

This booklet contains **16** printed pages.

Do not open this Test Booklet until you are asked to do so.

English

Date: 22/03/2020

Important Instructions:

1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. The Answer Sheet is kept inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully.
3. The test is of **3 hours** duration.
4. The Test Booklet consists of **180** questions. The maximum marks are **720**.
5. There are three part in the question paper. The distribution of marks subjectwise in each part is as under for each correct response.
Part A : PHYSICS (120 marks) - Question No. 1 to 45 consist Four (4) marks each for each correct response.
Part B : CHEMISTRY (120 marks) - Question No. 46 to 90 consist Four (4) marks each for each correct response.
Part C : BIOLOGY (240 marks) - Question No. 91 to 180 consist Four (4) marks each for each correct response.
6. Candidates will be awarded marks as stated above in instructions No. 5 for correct response of each question. 1 (one) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
7. Use Blue/Black Ball Point Pen only for writing particulars/marking response the Answer Sheet. Use of pencil is strictly prohibited.
8. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc., inside the examination hall/room.
9. Rough work is to be done on the space provided for this purpose in the Test Booklet only. This space is given at the bottom of each page and in 1 page at the end of the booklet.
10. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.
11. Do not fold or make any stray marks on the Answer Sheet.

Name of the Candidate (in Capitals): _____

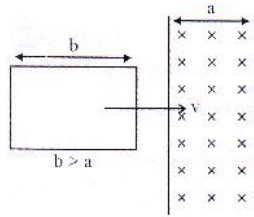
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Candidate's Signature: _____ Invigilator's Signature: _____

Part - A

1. In the given arrangement, the loop is moved with constant velocity v in a uniform magnetic field B in a restricted region of width a . The time for which the emf is induced in the circuit is



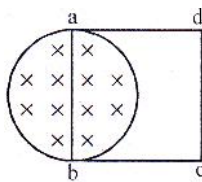
- (1) $\frac{2b}{v}$ (2) $\frac{2a}{v}$
 (3) $\frac{(a+b)}{v}$ (4) $\frac{2(a-b)}{v}$

2. Which statement is CORRECT from following?

- (a) Inductor store energy in the form of magnetic field
 (b) Capacitor store energy in the form of electric field
 (c) Inductor store energy in the form of electric and magnetic field both
 (d) Capacitor store energy in the form of electric and magnetic field both

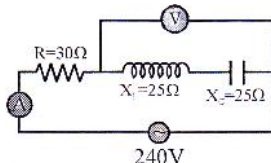
- (1) a, b (2) a, c
 (3) b, d (4) b, c

3. A uniform magnetic field B exists in a cylindrical region of radius 10 cm as shown in figure. A uniform wire of length 80 cm and resistance 4.0Ω is bent into a square frame and is placed with one side along a diameter of the cylindrical region. If the magnetic field increases at a constant rate of 0.010 T/s , find the current induced in the frame.



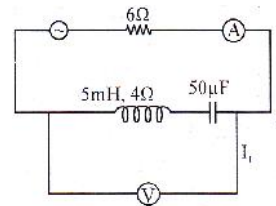
- (1) $3.9 \times 10^{-5}\text{ A}$ (2) $0.2 \times 10^{-5}\text{ A}$
 (3) $8 \times 10^{-5}\text{ A}$ (4) $10 \times 10^{-5}\text{ A}$

4. In the circuit shown in figure neglecting source resistance the voltmeter and ammeter reading will respectively, will be



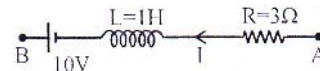
- (1) 0 V, 3 A (2) 150 V, 3 A
 (3) 150 V, 6 A (4) 0 V, 8 A

5. In the circuit shown in figure, the AC source gives a voltage $V = 20 \cos(2000t)$. Neglecting source resistance, the voltmeter and ammeter readings will be



- (1) 0 V, 2.0 A (2) 0 V, 1.4 A
 (3) 5.6 V, 1.4 A (4) 8 V, 2.0 A

6. In the given branch AB of a circuit a current $I = (10t + 5)\text{ A}$ is flowing, where t is time in second. At $t = 0$, the potential difference between points A and B ($V_A - V_B$) is



- (1) 15 V (2) -5 V
 (3) -15 V (4) 5 V

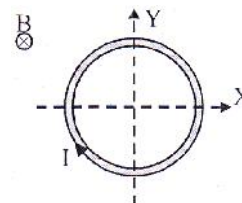
7. The current in a LR circuit builds up to $\frac{3}{4}$ th of its steady state value in 4s. The time constant of this circuit is

- (1) $\frac{1}{\ln 2}\text{ s}$ (2) $\frac{2}{\ln 2}\text{ s}$
 (3) $\frac{3}{\ln 2}\text{ s}$ (4) $\frac{4}{\ln 2}\text{ s}$

8. There is a 100Ω resistance in a L-C-R AC circuit and AC emf of 200 V is applied on this circuit. When only capacitor is removed current lags the voltage by 60° and when only inductor removed current leads the voltage by 60° , then current in this L-C-R circuit will be

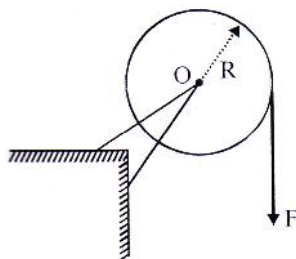
- (1) 1 A (2) 0.5 A
 (3) 2 A (4) 4 A

9. A conducting loop carrying a current I is placed in a uniform magnetic field pointing into the plane of the paper as shown. The loop will have a tendency to



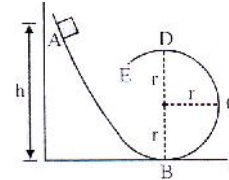
- (1) Contract (2) Expand
 (3) Move towards +ve x-axis
 (4) Move towards -ve x-axis

