

MARKS: 720

FULL TEST 5
PART A – PHYSICS
SECTION A

TIME: 3 Hrs

1. When a ceiling fan is switched on, it makes 10 rotations in the first 3 seconds. How many rotations will it make in the next 3 seconds? (Assume uniform angular acceleration)

a) 10 b) 20 c) 30 d) 40
2. In a young's double – slit experiment, the central bright fringe can be identified

a) As it has greater intensity than the other bright fringes
 b) As it is wider than the other bright fringes
 c) As it is narrower than the other bright fringes
 d) By using white light instead of monochromatic light
3. The shape of graph plotted between velocity and position of a particle executing simple harmonic motion is

a) an ellipse b) a parabola c) a hyperbola d) a straight line
4. The maximum and minimum tension in the string whirling in a circle of radius 2.5 m with constant velocity are in the ratio 5 : 3 then its velocity is

a) $\sqrt{98} \text{ ms}^{-1}$ b) 7 ms^{-1} c) $\sqrt{490} \text{ ms}^{-1}$ d) $\sqrt{4.9} \text{ ms}^{-1}$
5. A bar magnet is demagnetized by inserting it inside a solenoid of length 0.2 m, 100 turns, and carrying a current of 5.2 A. The coercivity of the bar magnet is :

a) 1200 A/m b) 2600 A/m c) 520 A/m d) 285 A/m
6. A passenger train is running on a railways track with a speed v_1 . While driving, the driver discovers that another goods train is travelling in front of the passenger train with a speed v_2 ($v_1 > v_2$). Its retardation after applying brakes is a . The least distance the passenger train must travel to avoid collision with goods train is

a) $\frac{v_1^2 - v_2^2}{2a}$ b) $\frac{v_2 - v_1}{a}$ c) $\frac{v_2 + v_1}{2a}$ d) $\frac{v_2^2 + v_1^2}{2a}$
7. A man is standing at a spring platform. Reading of spring balance is 60 kgwt. If man jumps outside platform, then reading of spring balance

a) First increases then decreases to zero b) Decreases
 c) Increases d) Remains same
8. For a particle showing motion under the force $F = -4(X-3)^2$, the motion is

a) Oscillatory b) simple harmonic motion c) translatory d) both (1) and (2)
9. A 2 kg mass is rotating on a circular path of radius 0.8 m with angular velocity of 44 rad/sec. If radius of path becomes 1 m. Then the value of angular velocity will be

a) 28.16 rad/sec b) 35.16 rad/sec c) 19.28 rad/sec d) 8.12 rad/sec
10. A body of mass 3kg is moving with a velocity of 4ms^{-1} towards right, collides head on with a body of mass 4 kg moving in opposite direction with a velocity of 3ms^{-1} . After collision the two bodies stick together and move with a common velocity, which is

a) Zero b) 12 ms^{-1} towards left c) 12ms^{-1} towards right d) $\frac{12}{7} \text{ ms}^{-1}$ towards left
11. Two bodies of masses m_1 and m_2 are initially at rest at infinite distance apart. They are then allowed to move towards each other under mutual gravitational attraction. Their relative velocity

of approach at a separation distance r between them is

- a) $[2G \frac{(m_1-m_2)}{r}]^{1/2}$ b) $[\frac{2G}{r} (m_1+m_2)]^{1/2}$ c) $[\frac{r}{2G(m_1m_2)}]^{1/2}$ d) $[\frac{2G}{r} (m_1m_2)]^{1/2}$

12. Wires A and B are made from the same material. A has twice the diameter and threetimes the length of B. If the elastic limits are not reached, When each is stretched by the same tension, the ratio of energy stored in A to that in B is

- a) 2:3 b) 3:4 c) 3:2 d) 6:1

13. In a streamline flow if the gravitational head is h . The kinetic and pressure heads are

- a) v^2/g and p/ρ b) $v^2/2g$ and $p/\rho g$ c) $v^2/2g$ and p/ρ d) $v^2/2$ and $p/\rho g$

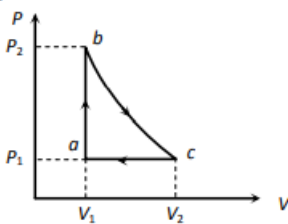
14. A uniform metal rod is used as a bar pendulum. If the room temperature rises by 10°C , and the coefficient of linear expansion of the metal of the rod is $2 \times 10^{-6} / ^\circ\text{C}$, the period of the pendulum will have percentage increase of

- a) 2×10^{-5} b) 10^{-5} c) 2×10^{-3} d) 10^{-3}

15. The temperature, at which Centigrade and Fahrenheit scales give the same reading is

- a) -40° b) 40° c) -30° d) 30°

16. Carbone monoxide is carried around a closed cycle abc in which bc is an isothermal process as shown in the figure. The gas absorbs 7000 J of heat as its temperature increases from 300 K to 1000 K in going from a to b . The quantity of heat rejected by the gas during the process ca is



- a) 4200 J b) 5000 J c) 9000 J d) 9800 J

17. The dimensions of $\frac{1}{2} \epsilon_0 E^2$ (ϵ_0 = permittivity of free space ; E = electric field) is

- a) ML^2T^{-2} b) MLT^{-1} c) $\text{ML}^{-1}\text{T}^{-2}$ d) ML^2T^{-1}

18. The tyre of a motor car contains air at 15°C . If the temperature increases to 35°C , the approximate percentage increase in pressure (ignore to expansion of tyre)

- a) 7 b) 9 c) 11 d) 13

19. Two blocks each of mass m are connected to a spring of spring constant k . If both are given velocity v in opposite directions, then the maximum elongation of the spring is



- a) $\sqrt{\frac{mv^2}{k}}$ b) $\sqrt{\frac{2mv^2}{k}}$ c) $\sqrt{\frac{mv^2}{2k}}$ d) $2\sqrt{\frac{mv^2}{k}}$

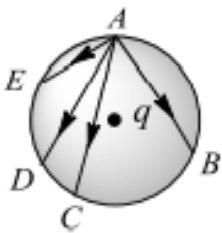
20. A particle is executing simple harmonic motion with time period T . Starting from mean position, time taken by it to complete $5/8$ oscillations is

- a) $7T/12$ b) $5T/12$ c) $T/12$ d) $T/6$

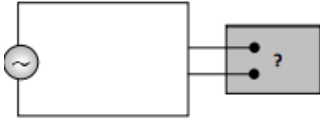
21. The transverse displacement of a string fixed at both ends is given by $y = 0.06 \sin(\frac{2\pi x}{3}) \cos(120\pi t)$ and x are in metres and t in seconds. The wavelength and frequency of the two superposing waves are

