptyalin
(2)	pyrogen, virus	Passive	lysozyme
(3)	interferon , viral	Anamnestic	lysozyme
(4)	cytokinin, bacterial	passive	mucus

124. The pattern of microtubule organisation in a centriole is

(1) 9 doublet + 2 central singlet
(2) 9 doublet + no central singlet
(3) 9 triplet + no central singlet
(4) 9 triplet + 2 central singlet

125. One of the following is true for muscle contraction

(1) A-band remains constant
(2) I-band expands
(3) H-zone shortens
(4) both 1 and 3

126. Which of the following is NOT a correct match?

(1) Vomiting – ejection of stomach contents through mouth
(2) Diarrhoea – abnormal frequency of bowel movements
(3) Constipation – reduced absorption of food
(4) Indigestion – feeling of fullness

127. What is not true for ADH?

(1) Has a constrictory effect on blood vessels
(2) Increases reasorption of water from DCT
(3) Released from the anterior lobe of pituitary but synthesised in hypothalamus
(4) Decrease in body fluid volume triggers release of ADH

128. **Statement-I** : Largest phylum of animalia includes animals that are triploblastic, radially symmetrical and coelomate animals.

Statement-II : Majority of animals belonging to second largest phylum contain calcareous shell and are unsegmented.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

129. Which of the following statement is incorrect?

(1) Bipolar neurons are present in cerebral cortex
(2) Neural system provides an organised network of point to point connections for quick co-ordination
(3) Neural and endocrine system work in a synchronised fashion
(4) Neurons are excitable cells due to differential concentration gradients of ions across the membrane

130. Which of the following animal shows the given characteristics ?

a. Choanocytes
b. Cellular level of organisation
c. Canal system

(1) *Scypha*
(2) *Planaria*
(3) *Meandrina*
(4) *Ctenoplana*

131. Match the column I and II and select the correct option

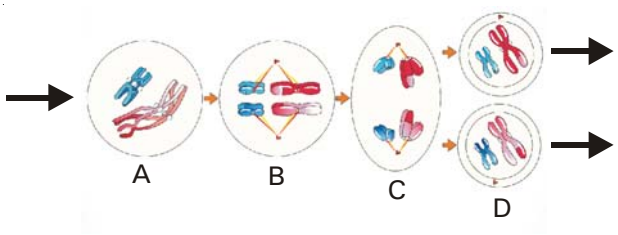
	Column-I		Column-II
a.	Fallopian tubes	i.	Implantation
b.	Fimbriae	ii.	Thoracic region
c.	Womb	iii.	Collects ovum
d.	Mammary glands	iv.	Fertilisation

(1) a–iv, b–iii, c–i, d–ii
(2) a–iii, b–i, c–ii, d–iv
(3) a–iv, b–i, c–iii, d–ii
(4) a–ii, b–iii, c–iv, d–i

132. Cells involved in functions like formation of diffusion boundary are likely to be present in

(1) lining of blood vessels and air sacs of lungs
(2) ducts of glands and tubular parts of nephrons
(3) lining of stomach and intestine
(4) inner surface of hollow organs like bronchioles and fallopian tubes

133. Identify the correct labels from the given figure



(1) A- Anaphase I
(2) B- Metaphase I
(3) C-Anaphase -II
(4) D-Telophase-II

134. The signals for parturition originate from
(1) fully developed foetus only
(2) placenta only
(3) fully developed foetus and placenta which induce mild uterine contractions
(4) hormone oxytocin from materal pituitary

135. How many of the following statements are true about chordates?
a. Notochord is absent
b. Central nervous system is ventral, solid and double
c. Heart is ventral
d. Post anal tail is absent
(1) Three
(2) One
(3) Four
(4) Two

ZOOLOGY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

136. 'X', 'Y' and 'Z' in the given table are respectively.