10. A 60- μ F capacitor is charged to 50 V. This charged capacitor is connected across a 1.5 mH coil, so that LC oscillations occur. The max current in the coil is
 (1) 1.5 A (2) 2 A
 (3) 15 A (4) 10 A
11. A particle of mass m and carrying a charge q enters with a velocity v perpendicular to a uniform magnetic field. The time period of rotation of the particle
 (1) Decreases with increase of velocity
 (2) Increases with increase of radius of the orbit
 (3) Depends only on magnetic field
 (4) Depends on magnetic field and (q/m) of the particle
12. A solid cylinder of mass M and radius R rotates about its axis with angular speed S . Its rotational kinetic energy is
 (1) $\frac{1}{2} MR^2 S^2$ (2) $MR^2 S^2$
 (3) $\frac{1}{4} MR^2 S^2$ (4) $\frac{1}{8} MR^2 S^2$
13. To maintain a rotor at a uniform angular speed of 100 rad s^{-1} , an engine needs to transmit torque of 100 N m. The power of the engine is
 (1) 10 kW (2) 100 kW
 (3) 10 MW (4) 100 MW
14. Which of the following is the correct relation between linear velocity \vec{v} and angular velocity \vec{S} of a particle?
 (1) $\vec{v} = \vec{r} \times \vec{S}$ (2) $\vec{v} = \vec{S} \times \vec{r}$
 (3) $\vec{S} = \vec{r} \times \vec{v}$ (4) $\vec{S} = \vec{v} \times \vec{r}$
15. A uniform disc of radius R and mass M can rotate without friction on an axle passing through its centre and perpendicular to its plane face. A cord is wound over the rim of the disc and a uniform force F is applied on the cord as shown in the adjoining figure. Then the tangential acceleration of a point on the rim of the disc is proportional to



- (1) R^0 (2) R^1
 (3) R^{-1} (4) R^{-2}

16. A motor is used to deliver water at a certain rate through a given horizontal pipe. To deliver n times water through the same pipe in the same time the power of the motor must be increased as follows
 (1) n times (2) n^2 times
 (3) n^3 times (4) n^4 times
17. ABCDE is a channel in the vertical plane, part BCDE being circular with radius r . A block is released from A and slides without friction and without rolling. The block will complete the loop if h is



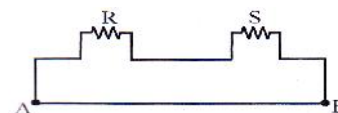
- (1) $h \leq \frac{3}{2} r$ (2) $h \geq \frac{5}{2} r$
 (3) $h \geq \frac{3}{2} r$ (4) $h \leq \frac{5}{2} r$
18. A body constrained to move in y-direction is subjected to a force given by

$$\vec{F} = (-2\hat{i} + 15\hat{j} + 6\hat{k}) \text{ N}$$

The work done by this force in moving the body a distance of 10 m along the y-axis is

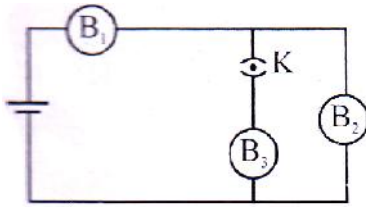
- (1) 20 J (2) 150 J
 (3) 160 J (4) 190 J
19. If the road is unbanked and the coefficient of friction between the road and the tyres is 0.8, then the maximum speed with which an automobile can move around a curve of 84.5 m radius without slipping is (Take $g = 10 \text{ ms}^{-2}$)
 (1) 26 ms^{-1} (2) 67.7 ms^{-1}
 (3) 13 ms^{-1} (4) 36.7 ms^{-1}
20. Two satellites A and B, having ratio of masses 3 : 1 are in circular orbits of radius r and $4r$. Calculate the ratio of total mechanical energy of A and B.
 (1) 3 : 4 (2) 12 : 1
 (3) 4 : 3 (4) 1 : 12

21. In a meter bridge, the null point is found at a distance of 25 cm from A. If now a resistance of 10Ω is connected in parallel with S , the null point occurs at mid-point of AB. The value of R is



- (1) 6.67Ω (2) 1.67Ω
 (3) 2.67Ω (4) 4.67Ω

22. B_1 , B_2 and B_3 are the three identical bulbs connected to a battery of steady e.m.f. with key K closed. What happens to the brightness of the bulbs B_1 and B_2 when the key is opened?

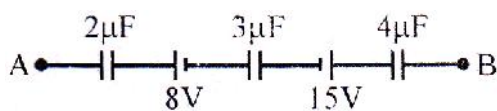


- (1) Brightness of the bulb B_1 increases and that of B_2 decreases.
 (2) Brightness of the bulb B_1 and B_2 increases.
 (3) Brightness of the bulb, B_1 decreases and that of B_2 increases.
 (4) Brightness of the bulbs B_1 and B_2 decreases.

23. The electric potential (V) as a function of distance (x) [in meters] is given by $V = (5x^2 + 10x - 9)$ volt. The value of electric field at $x = 1$ m would be

- (1) -20 volt / m (2) 6 volt / m
 (3) 11 volt / m (4) -23 volt / m

24. The potential of the point A is greater than that of B by 19 volt. What is the potential difference in volts across the 3 - F capacitor?



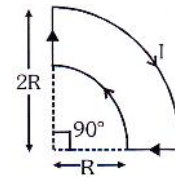
- (1) 7 (2) 8
 (3) 23 (4) 4

25. A charge Q is placed at geometric centre of an imaginary cone as in figure. If flux from circular face is w then flux from curved surface is



- (1) $\frac{Q}{\epsilon_0} - w$ (2) $\frac{Q}{\epsilon_0} + w$
 (3) $\frac{Q}{2 \epsilon_0}$ (4) w

26. What would be the magnetic moment of given current distribution?



- (1) $\frac{3fIR^2}{4} \odot$ (2) $\frac{3fIR^2}{4} \otimes$
 (3) $\frac{3fIR^2}{2} \odot$ (4) $\frac{3fIR^2}{2} \otimes$

27. In a circuit an alternating current and a direct current are supplied together. The expression of the instantaneous is given as $i = 3 + 6\sin \omega t$. Then the r.m.s. value of the current is

- (1) 3 A (2) 6 A
 (3) $3\sqrt{2}$ A (4) $3\sqrt{3}$ A

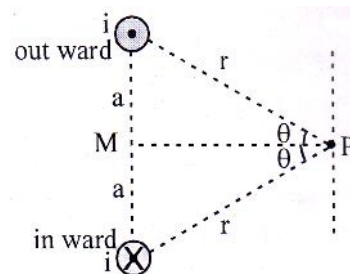
28. Two identical coils carrying equal currents have a common centre, and their planes are at right angles to each other. Find the ratio of the magnitudes of the resultant magnetic field at the centre and the field due to one coil alone

- (1) 2 : 1 (2) 1 : 1
 (3) 1 : $\sqrt{2}$ (4) $\sqrt{2} : 1$

29. A charge particle projected with velocity \vec{v} in uniform magnetic field \vec{B} then for maximum magnetic force on it, which is correct?