- a) $2m, 120 \text{ Hz}$ b) $\frac{2}{3}m, 60 \text{ Hz}$ c) $\frac{3}{2}m, 120 \text{ Hz}$ d) $3m, 60 \text{ Hz}$

22. If 10^{10} electrons are acquired by a body everysecond, the time required for the body to get a total charge of 1 C will be
 a) Two hours b) Two days c) Two years d) 20 years
23. Three identical capacitors are combined differently. For the same voltage to each combination, the one that stores the greatest energy is
 a) Two in parallel and the third in series with it b) Three in series
 c) Three in parallel d) Two in series and third in parallel with it
24. In the electric field of a point charge q , a certain point charges is carried from point A to B, C, D and E as shown in figure. The work done is



- a) Least along the path AE b) Least along the path AC
 c) Zero along any one of the paths d) Least along AB
25. Three resistors each of 2 ohm are connected together in a triangular shape. The resistance between any two vertices will be
 a) $4/3$ ohm b) $3/4$ ohm c) 3 ohm d) 6 ohm
26. A voltmeter has a range $0 - V$ with a series resistance R . With a series resistance $2R$, the range is $0 - V'$. The correct relation between V and V' is
 a) $V' = 2V$ b) $V' > 2V$ c) $V' \gg 2V$ d) $V' < 2V$
27. Two identical cells weather connected in parallel or in series gives the same current when connected to an external resistance 1.5Ω . Find the value of internal resistance of each cell.
 a) 1Ω b) 0.5Ω c) Zero d) 1.5Ω
28. A length of wire carries a steady current i . It is bent first to form a circular plane coil of oneturn. The same length is now bent more sharply to give three loops of smaller radius. The magnetic field at the centre caused by the same current is
 a) One-third of its first value b) Unaltered
 c) Three times of its initial value d) Nine times of its initial value
29. The sound intensity at a point 4m from the point source is 20 W/m^2 , then the sound intensity at a distance 8m from the same source will be
 a) 5 W/m^2 b) 10 W/m^2 c) 40 W/m^2 d) 2.5 W/m^2
30. The magnetic susceptibility of a paramagnetic substance at -73° C is 0.0060, then its value at -173° C will be
 a) 0.0030 b) 0.0120 c) 0.0180 d) 0.0045
31. In an AC generator, a coil with N turns, all of the same area A and total resistance R , rotates with frequency ω in a magnetic field B . The maximum value of emf generated in the coil is
 a) $NABR \omega$ b) NAB c) $NABR$ d) $NAB \omega$
32. Following figure shows an ac generator connected to a "block box" through a pair of terminals. The box contains possible R, L, C or their combination, whose elements and arrangements are not known to us.



$$e = 75 \sin(\omega t) \text{ volt}$$

$$i = 1.5 \sin(\omega t + 45^\circ) \text{ amp.}$$

The wrong statement is

- a) There must be a capacitor in the box b) There must be an inductor in the box
 c) There must be a resistance in the box d) The power factor is 0.707
- 33.** The frequency of ac mains in India is
 a) 30 c/s or Hz b) 50 c/s or Hz c) 60 c/s or Hz d) 120 c/s or Hz
- 34.** A radiation of 200 W is incident on a surface which is 60% reflecting and 40% absorbing. The total force on the surface is
 a) 1.07×10^{-6} N b) 1.3×10^{-6} N c) 1.07×10^{-7} N d) 1.03×10^{-7} N
- 35.** Which of the following logic gate is an Universal Gate?
 a) OR b) AND c) NAND d) NOT

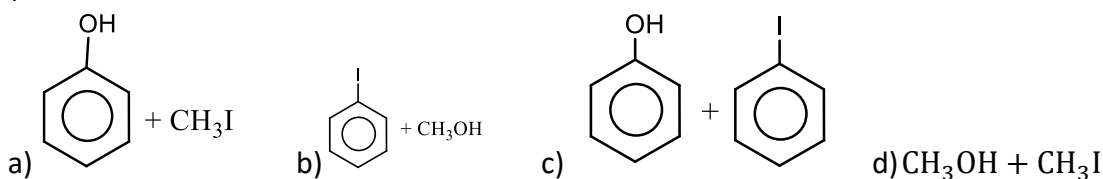
SECTION B

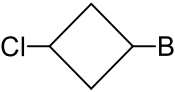
- 36.** If μ_j represents refractive index when a light ray goes from medium i to medium j , then the product ${}_2\mu_1 \times {}_3\mu_2 \times {}_4\mu_3$ is equal to
 a) ${}_3\mu_1$ b) ${}_3\mu_2$ c) $1/{}_1\mu_4$ d) ${}_4\mu_2$
- 37.** The equation of standing wave in a stretched string is given by $y = 5 \sin\left(\frac{\pi x}{3}\right) \cos(40\pi t)$. Where x and y are in cm and t in second. The separation between two consecutive nodes is
 a) 4 cm b) 1.5 cm c) 6 cm d) 3 cm
- 38.** The average velocity of a body moving with uniform acceleration travelling a distance of 3.06 m is 0.34 ms^{-1} . If the change in velocity of the body is 0.18 ms^{-1} during this time, its uniform acceleration is (in ms^{-2})
 a) 0.01 b) 0.02 c) 0.03 d) 0.04
- 39.** The ratio of the energy of a photon with $\lambda = 150 \text{ nm}$ to that with $\lambda = 300 \text{ nm}$ is
 a) 2 b) 1/4 c) 4 d) 1/2
- 40.** When an electron jumps from the orbit $n = 2$ to $n = 4$, then wavelength of the radiations absorbed will be (R is Rydberg's constant)
 a) $3R/16$ b) $5R/16$ c) $16/5R$ d) $16/3R$
- 41.** A tuning fork of unknown frequency produces 4 beats per second. When sounded with another tuning fork of frequency 254 Hz. It gives the same number of beats per second when unknown tuning fork loaded with wax. The unknown frequency before loading with wax is
 a) 254 Hz b) 258 Hz c) 250 Hz d) 252 Hz
- 42.** Which is the correct expression for half-life
 a) $(t)_{1/2} = \log_{10} 2$ b) $(t)_{1/2} = \frac{\lambda}{\log_{10} 2}$ c) $(t)_{1/2} = \frac{\lambda}{\log_{10} 2} (2.303)$ d) $(t)_{1/2} = \frac{2.303 \log_{10} 2}{\lambda}$
- 43.** A particle is moving in the $x - y$ plane with a constant velocity along a line parallel to the x - axis, away from the origin. The magnitude of its angular momentum about the origin
 a) Is zero b) remains constant c) goes on increasing d) goes on decreasing
- 44.** Two pieces of glass plate one upon the other with a little water in between them cannot be