Blood group	Antigens on RBCs	Antibodies in Plasma	Donor's group
A	A	anti-B	Z
B	B	anti-A	B,O
AB	X	nil	A, B, AB, O
O	nil	Y	O

(1) A, B ; nil ; A, O
(2) nil ; nil ; O
(3) nil ; anti A, anti B ; A, B
(4) A, B ; anti A, anti B ; A, O

137. Which of the following is not true for *Homo erectus*?
(1) Existed about 15 mya
(2) Cranial capacity 900 cc
(3) Ate meat
(4) Fossil discovered in 1891

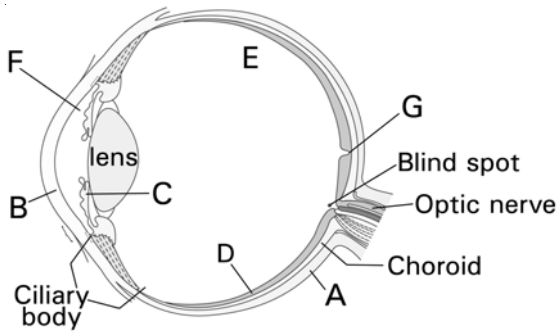
138. Filterate gets concentrated as it moves through
(1) descending limb of Henle's loop
(2) ascending limb of Henle's loop
(3) ascending limb of vasa recta
(4) descending limb of vasa recta

139. Which of the following is false?
(1) *Amphioxus* excretes through flame cells
(2) Nephridia are excretory organs of annelids
(3) Renal tubule start from Bowman's capsule
(4) Excretion is performed by nephrons in crustaceans

140. Plasmid pBR322 has Pst I restriction enzyme site within gene amp^R that confers ampicillin resistance. If this enzyme is used for inserting a gene for β-galactoside production and the recombinant plasmid is inserted in an *E.coli* strain
(1) it will not be able to confer ampicillin resistance to the host cell
(2) the transformed cells will have the ability to resist ampicillin as well as produce β-galactoside
(3) it will lead to lysis of host cell
(4) it will be able to produce a novel protein with dual ability

141. How many of the following are bacterial diseases?
Polio, Filariasis, Malaria, Diphtheria, Tetanus, Typhoid, Amoebiasis, AIDS, Syphilis
(1) 4
(2) 5
(3) 3
(4) 7

142. How many of the given labelled parts of human eye are correct ?
A-Sclera, B-Cornea, C-Suspensory ligament, D-Retina, E-Vitreous chamber, F-Aqueous chamber



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

143. Choose correct answer among the following options

A. Epinephrine	i. Increase in heart rate
B. Testosterone	ii. Decrease in liver glycogen
C. Glucagon	iii. Erythropoiesis
D. Atrial natriuretic factor	iv. Dilation of blood vessels

(1) A-ii, B-i, C-iii, D-iv
(2) A-iv, B-i, C-iii, D-ii
(3) A-i, B-ii, C-iii, D-iv
(4) A-i, B-iii, C-ii, D-iv

144. In the menstrual cycle, level of progestrone attain a peak value
(1) in the beginning of cycle
(2) in the end of cycle
(3) in the middle of cycle
(4) about 21st day

145. Lecithin is made up of
(1) 1 glycerol + 3 fatty acids + 1 choline
(2) 2 fatty acids + 1 phosphate + 1choline
(3) 1 glycerol + 3 fatty acids + 1 phosphate + 1 choline
(4) 1 glycerol + 2 fatty acids + 1 phosphate + 1choline

146. Production of a human protein in bacteria by genetic engineering is possible because
(1) bacterial cell can carry out the RNA splicing reactions
(2) the human chromosome can replicate in bacterial cell
(3) the mechanism of gene regulation is identical in humans and bacteria
(4) the genetic code is universal

147. **Statement-I** : Contraceptive are a regular requirement for the maintaince of reproductive health.

Statement-II : Vasectomy is a surgical interventation that blocks gamete transport and thereby prevent conception.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

148. Which of the following restriction enzymes produces blunt ends?
(1) *Hind* III
(2) *Sal* I
(3) *Eco* RV
(4) *Xho* I

149. Select the wrong statement
(1) Human insulin is being commercially produced from a transgenic *Escherichia coli.*
(2) Bt toxin gene *cry* 1*Ac* helps to control corn borer
(3) The crops engineered for glyphosate are resistant to herbicides
(4) Transgenic animals can be used for production of pharmacologically important proteins

150. **Assertion :** Mitosis is called equational division and meiosis is reductional division.