- (1) $\vec{v} \cdot \vec{B} = 0$ (2) $\vec{v} \times \vec{B} = 0$
 (3) $\vec{v} \parallel \vec{B}$ (4) \vec{v} is anti-parallel to \vec{B}

30. Find out the magnitude of the magnetic field at point P due to following current distribution?



- (1) $\frac{\sim_0 ia}{fr^2}$ (2) $\frac{\sim_0 ia^2}{fr}$
 (3) $\frac{\sim_0 ia}{2fr^2}$ (4) $\frac{2 \sim_0 ia}{fr^2}$



31. An alternating voltage $E = 200\sqrt{2} \sin(100t)$ is connected to a 1 microfarade capacitor through an ac ammeter. The reading of the ammeter shall be
(1) 10 mA (2) 20 mA
(3) 30 mA (4) 40 mA
32. Two coils X and Y are placed in a circuit such that when a current changes 2 A in coil X, the magnetic flux changes by 0.4 weber in Y. The value of mutual inductance of the coils
(1) 0.2 H (2) 5 H
(3) 0.8 H (4) 20 H
33. Current in the LCR circuit becomes extremely large when
(1) Frequency of AC supply is increased
(2) Frequency of AC supply is decreased
(3) Inductive reactance becomes equal to capacitive reactance
(4) Inductance becomes equal to capacitance
34. Which of the following quantities does not depend upon the orbital radius of the satellite?
(1) $\frac{T}{R}$ (2) $\frac{T^2}{R^2}$
(3) $\frac{T^2}{R}$ (4) $\frac{T^2}{R^3}$
35. A flywheel rotates with a uniform angular acceleration. Its angular velocity increases from $20f$ rad/s to $40f$ rad/s in 10 sec. How many rotations did it made in this period
(1) 50 (2) 150
(3) 100 (4) 250
36. In an ac circuit, a resistance of R ohm is connected in series with an inductance L . If phase angle between voltage and current be 45° , the value of inductive reactance will be:
(1) $\frac{R}{4}$ (2) $\frac{R}{2}$
(3) R
(4) cannot be found with the given data
37. In an ac circuit the potential V and the current I are given respectively by:
 $V = 100 \sin(100t)$ volt
and $I = 100 \sin\left(100t + \frac{\pi}{3}\right)$ mA .
The power dissipation in the circuit will be:
(1) 10^4 watt (2) 10 watt
(3) 2.5 watt (4) 5 watt
38. The primary winding of a transformer has 100 turns and its secondary winding has 200 turns. The primary is conneted to an ac supply of 120 V and current flowing in it is 10 A. The voltage and the current in the secondary are
(1) 240 V, 5 A (2) 240 V, 10 A
(3) 60 V, 20 A (4) 120 V, 20 A
39. A bulb and a capacitor are connected in series to a source of alternating current. If its frequency is increased, while keeping the voltage of the source constant, then
(1) bulb will give more intense light
(2) bulb will give less intense light
(3) bulb will give light of same intensity as before
(4) bulb will stop radiating light
40. A coil has 2000 turns and area of 70 cm^2 . The magnetic field perpendicular to the plane of the coil is 0.3 Wb/m^2 and takes 0.1 s to rotate through 180° . The value of the average induced emf will be
(1) 8.4 V (2) 84 V
(3) 42V (4) 4.2 V
41. The coefficient of mutual induction between two closely lying coils does not depend upon
(1) their mutual orientation
(2) the permeability of their core material
(3) their structure
(4) the current flowing in them
42. A long solenoid has 1000 turns. When a current of 4 A flows through it, the magnetic flux linked with each turn of the solenoid is $4 \times 10^{-3} \text{ Wb}$. The self-inductance of the solenoid is
(1) 1 H (2) 4 H
(3) 3 H (4) 2 H
43. A 100 kg fisherman and a 500 kg supply crate are on afrozen pond that is essentially frictionless. The man and the crate are initially separated by a distance of 600 m. The fisherman uses a very light rope to pull the crate closer to him. How far has the man moved when the crate reaches the him?
(1) zero meters (2) 50 m
(3) 500m (4) 100 m

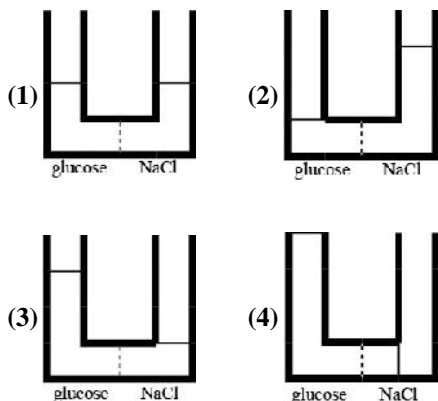


44. A rock is dropped from a high tower and falls freely under the influence of gravity. Which one of the following statements is true concerning the rock as it falls?
- (1) It will gain an equal amount of momentum during each second.
 - (2) It will gain an equal amount of kinetic energy during each second.
 - (3) It will gain an equal amount of speed for each meter through which it falls.
 - (4) It will gain an equal amount of momentum for each meter through which it falls.
45. Suppose two particles A and B of masses m and $2m$ rest at the origin of an inertial frame in free space. They are acted upon by forces of equal magnitudes F in the positive x -direction for equal amount of time t . Momenta $\vec{p}_{A/c}$ and $\vec{p}_{B/c}$ of the particles A and B in center of mass frame are
- (1) $\vec{p}_{A/c} = \frac{2Ft}{3} \hat{t}$ and $\vec{p}_{B/c} = -\frac{2Ft}{3} \hat{t}$
 - (2) $\vec{p}_{A/c} = -\frac{2Ft}{3} \hat{t}$ and $\vec{p}_{B/c} = \frac{2Ft}{3} \hat{t}$
 - (3) $\vec{p}_{A/c} = \frac{Ft}{3} \hat{t}$ and $\vec{p}_{B/c} = -\frac{Ft}{3} \hat{t}$
 - (4) $\vec{p}_{A/c} = -\frac{Ft}{3} \hat{t}$ and $\vec{p}_{B/c} = \frac{Ft}{3} \hat{t}$

SPACE FOR ROUGH WORK

Part - B

46. Equal volumes of aqueous 1.00 m glucose ($C_6H_{12}O_6$) and 1.00 m sodium chloride solutions are placed on opposite sides of a U-tube, separated by a semipermeable membrane (through which only water can diffuse). What will the setup look like at equilibrium?