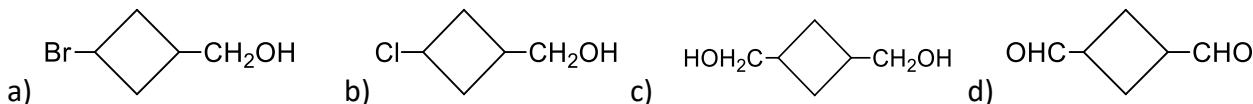
- separated easily because of
- a) Inertia b) pressure c) surface tension d) viscosity
45. At a place, if the earth's horizontal and vertical components of magnetic fields are equal, then the angle of dip will be
- a) 90° b) 45° c) 30° d) 0°
46. A body is tied with a string and is given a circular motion with velocity v in radius r . The magnitude of the acceleration
- a) $\frac{u}{r}$ b) $\frac{v^2}{r}$ c) $\frac{v}{r^2}$ d) $\frac{v^2}{r^2}$
47. Power of water pump is 2 KW. If $g = 10 \text{ m/sec}^2$, the amount of water it can raise in one minute to a height of 10 m is
- a) 2000 litre b) 1000 litre c) 100 litre d) 1200 litre
48. From a circular ring of mass M and R , an arc corresponding to a 90° sector is removed. The moment of inertia of the remaining part of the ring about an axis passing through the ring and perpendicular to the plane of ring is k times MR^2 . Then the value of k is
- a) $3/4$ b) $7/8$ c) $1/4$ d) 1
49. If the volume of a block of aluminium is decreased by 1%, the pressure (stress) on its surface is increased by (Bulk modulus of Al = $7.5 \times 10^{10} \text{ Nm}^{-2}$)
- a) $7.5 \times 10^{10} \text{ Nm}^{-2}$ b) $7.5 \times 10^8 \text{ Nm}^{-2}$ c) $7.5 \times 10^6 \text{ Nm}^{-2}$ d) $7.5 \times 10^4 \text{ Nm}^{-2}$
50. A particle executes simple harmonic motion with a time period of 16s. At time $t = 2\text{s}$, the particle crosses the mean position while at $t = 4\text{s}$, velocity is 4 ms^{-1} . The amplitude of motion in metre is
- a) $\sqrt{2}\pi$ b) $16\sqrt{2}\pi$ c) $24\sqrt{2}\pi$ d) $\frac{32\sqrt{2}}{\pi}$

PART B – CHEMISTRY
SECTION A

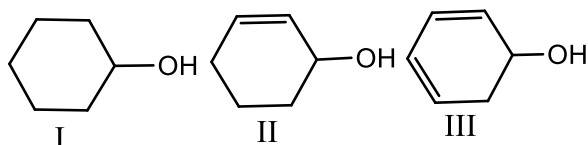
51. The products obtained when anisole is heated in a sealed tube with HI are



52.  $\xrightarrow{\text{Mg/ether}}$ $\xrightarrow[\text{H}_3\text{O}^+]{\text{HCHO}}$ A, A is



53. The correct order of ease of dehydration of following is



- a) I > II > III b) III > II > I c) I > III > II d) III > I > II

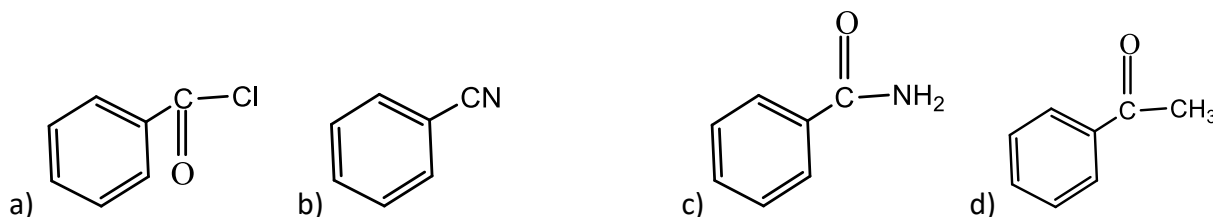
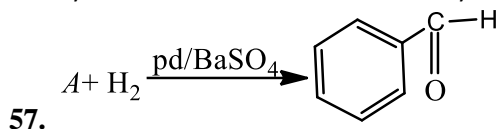
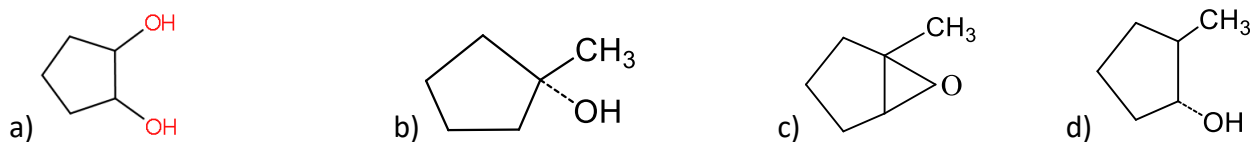
54. The end product of the reaction, $\text{CH}_3\text{OH} \xrightarrow[300^\circ\text{C}]{\text{Cu}} \text{A} \xrightarrow{\text{NaOH}} \text{B}$ is :

- a) Alkane b) Carboxylic acid c) Sodium salt of carboxylic acid d) Ketone

55. The correct order of decreasing acidity of nitrophenols will be

- a) *m*-nitrophenol > *p*-nitrophenol > *o*-nitrophenol b) *o*-nitrophenol > *m*-nitrophenol > *p*-nitrophenol
 c) *p*-nitrophenol > *m*-nitrophenol > *o*-nitrophenol d) *p*-nitrophenol > *o*-nitrophenol > *m*-nitrophenol