Reason : Daughter cells produced after mitosis have same number of chromosomes whereas daughter cells produced after meiosis have half the number of chromosomes as compared to parent cell.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

BOTANY : SECTION-A

All questions are compulsory in section A

151. Which RNA has structural and catalytic role during translation ?
(1) mRNA
(2) tRNA
(3) rRNA
(4) sRNA

152. Ground tissue is composed of
(1) simple tissue only
(2) complex tissue only
(3) both simple and complex tissues
(4) meristematic tissues

153. A disorder caused due to absence of one of the X-chromosome in human beings is
(1) Klinefelter's syndrome
(2) Down's syndrome
(3) Turner's syndrome
(4) Thallesemia

154. Which gene is responsible for synthesis of enzyme which splits lactose into glucose and galactose in inducible operon system in *E. coli*?
(1) tryp A
(2) lac Z
(3) lac Y
(4) lac A

155. VNTR used by Alec Jeffreys for DNA fingerprinting are referred to as
(1) microsatellites
(2) satellites
(3) minisatellites
(4) SNP

156. Heterotrophic , multicellular organisms having cell wall and absorptive mode of nutrition are placed In which of the following Kingdom ?
(1) Protista (2) Fungi
(3) Plantae (4) Animalia

157. The rate of formation of new organic matter by rabbit in a grassland is called
(1) Gross primary productivity
(2) Net primary productivity
(3) Primary production
(4) Secondary productivity

158. **Statement-I** : Micronutrients are required in trace quantities and are as important as macronutrients.
Statement-II : Even a slight deficiency of micronutrients causes toxicity symptoms.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

159. Kranz anatomy is found in
(1) C_3 plants only
(2) C_4 plants only
(3) CAM plants only
(4) All photosynthetic plants

160. Identify the incorrect statement.
(1) Mycoplasma are present in the gut of several ruminant animals such as cows.
(2) The organisation of the prokaryotic cell is fundamentally similar even though prokaryotes exhibit a wide variety of functions
(3) All prokaryotes have a cell wall surrounding the cell membrane except in Mycoplasma.
(4) Several ribosomes may attach to a single mRNA, form a chain called polysome in bacteria

161. Match the following

a.	*Puccinia*	i.	Seed
b.	Diatoms	ii.	Basidiospores
c.	*Nostoc*	iii.	Soap box
d.	*Ginkgo*	iv.	Heterocyst

(1) a–i, b–ii, c–iii, d–iv
(2) a–ii, b–iii, c–iv, d–i
(3) a–ii, b–i, c–iii, d–iv
(4) a–iii, b–ii, c–iv, d–i

162. Wheat variety, Atlas 66 has
(1) high vitamin content
(2) high protein content
(3) high iron content
(4) high fat content

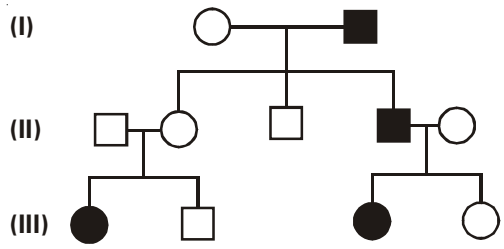
163. Mammals from colder climate have short ears and limbs to minimise heat loss. This is called
(1) Chargaff's rule
(2) Allen' rule
(3) Gloger's rule
(4) Bergman's rule

164. Which of the following statements is incorrect w.r.t. monocotyledonous root?
(1) It has epidermis, cortex, endodermis, pericycle, vascular bundles and pith
(2) There are usually more than six (polyarch) xylem bundles in the monocot root
(3) Its pith is small and underdeveloped
(4) It does not undergo any secondary growth

165. When the plant cell is placed in hypertonic solution, the cell is said to be
(1) partially turgid
(2) flaccid
(3) turgid
(4) plasmolysed

166. In China rose,
a. phyllotaxy is alternate
b. stamens are monoadelphous
c. ovary is superior
d. gynoecium is pentacarpellary apocarpous
e. petals show imbricate aestivation
(1) b, c & e
(2) d & e
(3) a, c & d
(4) a, b & c

167. Following pedigree shows the inheritance of a trait



This trait is
(1) autosomal dominant
(2) autosomal recessive
(3) sex-linked dominant
(4) sex-linked recessive

168. At the equilibrium stage of sigmoid growth curve, population size
(1) shows minor fluctuations
(2) remains static
(3) shows slow growth
(4) declines very slowly

169. **Statement-I** : *Strobilanthus kunthiana* flowers once in 12 years.