47. Which statement about atoms arranged in a body-centered cubic (bcc) crystal structure is correct?

- (1) It is not observed as the structure of any metallic elements
 (2) It is also called the cubic closest-packed (ccp) structure
 (3) The unit cell contains two atoms
 (4) Each atom has 6 nearest neighbors

48. According to EPA guidelines the permissible level for lead in drinking water is 15 parts per billion (ppb). What is the maximum allowable mass of lead that could be present in 1.00 L of H_2O ?

- (1) 0.015 ng (2) 0.015 μ g
 (3) 0.015 mg (4) 0.015 g

49. An oxide of rhenium crystallizes with eight rhenium atoms at the corners of the unit cell and 12 oxygen atoms on the edges between them. What is the formula of this oxide?

- (1) ReO (2) Re_2O_3
 (3) ReO_2 (4) ReO_3

50. Which physical property decreases with an increase in intermolecular molecular forces?

- (1) boiling point (2) enthalpy of vaporization
 (3) vapor pressure (4) viscosity

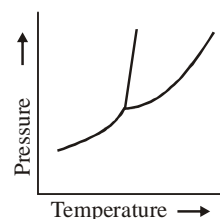
51. What is the principal difference between crystalline and amorphous solids?

- | Crystalline solids | Amorphous solids |
|---------------------------|---------------------------|
| (1) ionic bonding | covalent bonding |
| (2) higher molar masses | lower molar masses |
| (3) stoichiometric solids | non-stoichiometric solids |
| (4) long-range order | lack of long-range order |

52. A solution of sulfuric acid in water that is 25% H_2SO_4 by mass has a density of $1.178 \text{ g}\cdot\text{mL}^{-1}$. Which expression gives the molarity of this solution?

- (1) $0.25 \times 98 \times 1178$ (2) $\frac{0.25 \times 1178}{98}$
 (3) $\frac{0.25}{98 \times 1178}$ (4) $\frac{1178}{0.25 \times 98}$

53. According to this phase diagram, which phases can exist at pressures lower than the triple point pressure?



- (1) gas only (2) solid and gas only
 (3) liquid only (4) solid and liquid only

54. What is the Na^+ ion concentration in the solution formed by mixing 20. mL of 0.10 M Na_2SO_4 solution with 50. mL of 0.30 M Na_3PO_4 solution?

- (1) 0.15 M (2) 0.24 M
 (3) 0.48 M (4) 0.70 M

55. A solution prepared by dissolving a 2.50 g sample of an unknown compound dissolved in 34.0 g of benzene, C_6H_6 , boils 1.38°C higher than pure benzene. Which expression gives the molar mass of the unknown compound?

- | Compound | K_b |
|----------|--|
| C_6H_6 | $2.53^\circ\text{C}\cdot\text{m}^{-1}$ |
- (1) $2.53 \times \frac{2.50}{1.38}$ (2) $1.38 \times \frac{34.0}{2.53} \times 2.50$
 (3) $2.50 \times 10^3 \times \frac{2.53}{34.0} \times \frac{1}{1.38}$
 (4) $2.50 \times 10^3 \times \frac{1.38}{34.0} \times 2.53$

56. What type of solid is generally characterized by having low melting point and low electrical conductivity?

- (1) ionic (2) metallic
 (3) molecular (4) network covalent

57. How many nearest neighbors surround each particle in a face-centered cubic lattice?

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



58. The vapor pressure of a liquid in a closed container depends on
1. temperature of the liquid
 2. quantity of liquid
 3. surface area of the liquid
- (1) 1 only (2) 2 only
(3) 1 and 3 only (4) 1, 2 and 3
59. KCl crystallizes in the same type of crystal as does NaCl. Given that $\frac{r_{\text{Na}^+}}{r_{\text{Cl}^-}} = 0.5$ and $\frac{r_{\text{Na}^+}}{r_{\text{K}^+}} = 0.7$, the ratio of edge lengths of the unit cell of KCl to that of NaCl is
- (1) $\frac{7}{8}$ (2) $\frac{8}{7}$
(3) $\frac{5}{7}$ (4) $\frac{7}{10}$
60. The interionic distance for sodium chloride crystal will be
- (1) a (2) $\frac{a}{2}$
(3) $\frac{\sqrt{3}a}{2}$ (4) $\frac{2a}{\sqrt{3}}$
61. Which of the following fcc structure contains cations in alternate tetrahedral voids?
- (1) NaCl (2) ZnS
(3) Na₂O (4) CaF₂
62. Which of the following statements for crystals having Schottky defect is not correct?
- (1) Schottky defect arises due to the absence of a cation or anion from the position which it is expected to occupy.
(2) Schottky defects are more common in ionic compounds with high coordination numbers.
(3) The density of the crystals having Schottky defect is larger than that of the perfect crystal.
(4) The crystal having Schottky defect is electrical neutral as a whole.
63. Which of the following statements for crystals having Frenkel defect is not correct?
- (1) Frenkel defects are observed where the difference in sizes of cations and anions is large.
(2) The density of crystals having Frenkel defect is lesser than that of a pure perfect crystal.
(3) In an ionic crystal having Frenkel defect may also contain Schottky defect.
(4) Pure alkali halides do not have Frenkel defect.
64. Which of the following conditions is correct regarding the monoclinic crystal system?
- (1) $a = b \neq c$ (2) $a = b = c$
(3) $\alpha \neq \beta \neq \gamma \neq 90^\circ$ (4) $\alpha = \gamma = 90^\circ \neq \beta$
65. If the dissolution of an ionic solid in water is endothermic, then it can be concluded that
- (1) the solubility of the solid will increase with increasing temperature
(2) the solubility will decrease with increasing temperature
(3) the solution process release heat
(4) the solubility of the solid is independent of temperature
66. Which of the following solutions would have the lowest freezing point?
- (1) 0.1 m Ca(NO₃)₂ (2) 0.1 m KNO₃
(3) 0.1 m HCl (4) 0.2 m sucrose (sugar)
67. Liquids A and B form an ideal solution
- (1) The enthalpy of mixing is zero
(2) The entropy of mixing is zero
(3) The free energy of mixing is zero
(4) The free energy as well as the entropy of mixing are each zero
68. On mixing, heptane and octane form an ideal solution. At 373 K, the vapour pressures of pure heptane and pure octane are 105 kPa and 45 kPa respectively. Vapour pressure of a solution formed by mixing 25.0 g of heptane and 57.0 g octane would be
- (1) 72.0 kPa (2) 65.0 kPa
(3) 96.0 kPa (4) 36.0 kPa
69. The van't Hoff factor, i , for a compound which undergoes dissociation in one solvent and association in other solvent is, respectively.
- (1) greater than one and greater than one
(2) less than one and greater than one
(3) less than one and less than one
(4) greater than one and less than one
70. The molecular weight of benzoic acid in benzene as determined by depression in freezing point method corresponds to
- (1) Ionization of benzoic acid.
(2) Dimerization of benzoic acid.
(3) Trimerization of benzoic acid.
(4) Solvation of benzoic acid.
71. The Henry's law constant for the solubility of N₂ gas in water at 298 K is 1.0×10^5 atm. The mole fraction of N₂ in air is 0.8. The number of moles of N₂ from air dissolved in 10 moles of water at 298 K and 5 atm pressure is
- (1) 4.0×10^{-4} (2) 4.0×10^{-5}
(3) 5.0×10^{-4} (4) 4.0×10^{-6}