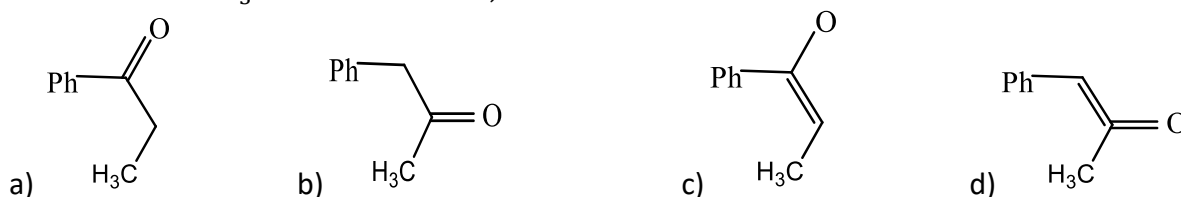
56. The major product during hydroboration-oxidation of 1-methylcyclopentene is



58. What is the product in the reaction $CH_3MgBr \xrightarrow{(i)CO_2, (ii)H_2O} X$?

- a) Acetaldehyde b) Acetic acid c) Formic acid d) Formaldehyde

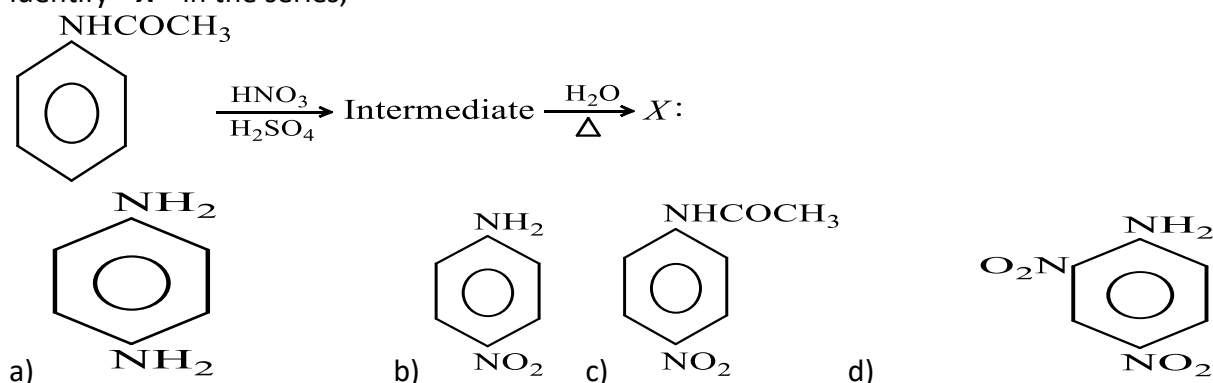
59. $Ph - C \equiv C - CH_3 + H_2O \xrightarrow{Hg^{2+}/H^+} A, A$ is



60. Increasing order of basicity of $CH_3CH_2CH_2NH_2$, $H_2C = CHCH_2NH_2$ and $HC \equiv CCH_2NH_2$ is

- a) $CH_3CH_2CH_2NH_2 < HC \equiv CCH_2NH_2 < H_2C = CHCH_2NH_2$
 b) $CH_3CH_2CH_2NH_2 < H_2C = CHCH_2NH_2 < HC \equiv CCH_2NH_2$
 c) $HC \equiv CCH_2NH_2 < H_2C = CHCH_2NH_2 < CH_3CH_2CH_2NH_2$
 d) $HC \equiv CCH_2NH_2 < CH_3CH_2CH_2NH_2 < H_2C = CHCH_2NH_2$

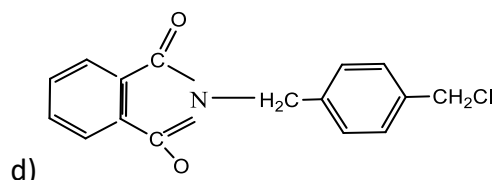
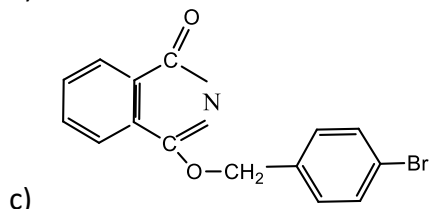
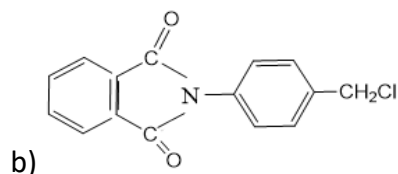
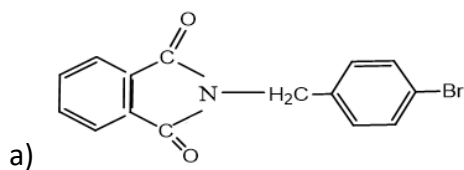
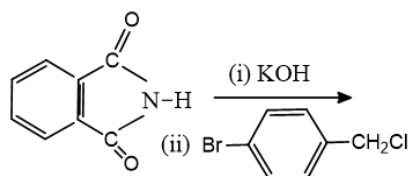
61. Identify "X" in the series,



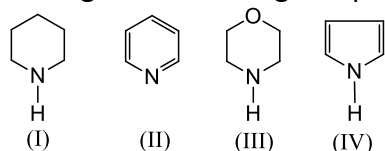
62. The decreasing order of basic characters of the three amines and ammonia is

- a) $NH_3 > CH_3NH_2 > C_2H_5NH_2 > C_6H_5NH_2$ b) $C_2H_5NH_2 > CH_3NH_2 > NH_3 > C_6H_5NH_2$
 c) $C_6H_5NH_2 > C_2H_5NH_2 > CH_3NH_2 > NH_3$ d) $CH_3NH_2 > C_2H_5NH_2 > C_6H_5NH_2 > NH_3$

63. The major product of the following reaction is



64. Arrange the following compounds in decreasing order of basic strength



a) IV > I > III > II

b) III > I > IV > II

c) II > I > III > IV

d) I > III > II > IV

65. Consider the following reagents

I. Br₂ water

II. Tollen's reagent

III. Fehling's solution

Which can be used to make distinction between an aldose and a ketose?