Statement-II : Water hyacinth is a weed that is called "Terror of Bengal".

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

170. The central cell of embryo sac after triple fusion becomes the

(1) PEN (primary endosperm nucleus)
(2) Zygote
(3) PEC (primary endosperm cell)
(4) Embryo

171. Select the incorrect match

(1) 2,4-D–synthetic cytokinin

(2) Gibberellins–bolting

(3) Cytokinin–promote nutrient mobilisation
(4) Ethylene–induce flowering in mango

172. Floral formula of tobacco plant (Solanaceae) is

(1) $\oplus \, ♀ \, K_{(5)} \overset{\frown}{C_{(5)} A_5} \, G_{(2)}$

(2) $\oplus \, ♂ \, K_{4-5} \, C_{(5)} \, A_{(5)} \, G_{(2)}$

(3) $\oplus \, ♂ \, K_{4-5} \, C_{4-5} \, A_5 \, G_{(2)}$

(4) $\oplus \, ♂ \, K_{(5)} \, C_5 \, A_{10} \, G_{(2)}$

173. High concentration of DDT in birds disturbs the metabolism of

(1) magnesium
(2) nitrogen
(3) calcium
(4) phosphorus

174. Which metal ion is a constituent of chlorophyll?

(1) Iron
(2) Copper
(3) Magnesium
(4) Zinc

175. Which of the following statement is correct?

(1) Pteridophyte gametophyte have protonemal and leafy stage

(2) In gymnosperms, female gametophyte is free living

(3) Antheridiophores and archegoniophores are present in pteridophyte

(4) Events that are precursor to seed habit can be traced in pteridophytes

176. How many turns of Calvin cycle yield one molecule of glucose?

(1) 4
(2) 6
(3) 12
(4) 8

177. Which of the following is not an assumption made during calculation of respiratory balance sheet for one glucose molecule?

(1) Only glucose is being respired and no other substrate is being used.

(2) Various intermediates of pathway are used to synthesise other biomolecules

(3) NADH synthesised in glycolysis is transferred to mitochondria

(4) All pathways occur in a sequential, and orderly manner

178. Which statement is not correct w.r.t. key?

(1) It is a taxonomical aid based on the similarities and disimilarities

(2) Keys are based on the contrasting characters generally in a pair

(3) Each statement in the key is called a couplet

(4) It is analytic in nature

179. Which one of the following is not included under in-situ conservation?

(1) national park
(2) sanctuary
(3) botanical garden
(4) biosphere reserve

180. Which of the following is incorrect?

(1) Potato is an edible underground stem which become fleshy as a result of food storage.

(2) In *Nerium* and *Alstonia* two leaves arise at each node .

(3) The NADP reductase enzyme (FNR) is located on the stroma side of the thylakoid membrane.

(4) Blue and red regions of the light spectrum are the most effective in photosynthesis.

181. Which of the following has greatest biodiversity on Earth?

(1) Western Ghats of India

(2) Amazon rain forest

(3) Arctic Tundra

(4) Temperate forest

182. **Assertion** : Viruses are not placed in any of the five kingdoms in Whittaker's system of classification.

Reason : Viruses are acellular entities and have no metabolism.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

183. Pioneer community in xerarch succession is

(1) lichens

(2) ferns

(3) reed swamp

(4) marsh meadows

184. If one debarks a tree, what parts of the plant is being removed?

a. Xylem

b. Phloem

c. Cortex

(1) Both a & b

(2) Both a & c

(3) Both b & c

(4) a, b & c

185. Algin is obtained from

(1) Red algae

(2) Green algae

(3) Blue green algae

(4) Brown algae

BOTANY : SECTION-B

This section has 15 questions, attempt any 10 questions of them.