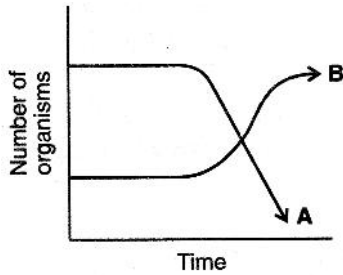
72. Dissolving 120 g of urea (mol. wt. 60) in 1000 g of water gave a solution of density 1.15 g/mL. The molarity of the solution is
(1) 1.78 M (2) 2.00 M
(3) 2.05 M (4) 2.22 M
73. A 0.180 g sample of liquid H₂O is injected into a 5.00 L flask at 25 °C. What will be present in the flask when equilibrium is established?
(Vapor pressure H₂O at 25 °C = 23.8 mm Hg)
(1) H₂O vapor at a pressure of 186 mm Hg
(2) H₂O vapor at a pressure of 37.2 mm Hg
(3) liquid H₂O and H₂O vapor at a pressure of 37.2 mm Hg
(4) liquid H₂O and H₂O vapor at a pressure of 23.8 mm Hg
74. The composition of a sample of wustite is Fe_{0.95}O_{1.0}. The ratio of Fe²⁺ ions & Fe³⁺ ions in the given sample is
(1) 9.5 : 1.0a (2) 8.5 : 1.0
(3) 9.0 : 1.0 (4) 8.0 : 1.0
75. In the extraction of chlorine by electrolysis of brine _____ .
(1) oxidation of Cl⁻ ion to chlorine gas occurs
(2) reduction of Cl⁻ ion to chlorine gas occurs
(3) For overall reaction ΔG° has negative value
(4) A displacement reaction takes place
76. When copper ore is mixed with silica, in a reverberatory furnace copper matte is produced. The copper matte contains _____ .
(1) Sulphides of copper (II) and iron (II)
(2) Sulphides of copper (II) and iron (III)
(3) Sulphides of copper (I) and iron (II)
(4) Sulphides of copper (I) and iron (III)
77. In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with :
(1) iron (II) sulphide (2) carbon monoxide
(3) copper (I) sulphide (4) sulphur dioxide
78. A number of elements are available in earth's crust but most abundant elements are _____ .
(1) Al and Fe (2) Al and Cu
(3) Fe and Cu (4) Cu and Ag
79. Zone refining is based on the principle that _____.
(1) impurities of low boiling metals can be separated by distillation
(2) impurities are more soluble in molten metal than in solid metal
(3) different components of a mixture are differently adsorbed on an adsorbent
(4) vapours of volatile compound can be decomposed in pure metal
80. In aluminothermic process, Al acts as _____.
(1) An oxidising agent (2) A flux
(3) A reducing agent (4) A solder
81. The salt which is least likely to be found in minerals is:
(1) Sulphide (2) Chloride
(3) Nitrate (4) Sulphate
82. Which method of purification is represented by the given equation?
$$\text{Ti}_{(\text{Impure})} + 2\text{I}_2 \xrightarrow{500\text{ K}} \text{TiI}_4 \xrightarrow{1675\text{ K}} \text{Ti}_{(\text{Pure})} + 2\text{I}_2$$

(1) Cupellation (2) Poling
(3) Van Arkel (4) Zone refining
83. Heating of an ore in the absence of air below the melting point is called _____.
(1) Leaching (2) Roasting
(3) Smelting (4) Calcination
84. Sulphide ores of metals are usually concentrated by froth floatation. Which one of the following sulphide ores is an exception and concentrated by leaching?
(1) Copper pyrite (2) Argentite
(3) Galena (4) Sphalerite
85. What will be the molarity of a solution, which contains 5.85 g of NaCl(s) per 500 mL?
(1) 4 mol L⁻¹ (2) 20 mol L⁻¹
(3) 0.2 mol L⁻¹ (4) 2 mol L⁻¹
86. If the concentration of glucose (C₆H₁₂O₆) in blood is 0.9 g L⁻¹, what will be the molarity of glucose in blood?
(1) 5 M (2) 50 M
(3) 0.005 M (4) 0.5 M
87. What will be the molality of the solution containing 18.25 g of HCl gas in 500 g of water?
(1) 0.1 m (2) 1 M
(3) 0.5 m (4) 1 m
88. How many moles of Na⁺ ions are in 20 mL of 0.40 M Na₃PO₄?
(1) 0.0080 (2) 0.024
(3) 0.050 (4) 0.20
89. 4.28 g of NaOH is dissolved in water and the solution is made to 250 cc. What will be the molarity of the solution?
(1) 0.615 mol L⁻¹ (2) 0.428 mol L⁻¹
(3) 0.99 mol L⁻¹ (4) 0.301 mol L⁻¹
90. A solution is prepared by adding 5 g of a solute 'X' to 45 g of solvent 'Y'. What is the mass per cent of the solute 'X'?
(1) 10 % (2) 11.1 %
(3) 90 % (4) 75 %