a) I, II and III

b) II and III

c) I only

d) II only

66. Dacron is an example of

a) Polyester

b) Polyurethane

c) Polyamide

d) Polypropylene

67. Bithional is an example of

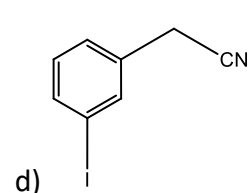
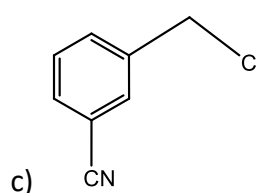
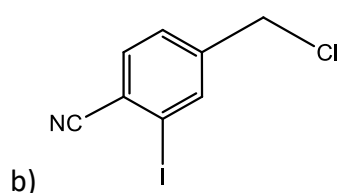
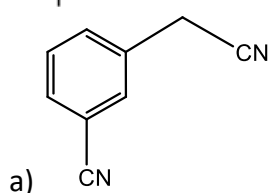
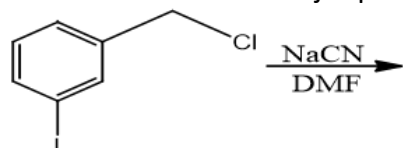
a) Disinfectant

b) Antiseptic

c) Antibiotic

d) Analgesic

68. The structure of the major product formed in the following reaction is



69. If the density of water is 1 g cm⁻³ then the volume occupied by one molecule of water is approximately

a) 18 cm³

b) 22400 cm³

c) 6.02 × 10⁻²³ cm³

d) 3.0 × 10⁻²³ cm³

70. Which one of the following set of quantum numbers is not possible for electron in the ground state of an atom with atomic number 19?

a) n = 2, l = 0, m = 0

b) n = 2, l = 1, m = 0

c) n = 3, l = 1, m = -1

d) n = 3, l = 2, m = +2

71. The energy of electron in first orbit of He⁺ is (R_H = -871.6 × 10⁻²⁰ J). The energy of electron in the first orbit of H is:

a) -871.6 × 10⁻²⁰ J

b) -435.8 × 10⁻²⁰ J

c) -217.9 × 10⁻²⁰ J

d) -108.9 × 10⁻²⁰ J

72. In which of the following arrangements, the sequence is not strictly according to the property written against it?

- a) $\text{CO}_2 < \text{SiO}_2 < \text{SnO}_2 < \text{PbO}_2$: increasing oxidising power
 b) $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$: increasing acid strength
 c) $\text{NH}_3 > \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$: increasing basic strength
 d) $\text{B} < \text{C} < \text{O} < \text{N}$: increasing first ionisation enthalpy
73. Geometry of SiO_4^{4-} anion is
 a) Tetrahedral b) Trigonal c) Trihedral d) Pentagonal
74. Four diatomic species are listed below. Identify the correct order in which the bond order is increasing in them:
 a) $\text{NO} < \text{O}_2^- < \text{C}_2^{2-} < \text{He}_2^+$ b) $\text{O}_2^- < \text{NO} < \text{C}_2^{2-} < \text{He}_2^+$
 c) $\text{C}_2^{2-} < \text{He}_2^+ < \text{O}_2^- < \text{NO}$ d) $\text{He}_2^+ < \text{O}_2^- < \text{NO} < \text{C}_2^{2-}$
75. Which one of the following is correct about surface tension (ST) and viscosity (η) ?
 a) Both decrease with temperature b) Both increases with temperature
 c) ST increases and η decreases with temperature d) ST decreases and η increases with temperature
76. If, $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$; $\Delta H = -298.2 \text{ kJ}$... (i)
 $\text{SO}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{SO}_3$; $\Delta H = -98.7 \text{ kJ}$... (ii)
 $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$; $\Delta H = -130.2 \text{ kJ}$... (iii)
 $\text{H}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{H}_2\text{O}$; $\Delta H = -227.3 \text{ kJ}$... (iv)
 The enthalpy of formation of H_2SO_4 at 298 K will be:
 a) -754.4 kJ b) $+320.5 \text{ kJ}$ c) -650.3 kJ d) -433.7 kJ
77. Hess's law of constant heat summation is an application of :
 a) Kirchoff's law b) First law of thermodynamics
 c) Second law of thermodynamics d) Entropy
78. The solubility of AgCl is $1 \times 10^{-5} \text{ mol/L}$. Its solubility in 0.1 molar sodium chloride solution is
 a) 1×10^{-10} b) 1×10^{-5} c) 1×10^{-9} d) 1×10^{-4}
79. Phosphorus pentachloride dissociates as follows, in a closed reaction vessel,
 $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$ If total pressure at equilibrium of the reaction mixture is p and degree of dissociation of PCl_5 is x , the partial pressure of PCl_3 will be
 a) $\left(\frac{x}{x+1}\right)p$ b) $\left(\frac{2x}{1-x}\right)p$ c) $\left(\frac{x}{x-1}\right)p$ d) $\left(\frac{x}{1-x}\right)p$
80. 100 mL of 0.015 M HCl solution is mixed with 100 mL of 0.005 M HCl. What is the pH of the resultant solution?
 a) 2.5 b) 1.5 c) 2 d) 1
81. A solution of KMnO_4 is reduced to MnO_2 . The normality of solution is 0.6. The molarity is:
 a) 1.8 M b) 0.6 M c) 0.1 M d) 0.2 M
82. In which of the following reactions, H_2O_2 is acting as a reducing agent?
 a) $\text{SO}_2 + \text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{SO}_4$ b) $2\text{KI} + \text{H}_2\text{O}_2 \rightarrow 2\text{KOH} + \text{I}_2$
 c) $\text{PbS} + 4\text{H}_2\text{O}_2 \rightarrow \text{PbSO}_4 + 4\text{H}_2\text{O}$ d) $\text{AgO}_2 + \text{H}_2\text{O}_2 \rightarrow 2\text{Ag} + \text{H}_2\text{O} + \text{O}_2$
83. Bleaching powder is obtained by the interaction of chlorine and
 a) Dry calcium oxide b) Dry slaked lime
 c) conc. solution of $\text{Ca}(\text{OH})_2$ d) dilute solution of $\text{Ca}(\text{OH})_2$
84. Na_2CO_3 can be manufactured by Solvay process but K_2CO_3 cannot be prepared because:
 a) K_2CO_3 is more soluble b) K_2CO_3 is less soluble
 c) KHCO_3 is more soluble than NaHCO_3 d) KHCO_3 is less soluble than NaHCO_3
85. The hybridization of boron atom in orthoboric acid is:
 a) sp b) sp^2 c) sp^3 d) sp^3d

SECTION B

- 101.** *Assertion:* Black rot of crucifers is a rot disease seen in *Brassicaceae* members.
Reason: Black rot of crucifers is a fungal disease
- 1) Both A and R are true and R explains A 2) Both A and R are true but R doesn't explain A
 3) A is true but R is false 4) A is false but R is true
- 102.** In a meiocyte, Interkinesis is immediately followed by
- 1) Prophase I 2) Telophase I 3) Prophase II 4) Metaphase I
- 103.** Shape of the bacteria used by Griffith for his transformation experiment is _____