186. Which of the following is incorrectly matched?

(1) *Chlamydomonas* - cup shaped chloroplast
(2) *Fucus* - oogamy
(3) *Volvox* - isogamy
(4) *Spirogyra* - spiral chloroplast

187. Perigynous flower is not found in

(1) Peach

(2) Plum

(3) Rose

(4) Guava

188. **Assertion** : Blood groups in human is controlled by gene(I) having three alleles.

Reason : Offspring having genotype I^AI^B show AB blood group .

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

189. Which process represents the dominance of RNA world?

(1) Capping
(2) Tailing
(3) Splicing
(4) Polyadenylation

190. Multiple phenotype seen in

(1) pleiotropy
(2) incomplete dominance
(3) multiple allelism
(4) polygenic inheritance

191. Read the following statement and select the correct option

a. Nitrogenous base is linked to pentose sugar through a N-glycosidic linkage

b. Phosphate group is linked to 5′-OH of a nucleoside through phosphoester linkage

c. Two nucleosides are linked through 3′–5′ N- glycosidic linkage

d. Negatively charged DNA is wrapped around positively charged histone octamer to form nucleosome

e. The chromatin that is more densely packed and stains dark is called euchromatin

(1) a, b & c are correct

(2) only c & d are correct

(3) c & e are incorrect

(4) only a is correct

192. Identify the incorrect statement

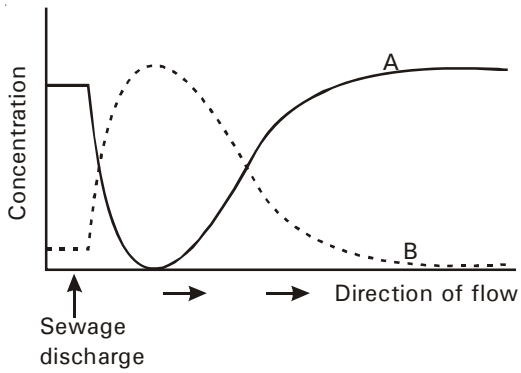
(1) DNA is acidic

(2) Watson and Crick proposed double helical model of DNA

(3) A + T/G + C ratio is constant for a species

(4) First step in central dogma is translation

193. Following graph shows the effect of sewage discharge on some characteristics of river



In this graph curves A & B respectively represent the levels of

(1) BOD and dissolved oxygen
(2) dissolved oxygen and BOD
(3) BOD and impurities
(4) dissolved oxygen and impurities

194. Which is incorrect regarding pollination by wind?

(1) It is more common in grasses
(2) It requires pollen grains to be light
(3) The pollen grains must be sticky
(4) They are without pollen kitt

195. Select the incorrect match

(1) Water act – 1974
(2) Air act – 1981
(3) Chipko movement – 1988
(4) Montreal protocol – 1987

196. Ramesh Chandra Dagar was concerned with case study of

(1) plastic waste
(2) organic farming
(3) integrated waste water management
(4) deforestation

197. RQ = 1 when _____ is respiratory substrate

(1) paddy grains
(2) bean seeds
(3) castor seeds
(4) linseed

198. Which of the following statement/s is/are correct?

a. In fungi and algae, both types of gametes are always non-motile.
b. In algae, gymnosperms and angiosperms, water is the medium through which gamete transfer takes place.
c. In seed plants, pollen grains are the carriers of female gamete.
d. Male and female gamete must be physically brought together to facilitate fusion.

(1) a & d
(2) c & d
(3) a & b
(4) only d

199. Select the incorrect one w.r.t. growth hormones

(1) Small and simple molecules
(2) Are of diverse chemical composition
(3) Also called phytohormones
(4) Always involved in growth promoting activities

200. **Statement-I** : Alfred Sturtevant (student of Morgan) used the frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes and mapped their position on the chromosome.

Statement-II : One percent crossover frequency is equal to a distance of one map unit between two genes present on same chromosome.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

Space for rough work

Space for rough work