**Part - C**

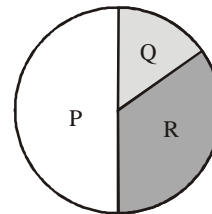
91. Water holding capacity is highest in
(1) sandy soil (2) silt soil
(3) clay soil (4) loam soil
92. A₀ layer of the soil is made of
(1) decaying litter
(2) rocky matter
(3) solid mixed with organic matter
(4) soil rich in inorganic matter
93. A terrestrial mammal who seldom drinks water
(1) *Hippopotamus* (2) *Rhinoceros*
(3) Kangaroo rat (4) Camel
94. Animals that can tolerate a narrow range of salinity are
(1) stenohaline (2) euryhaline
(3) anadromous (4) catadromous
95. Mark the odd one
(1) *Pistia* (2) *Hydrilla*
(3) *Vallisneria* (4) *Casurina*
96. Soil rich in Fe and Al due to excessive leaching is
(1) laterite (2) laom
(3) alluvial (4) both (1) and (2)
97. Nutrient enrichment of water body is
(1) eutrophication (2) stratification
(3) biomagnification (4) none of these
98. Maximum quantity of humus occurs is
(1) lowermost layer of soil
(2) upper layer of soil
(3) middle layer of soil (4) same everywhere
99. Which is not correctly matched?
(1) Laterite - contains aluminium
(2) Terrarosa - most suitable for roses
(3) Chernozem - richest soil
(4) Black cotton soil - rich in calcium carbonate
100. The ability of the venus fly trap to capture insects is due to
(1) specialized 'muscle like' cells
(2) chemical stimulation by the prey
(3) a passive process requiring no special ability on the part of the plant
(4) rapid turgor pressure changes
101. Animals have the innate ability to escape from predation. Examples for the same are given below. Select the incorrect example
(1) colour change in chameleon
(2) enlargement of body size by swallowing air in puffer fish
(3) poison fangs in snakes
(4) melanism in moths
102. Small fish get struck near the bottom of a shark and derives its nutrition from it. This type of association is called as
(1) symbiosis (2) commensalism
(3) predation (4) parasitism
103. At which latitude heat gain through insolation approximately equals heat loss through terrestrial radiation
(1) 22.5° North and South
(2) 40° North and South
(3) 42.5° North and South
(4) 66° North and South
104. A species inhabiting different geographical area is
(1) sympatric (2) synchronous
(3) allochronous (4) allopatric
105. Which size of clay particles is ?
(1) 0.2 to 0.03 mm (2) 1 to 2 mm
(3) Less than 0.002 mm (4) 2.0 to 0.06 mm
106. Large woody vines are more commonly found in
(1) mangrove (2) tropical rainforests
(3) alpine forests (4) temperate forests
107. The zone of atmosphere in which the ozone layer is present called
(1) troposphere (2) ionosphere
(3) mesosphere (4) stratosphere
108. In which of the following interactions both partners are adversely affected?
(1) Competition (2) Predation
(3) Parasitism (4) Mutualism
109. The species confined to a particular region and not found else where is termed as
(1) Keystone (2) Alien
(3) Endemic (4) Rare

110. The following graph depicts changes in two populations (A and B) of herbivores in a grassy field. A possible reason for these changes is that:



- (1) Both plant populations in this habitat decreased
 (2) Population B competed more successfully for food than population A
 (3) Population A produced more offspring than population B
 (4) Population A consumed the members of population B
111. An association of individuals of different species living in the same habitat and having functional interactions is
 (1) Ecological niche (2) Biotic community
 (3) Ecosystem (4) Population
112. When does the growth rate of a population following the logistic model equal zero? The logistic model is given as $dN/dt = rN(1 - N/K)$
 (1) when N/K is exactly one
 (2) when N nears the carrying capacity of the habitat
 (3) when N/K equal zero
 (4) when death rate is greater than birth rate
113. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called
 (1) ley farming (2) contour farming
 (3) strip farming (4) shifting agriculture
114. An ecosystem does not normally alter because it is in a state of
 (1) homeostasis (2) imbalance
 (3) deficient light (4) deficient components
115. Alpine forests of Himalayas have
 (1) tall evergreen coniferous trees
 (2) tall broad-leaved evergreen trees
 (3) tall broad-leaved deciduous trees
 (4) dwarf shrubby plants
116. Annual rainfall in an area of tropical deciduous forests is
 (1) over 300 cm (2) 200-250 cm
 (3) 100-150 cm (4) 50-75 cm
117. Nepenthes belongs to the category of
 (1) primary consumer (2) producer
 (3) secondary consumer (4) both (2) and (3)
118. Decomposers of an ecosystem include
 (1) microscopic animals (2) bacteria and fungi
 (3) both (1) and (2)
 (4) bacteria, fungi and macroscopic animals
119. An ecosystem is an interacting system of
 (1) communities
 (2) communities and their physical environment
 (3) populations (4) individuals
120. Total energy fixed by an ecosystem is
 (1) primary production (2) gross production
 (3) net production (4) secondary production
121. Which one lies at the level of primary consumers?
 (1) Fishes (2) Eagles
 (3) Cattle and Insects (4) Snakes and Frogs
122. Species diversity is lowest in ecosystem
 (1) Desert (2) Tundra
 (3) Grassland (4) Deciduous forest
123. Tropical dry deciduous forests occur in India in
 (1) Andmans (2) Eastern Himalayas
 (3) Madhya Pradesh (4) Kerala
124. Major communities of the world are
 (1) scrubs, jungles and gardens
 (2) oceans, freshwater and forest communities
 (3) grassland and desert communities
 (4) both (2) and (3)
125. Which of the following ecosystems is most productive in terms of net primary production?
 (1) deserts (2) tropical rain forests
 (3) oceans (4) estuaries
126. The reservoir for the gaseous type of bio-geochemical cycle exists in
 (1) stratosphere (2) atmosphere
 (3) ionosphere (4) lithosphere
127. The biomass of each succeeding trophic level is
 (1) more than the one preceding
 (2) less than the one preceding
 (3) constantly fixed
 (4) equal to next trophic level