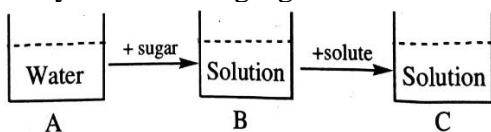
- 104.** Exogenously produced sexual spores are found in
- 1) *Alternaria* 2) *Albugo* 3) *Agaricus* 4) *Aspergillus*
- 105.** Study the following lists and identify the correct match

- | | |
|---------------|----------------------|
| List I | List II |
| A. Edible oil | I. <i>Crotalaria</i> |
| B. Ornamental | II. <i>Capsicum</i> |
| C. Fodder | III. <i>Petunia</i> |
| D. Spice | IV. <i>Arachis</i> |
| | V. <i>Dalbergia</i> |

- | | <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> |
|----|----------|----------|----------|----------|
| 1) | V | III | I | II |
| 2) | IV | III | II | I |
| 3) | IV | III | I | V |
| 4) | IV | III | I | II |

- 106.** ATP equivalents produced during oxidation of Succinate to Fumerate for one glucose molecule is/are
- 1) 2 2) 1 3) 4 4) 3
- 107.** *Selaginella* and *Salvinia* represent a significant step toward evolution of seed habit because
- 1) Female gametophyte is free & gets dispersed like seeds
 2) Male gametophyte contains antheridia
 3) Megaspores possess endosperm and embryo surrounded by seed coat
 4) Embryo develops in the female gametophyte which is retained on parent sporophyte
- 108.** The size (diameter) of pollen grains is generally measured as
- 1) 25-50 millimetres 2) 25-50 nanometres 3) 25-50 micrometers 4) 25-30 meters

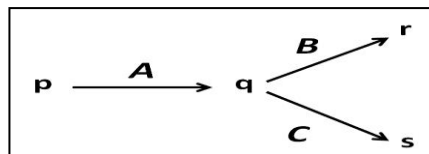
- 109.** Study the following figures



Identify the true statement with reference to ψ values of A, B and C

- 1) A greater than B but less than C 2) B greater than C but less than A
 3) C less than B but greater than A 4) A greater than C but equal to B
- 110.** NAD^+ in Krebs cycle functions as
- 1) Oxygen donor 2) Acceptor of hydrogen ion and electrons
 3) Oxygen acceptor 4) Donor of hydrogen ions and electrons
- 111.** *Assertion:* Vascular bundles are bicollateral in the stems of *Solanaceae*.
Reason: Bicollateral vascular bundles contain phloem flanked by two layers of xylem
- 1) Both A and R are true and R is the correct explanation of A.
 2) Both A and R are true but R is not the correct explanation of A.
 3) A is true but R is false. 4) A is false but R is true.
- 112.** From a cross $\text{AABb} \times \text{aaBb}$, the genotypes $\text{AaBB} : \text{AaBb} : \text{Aabb} : \text{aabb}$ will be obtained in the following ratio

- 1) 1 : 1 : 1 : 1 2) 1 : 2 : 1 : 0 3) 0 : 3 : 1 : 0 4) 1 : 1 : 1 : 0
- 113.** In which form Phosphorous is absorbed from soil?
 1) $\text{H}_3\text{PO}_4^{-1}$ 2) HPO_4^{-1} 3) $\text{H}_2\text{PO}_4^{-1}$ 4) $\text{H}_4\text{P}_2\text{O}_7^{-1}$
- 114.** Duplication of centriole in animal cells occurs during
 1) G_1 phase 2) S phase 3) G_2 phase (4) G_0 phase
- 115.** Plant tissue culture is primarily based on the principle of
 1) Apoptosis 2) Totipotency 3) Inoculation and incubation 4) Meiosis
- 116.** Identify the *incorrect* statement
 1) A false septum is found in mustard 2) Variation in stamen length is found in mustard
 3) Hypogynous flower is found in mustard 4) Pentamerous flowers are found in mustard
- 117.** Enzymes that catalyze the removal of groups from substrates in the absence of water belongs to the following classes
 1) Class 6 2) Class 2 3) Class 4 4) Class 5
- 118.** During DNA replication, Okazaki fragments are used to elongate:
 1) The lagging strand towards replication fork 2) The leading strand away from replication fork
 3) The lagging strand away from the replication fork 4) The leading strand towards replication fork
- 119.** Two proteins r and s are produced in the mice according to the given pathway. A, B, and C are the genes that code for enzymes involved in the respective steps. A researcher identified two different recessive mutant inbred lines which do not produce r or s proteins. Which of the following pair could be the genotypes of those mutants?



- 1) AABbCC & AaBbCC 2) Aabbcc & aaBBCC 3) AABbCc & AaBbCc 4) AaBbCC & aabbcc
- 120.** Based on the percentage weight of elemental composition found in human body, arrange the following elements in increasing order
 A. Carbon B. Nitrogen C. Sodium D. Silicon E. Magnesium F. Calcium
 1) DECFCBA 2) AFDEBA 3) ABDECF 4) FEDCBA
- 121.** A tall pea plant with white flowers produced 160 progeny upon selfing. The progeny contains both tall and dwarf plants. How many of the 160 progeny are double homozygous?
 1) 0% 2) 25% 3) 50% 4) 75%
- 122.** The number of Basmati varieties of Rice grown in India is
 1) 127 2) 227 3) 37 4) 27
- 123.** *Assertion:* Gene gun method is used to insert DNA into the competent host.
Reason: In this method, cells are bombarded with high-velocity microparticles of *Gold* or *Tin* coated with DNA
 1) Both A and R are true and R is the correct explanation of A.
 2) Both A and R are true but R is not the correct explanation of A.
 3) A is true but R is false 4) A is false but R is true
- 124.** *Adiantum* belongs to class
 1) Pteropsida 2) Psilopsida 3) Sphenopsida 4) Lycopsida
- 125.** A linear DNA molecule contains three restriction sites for Eco RI, two restriction sites for PstI, and five restriction sites for Hin DIII. How many fragments are produced from the double digestion of Eco RI and Hin DIII?
 1) Eight 2) Nine 3) Ten 4) Seven
- 126.** Bark does not include
 1) Secondary phloem 2) Secondary cortex 3) Secondary xylem 4) Cork
- 127.** Last cell of the Sporophytic generation is
 1) Meiocyte 2) Meiospore 3) Gamete 4) Pollen grain

128. A plant hormone and an external factor that act as antitranspirants respectively are
 1) ABA, low CO₂ 2) PMA, high CO₂ 3) Low CO₂ PMA 4) ABA, high CO₂
129. Which of the following cell organelle is associated with distinct *cis* and *trans* face?
 1) Golgi complex 2) Mitochondria 3) Lysosome 4) Peroxisome
130. More number of common characters are observed in members of a
 1) Family 2) Species 3) Genus 4) Kingdom
131. A tissue that does not produce any phytohormones
 1) Senescing leaf 2) Hypodermis of monocot stem
 3) Hypodermis of dicots stem 4) Cotyledons
132. What template DNA sequence corresponds to an mRNA codon of 5'-AGU-3'?'
 1) 5'-AGT-3' 2) 3'-AGT-5' 3) 5'-TCA-3' 4) 3'-TCA-5'
133. A *Pisum* (pea) plant has twenty flowers. Each microsporangium has produced 80 pollen grains. What will be the total number of pollen grains produced in all 20 flowers of that plant?
 1) 16,000 2) 8,200 3) 64,000 4) 32,000
134. The pressure created in the tracheary elements of the root that pushes water or sap upwards into the shoot system is known as
 1) Turgor pressure 2) Wall pressure 3) Osmotic pressure 4) Root pressure
135. The cell membrane in Archaeobacteria is composed of
 1) Chitin 2) Pseudopeptidoglycan 3) Proteins & phospholipids 4) Peptidoglycan

SECTION B

136. _____ is a taxonomic aid which contains the actual account of habitat and distribution of plants of a given area and also provides the index to the plant species found in a particular area.
 1) Flora 2) Key 3) Monograph 4) Manual
137. The R.Q. (Respiratory quotient) of C₃₉H₇₂O₆ (*Tripalmitin*) is
 1) 1.00 2) 1.32 3) 0.72 4) 3.250
138. The activity of alpha-amylase in the endosperm of barley germinating seeds is induced by
 1) Gibberellin 2) Ethylene 3) Cytokinin 4) IAA
139. Longitudinal binary fission is found in
 1) Amoeba 2) *Paramecium* 3) *Euglena* 4) *Plasmodium*
140. Isogametes are seen in:
 1) *Cladophora* (2) *Fucus* (3) Humans (4) *Ficus*
141. During glycolysis, water is released from
 1) 2-PG 2) 1, 3-BPG 3) PEP 4) G-3-P
142. Methanogens are
 1) Photoautotrophs 2) Saprophyte 3) Chemoautotrophs 4) Parasites
143. In photosynthesis, photolysis of water is ultimately used for_____
 1) Reduction of NADP⁺ 2) Oxidation of NADP 3) Oxidation of NAD⁺ 4) Reduction of NAD⁺
144. A polyribosome is formed from which of the following components
 1) A single ribosome attached to a single mRNA
 2) A single ribosome attached to several mRNAs
 3) Several ribosomes attached to a single mRNA
 4) Several ribosomes attached to several mRNAs
145. Nirenberg synthesised an RNA having 34 cytosine residues (CCCC...) and obtained a polypeptide of 11 Proline residues. It proved that genetic code of proline is
 1) Cytosine 2) CC 3) CCC 4) CCCC
146. The component of nitrogenase & nitrogen reductase is
 1) Mg 2) Mo 3) Mn 4) Cl

- 162.** Which is true ?
- (a) $P_{Hg}CO_2$ of deoxygenated blood is 95 mm Hg (b) PCO_2 of alveoli air is 40 mm Hg
- (c) PCO_2 of oxygenated blood is 95 mm Hg (d) $P_{Hg}CO_2$ of deoxygenated blood is 40 mm Hg
- 163.** Which one represents pulmonary – circulation ?
- (a) Left auricle(oxygenated blood → lungs
Deoxygenated blood → Right auricle
- (b) Left auricle(deoxygenated blood → lungs
(oxygenated blood → Right auricle
- (c) Left auricle(oxygenated blood → lungs
(deoxygenated blood → Left auricle
- (d) Right auricle(deoxygenated blood → lungs
(oxygenated blood → Left auricle
- 164.** Identify the correct sequence of events in a cardiac cycle
- (a) diastole, atrial systole, ventricular diastole
- (b) atrial systole, ventricular systole, joint diastole
- (c) atrial systole, ventricular diastole, ventricular systole
- (d) ventricular diastole, diastole, ventricular systole, atrial systole
- 165.** Which statement of the following are true for formed elements ?
- (a) Leucocytes are generally short lived
- (b) eosinophils are the most abundant agranulocytes
- (c) Platelets are cell fragments produced from thrombocytes
- (d) Neutrophils & basophils are non-phagocytic cells
- 166.** A large quantity of fluid is filtered everyday by the nephrons in the kidney only about 1% of it excreted as urine. The remaining 99% of filtrate
- (a) gets collected in the renal pelvis (b) is lost as sweat
- (c) is absorbed into the blood (d) is stored in the urinary bladder
- 167.** The principal nitrogenous excretory compounds in human is synthesized
- (a) in the liver but eliminated mostly through kidneys
- (b) in kidneys but eliminated mostly through liver
- (c) in kidneys as well as eliminated by kidneys
- (d) in liver and also eliminated by the same through bile
- 168.** A fall in glomerular filtration rate(GFR) activates
- (a) Adrenal medulla to release adrenaline (b) Posterior pituitary to release vasopressin
- (c) Juxta glomerular cells to release renin (d) adrenal cortex to release aldosterone
- 169.** Glenoid cavity articulates:
- (a) Scapula with acromion (b) Clavicle with scapula;
- (c) humerus with scapula (d) Clavicle with acromion
- 170.** Osteoporosis is an age-related disease of skeletal system may occur due to
- (a) immune disorder affective neuromuscular junction leading to fatigue
- (b) high concentration of Ca^{++} and Na^+
- (c) decreased level of estrogen
- (d) accumulation of uric acid leading to inflammation of joints
- 171.** End of T-wave in ECG represents
- (a) End of ventricular systole (b) End of ventricular diastole
- (c) Beginning of ventricular systole (d) End of complete cardiac diastole
- 172.** Unidirectional transmission of a nerve impulse through nerve fibre is due to the fact that
- (a) Nerve fibre is insulated by a myelin sheath
- (b) Sodium pump starts operating only at the cyton and then continues into the nerve fibre
- (c) Neuro transmitters are released by dendrites and not by axon endings
- (d) Neurotransmitters are released by the axon endings and not by dendrites
- 173.** A gymnast is able to balance his body upside down even in the total darkness because of
- (a) Vestibular apparatus (b) Tectorial membrane (c) Organ of corti (d) Cochlea