- 128.** Largest reservoir of sulphur is
 (1) atmosphere (2) rocks
 (3) ocean (4) lake
- 129.** Nitrates are transformed into nitrogen by
 (1) ammonifying bacteria (2) nitrifying bacteria
 (3) denitrifying bacteria (4) both (1) and (2)
- 130.** The most abundant element present in the plants is
 (1) nitrogen (2) manganese
 (3) iron (4) carbon
- 131.** Lichen is the pioneer vegetation in which type of succession?
 (1) hydrosere (2) lithosere
 (3) psammosere (4) xerosere
- 132.** A rocky barren land after some time changes into fertile rich, crop yielding land. Which sequence might have occurred?
 (1) lichens, mosses, shrubs, herbs
 (2) lichens, mosses, herbs, shrubs
 (3) mosses, herbs, shrubs, lichens
 (4) herbs, shrubs, lichens, mosses
- 133.** Study the four statements (a - d) given below and select the two correct ones out of them
 (a) a lion eating a deer and a sparrow feeding on grain are ecologically similar in being consumers
 (b) predator starfish *Pisaster* helps in maintaining species diversity of some invertebrates
 (c) predators ultimately lead to extinction of prey species
 (d) production of chemical such as nicotine and strychnine by the plants are metabolic disorders
 The two correct statements are
 (1) (a) and (d) (2) (a) and (b)
 (3) (b) and (c) (4) (c) and (d)
- 134.** Identify the possible link "A" in the following food chain:
 Plant → Insect → Frog → 'A' → Eagle
 (1) Rabbit (2) Wolf
 (3) Cobra (4) Parrot
- 135.** Which one of the following statements about pyramid of energy is incorrect whereas remaining three are correct?
 (1) it shows energy content of different trophic level organisms
 (2) it is inverted in shape
 (3) it is upright in shape (4) the base is broad
- 136.** Bundle of His is network of :
 (1) nerve fibres found throughout the heart
 (2) muscle fibres distributed throughout the heart walls
 (3) muscle fibres found only in the ventricle walls
 (4) nerve fibres distributed in ventricles
- 137.** What happens when the pacemaker is non-functional?
 (1) Only the auricles will contract rhythmically
 (2) The carciac muscle do not contract in a coordinated manner rhythmically
 (3) Only ventricles will contract rhythmically
 (4) Auricles and ventricles contract simultaneously
- 138.** Heart sound which is longer is :
 (1) lubb (2) dup
 (3) both equal (4) sometimes 1 & sometimes 2
- 139.** In which one of the following pair of terms both represent one and the same thing?
 (1) Mitral valve-bicuspid valve
 (2) Atrioventricular node - pace maker
 (3) Leucocytes - lymphocytes
 (4) Plasma - serum
- 140.** Match Column I with Column II and select the correct option from the codes given below :
- | Column I | Column II |
|-----------------------|---|
| P. Superior vena cava | (i) Carries deoxygenated blood to lungs |
| Q. Inferior vena cava | (ii) Carries oxygenated blood from lungs |
| R. Pulmonary artery | (iii) Brings deoxygenated blood from lower part of body to right atrium |
| S. Pulmonary vein | (iv) Bring deoxygenated blood from upper part of body to right atrium |
- (1) P - (ii), Q - (iv), R - (iii), S - (i)
 (2) P - (iv), Q - (i), R - (ii), S - (iii)
 (3) P - (iv), Q - (iii), R - (i), S - (ii)
 (4) P - (iv), Q - (i), R - (iii), S - (ii)
- 141.** In the given figure the durations of the events of the cardiac cycle are given. Identify these events and select the correct option.



- (1) P - Auricular systole, Q - Joint diastole, R - Ventricular systole
 (2) P - Ventricular systole, Q - Joint diastole, R - Auricular systole
 (3) P - Ventricular systole, Q - Auricular systole, R - Joint diastole
 (4) P - Joint diastole, Q - Auricular systole, R - Ventricular systole



- 142.** What happens during ventricular systole?
- (1) Oxygenated blood is pumped into the pulmonary artery and deoxygenated blood is pumped into the aorta
 - (2) Oxygenated blood is pumped into the aorta and deoxygenated blood is pumped into the pulmonary vein
 - (3) Oxygenated blood is pumped into the pulmonary vein and deoxygenated blood is pumped into the pulmonary artery
 - (4) Oxygenated blood is pumped into the aorta and deoxygenated blood is pumped into the pulmonary artery
- 143.** Which of the following statement(s) regarding the cardiac system is/are correct?
- (i) Human heart is an ectodermal derivative.
 - (ii) Mitral valve guards the opening between the right atrium and left ventricle
 - (iii) SAN is located on the left upper corner of the right atrium.
 - (iv) Stroke volume \times Heart rate = Cardiac output.
- (1) (i) only
 - (2) (i) and (ii)
 - (3) (ii) and (iii)
 - (4) (iv) only
- 144.** Serum is :
- (1) blood without fibrinogen
 - (2) lymph without corpuscles
 - (3) blood without corpuscles and fibrinogen
 - (4) lymph
- 145.** Which of the following statements are wrong?
- (i) Leucocytes disintegrate in the spleen and liver.
 - (ii) RBC, WBC and blood platelets are produced by bone marrow
 - (iii) Neutrophils bring about destruction and detoxification of toxins of protein origin.
 - (iv) The important function of lymphocytes is to produce antibodies
- (1) (ii) and (iv) only (2) (i) and (iv) only
 - (3) (i) and (iii) only (4) (ii) and (iii) only
- 146.** Which of the following leucocyte destroy foreign organisms entering the body?
p-Eosinophils, q-Basophils, r-Neutrophils, s-Monocytes, t-Lymphocytes
- (1) p and q (2) q and r
 - (3) r and s (4) s and t
- 147.** Conversion of larva into adult is called :
- (1) Metagenesis (2) Metastasis
 - (3) Metamorphosis (4) Metamerism
- 148.** Match column I with column II and select the correct option from the given codes :
- | Column I | Column II |
|----------------------------|---|
| (P) Protandry | (i) Ovaries mature earlier than testes |
| (Q) Protogyny | (ii) Testes mature earlier than ovaries |
| (R) Metameric segmentation | (iii) Scorpion |
| (S) Radial symmetry | (iv) <i>Nereis</i> |
| (T) Book lungs | (v) <i>Aurelia</i> |
- (1) P - ii, Q - i, R - v, S - iv, T - iii
 - (2) P - i, Q - ii, R - iii, S - v, T - iv
 - (3) P - i, Q - ii, R - iv, S - iii, T - v
 - (4) P - ii, Q - i, R - iv, S - v, T - iii
- 149.** Read the given statements and select the correct option.
Statement 1 : Blood is colourless in the insects.
Statement 2 : Insect blood has no role in O₂ transport.
- (1) Both statements 1 and 2 are correct
 - (2) Statement 1 is correct but statement 2 is incorrect
 - (3) Statement 1 is incorrect but statement 2 is correct
 - (4) Both statements 1 and 2 are incorrect
- 150.** Read the following statements and select the correct option :
- (P) Circulatory system in arthropods is of closed type
 - (Q) Parapodia in annelids help in swimming
 - (R) Phylum Mollusca is second largest phylum of Animalia
 - (S) Aschelminthes are dioecious
- (1) P and R are wrong (2) P alone is wrong
 - (3) R alone is wrong (4) R and S are wrong
- 151.** Match the animal names listed under column I with the zoological names given under column II and select the correct option from the given codes :
- | Column I | Column II |
|-----------------|------------------------|
| (Common name) | (Zoological name) |
| (P) Star fish | (i) <i>Sepia</i> |
| (Q) Jelly fish | (ii) <i>Asterias</i> |
| (R) Devil fish | (iii) <i>Aurelia</i> |
| (S) Cuttle fish | (iv) <i>Octopus</i> |
| | (v) <i>Hippocampus</i> |
- (1) P - ii, Q - iii, R - iv, S - i
 - (2) P - iii, Q - iv, R - i, S - v
 - (3) P - ii, Q - i, R - iv, S - iii
 - (4) P - v, Q - i, R - iv, S - ii