- 174.** Receptor sites for neurotransmitters are present on
 (a) membranes of synaptic vesicles (b) Pre-synaptic membrane
 (c) tips of axons (d) post-synaptic membrane
- 175.** Select the correct matched pair
 (a) Pineal gland - does not influence menstrual cycle
 (b) Corpus luteum - secretes oxytocin
 (c) Interstitial cells - erythropoietic
 (d) Cholecystokinin - stimulates contraction of gall bladder
- 176.** Find the incorrect Match
 (a) Parathormone - Ca⁺ metabolism(action)
 (b) ADH - Diabetes mellitus(disease)
 (c) Glucagon - 'α' cells(source)
 (d) Progesterone - Corpus Luteum(source)
- 177.** Mark List - I(hormones) with list - II(effect) and select the correct answer using the codes given below the lists
- | List -I
(Hormones) | List-II
(Effect) | |
|-----------------------|---------------------------------------------|--|
| A. Melatonin | 1. Loosening of pelvic ligaments | |
| B. Relaxin | 2. Influences the activities of ovary | |
| C. MSH | 3. Pigment dispersal in melanophores | |
| D. STH | 4. Synthesis and release of Glucocorticoids | |
| | 5. Metabolism of proteins and fat | |
- (1) A- 2; B-1; C-4; D-3 (2) A- 1; B-2; C-3; D-5 (3) A- 1; B-2; C-4; D-3 (4) A-2; B-1; C-3; D-5
- 178.** Which of the following hormones is active during proliferative phase of menstrual cycle ?
 (a) Estrogen (b) Progesterone (c) Testosterone (d) All of these
- 179.** Which of the following are haploid in nature ?
 (a) Spermatids (b) Spermatogonia (c) Primary spermatocytes (d) Secondary spermatocytes
 (1) a & b are correct (2) a & d are correct (3) b & d are correct (4) a,b & c are correct
- 180.** The phase of menstrual cycle in humans that lasts for 7-8 days in
 (a) Follicular phase (b) Ovulatory Phase (c) Luteal Phase (d) Menstruation
- 181.** Infertility is the relative state of failure to conceive after how many year/years of sexual life without contraception?
 (a) One (b) Two (c) Three (d) Four
- 182.** In which of the following ART techniques the semen is artificially introduced into the female
 (a) ET (b) GIFT (c) IVT (d) IUI
- 183.** Biogenesis was proposed by Francesco Redi and supported by
 (a) Thales and Plato (b) Spallanzani and pasteur
 (c) Thomson and Helmholtz (d) Oparin and Haldane
- 184.** According to Haeckel's biogenetic law
 (a) development of individual metazoan shows embryonic characters and ancestors
 (b) ontogeny repeats phylogeny
 (c) germplasm is immortal
 (d) every organism is produced by its parents
- 185.** The similarity of bone structure in the fore limbs of many vertebrates is an example of
 (a) Adaptive radiation (b) Convergent evaluation (c) Analogy (d) Homology

SECTION B

- 186.** The spread of cancerous cells to distant sites is termed
 (a) Metastasis (b) Metachrosis (c) Metagenesis (d) Metamorphosis
- 187.** Which one is a correct match ?
 (a) Bhang - Analgesic (b) Cocaine - Opiate narcotics
 (c) Morphine - Hallucinogen (d) Benzodiazepines - Tranquilizer

- 188.** Heroin is
 (a) diacetyl morphine (b) triacetyl morphine (c) tetracetyl morphine (d) Monoacetyl morphine
- 189.** Which of the following is not used as a biopesticide ?
 (a) Nuclear Polyhedrosis virus(NPV) (b) Xanthomonas campestris
 (c) Bacillus thuringiensis (d) Trichoderma harzianum
- 190.** The common nitrogen-fixer in paddy fields is
 (a) Frankia (b) Rhizobium (c) Azospirillum (d) Oscillatoria
- 191.** The plants growing in deserts to tolerate water stress, have
 (a) no stomata (b) pneumatophores (c) stem modified into leaf-like form (d) stipular spines
- 192.** Which of the following is correct for r-selected species ?
 (a) Large number of progeny with small size (b) Large number of progeny with large size
 (c) Small number of progeny with small size (d) Small number of progeny with large size
- 193.** What happens to activated sludge ?
 (a) It is generally released into natural water bodies like rivers & Streams
 (b) It is completely pumped back into aeration tank to serve as inoculum
 (c) The major part of sludge is pumped into large tanks called anaerobic sludge digestors
 (d) It undergoes sequential filtration
- 194.** Which one of the following is related to Ex-situ conservation of threatened animals and plants ?
 (a) Wildlife safari parks (b) Biodiversity hot spots
 (c) Amazon rainforest (d) Himalayan region
- 195.** High value of BOD(Bio chemical Oxygen Demand) indicates that
 (a) Water is highly polluted (b) Water is less polluted
 (c) Water consumption of organic matter in the water is higher by the microbes (d) Water is pure
- 196.** One example of animals having a single opening to the outside that serves as both mouth as well as anus is
 (a) Octopus (b) Asterias (c) Ascidia (d) Dugesia
- 197.** The kind of epithelium which forms the walls of alveoli is
 (a) Compound squamous epithelium (b) Columnar epithelium Ciliated
 (c) Ciliated Columnar (d) Simple squamous epithelium
- 198.** In puberty how many primary follicles are found in female body?
 (a) 60000 – 80000 (b) 40000 – 80000 (c) 120000 – 160000 (d) 30000 - 60000
- 199.** Select the correct statement from given below
 (a) smack is obtained from Erythroxyllum
 (b) morphine is often given to persons who have undergone surgery as a pain killer
 (c) Chewing tobacco lowers bloodpressure and heartrate
 (d) Cocaine is given to patients after surgery as it stimulates recovery
- 200.** Match list I and List II and select the answer using the codes given below the lists

List I

- (a) Action potential
 (b) Neurosecretion
 (c) Resting potential
 (d) Saltatory

List II

- 1) Myelinated nerve fibre
 2) Donnam equilibrium
 3) Hypathalamus
 4) Depolarisation propagation & repolarisation

Codes:

- | | a | b | c | d |
|----|---|---|---|---|
| 1. | 1 | 2 | 3 | 4 |
| 2. | 4 | 3 | 2 | 1 |
| 3. | 2 | 3 | 4 | 1 |
| 4. | 4 | 2 | 3 | 1 |