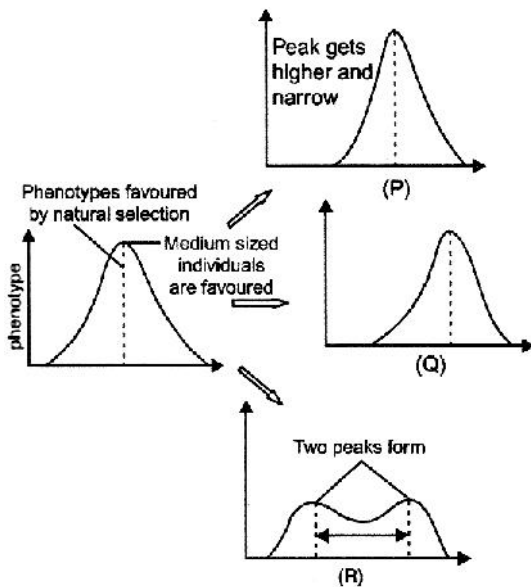


152. Correctly matched set of Phylum, Class and Example is :
- (1) Mollusca - Bivalvia - *Pinctada*
 - (2) Protozoa - Mastigophora - *Entamoeba*
 - (3) Arthropoda - Diplopoda - *Scolopendra*
 - (4) Chordata - Cyclostomata - *Phrynosoma*
153. Statement I : All metatherians are placental mammals.
Statement II : All placental mammals have menstrual cycle.
- (1) Statement I is true and statement II is false
 - (2) Statement I is false and statement II is true
 - (3) Both the statements I and II are true
 - (4) Both the statements I and II are false
154. Match column I and II, and choose the correct combination the options given.
- | Column I | Column II |
|------------------------|-------------------|
| (P) Limbless amphibia | (i) Ichthyophis |
| (Q) Jawless vertebrate | (ii) Ichthyosaurs |
| (R) Tailless amphibia | (iii) Frog |
| (S) Limbless reptile | (iv) Lamprey |
| (T) Fish like reptile | (v) Snake |
- (1) P - i, Q - ii, R - iii, S - v, T - iv
 - (2) P - i, Q - iv, R - ii, S - v, T - iii
 - (3) P - ii, Q - iv, R - iii, S - i, T - v
 - (4) P - i, Q - iv, R - iii, S - v, T - ii
155. The process of exchange of O_2 from the atmosphere with CO_2 produced by the cells is called :
- (1) breathing
 - (2) metabolism
 - (3) respiration
 - (4) both 1 and 3
156. When diaphragm of man is completely dome shaped it shows :
- (1) end of expiration and beginning of inspiration
 - (2) beginning of expiration and end of inspiration
 - (3) increased rate of breathing
 - (4) decreased rate of breathing
157. Match the items in column A with suitable terms in column B :
- | Column A | Column B |
|-------------------------------|-----------------------------------|
| (i) Uniparental reproduction | (a) Sexual reproduction |
| (ii) Budding | (b) <i>Spongilla</i> |
| (iii) Gemmule | (c) <i>Plasmodium</i> |
| (iv) Syngamy | (d) Gametes |
| (v) Fusion of similar gametes | (e) Hydra |
| (vi) Biparental reproduction | (f) <i>Penicillium</i> |
| (vii) Haploid | (g) Asexual reproduction |
| (viii) Conidia | (h) Isogamy |
| (ix) Multiple fission | (i) Fusion of two haploid gametes |
- (1) i - g, ii - e, iii - b, iv - i, v - h, vi - a, vii - d, viii - f, ix - c
- (2) i - g, ii - c, iii - b, iv - i, v - a, vi - h, vii - a, viii - e, ix - d
- (3) i - g, ii - e, iii - b, iv - i, v - a, vi - d, vii - c, viii - h, ix - f
- (4) i - g, ii - e, iii - b, iv - f, v - c, vi - d, vii - (i), viii - a, ix - h
158. Which among the following is correct?
- (1) In longitudinal binary fission body divides first followed by flagellum
 - (2) Under unfavourable conditions, Amoeba produces gametes called pseudopodiospores
 - (3) Binary fission involve meiotic divisions
 - (4) In Paramecium, the meganucleus divides by amitosis during transverse binary fission
159. Largest bird is :
- (1) Emu
 - (2) Penguin
 - (3) Kiwi
 - (4) Ostrich
160. Which of the following has an explosive impact on the growth of population?
- (1) Increased health facilities
 - (2) Contraceptive devices
 - (3) Better living condition
 - (4) Both 1 and 3
161. Consider the statements given below regarding contraception and answer as directed thereafter :
- (a) Medical Termination of Pregnancy (MTP) during first trimester is generally safe
 - (b) Generally chances of conception are nil until mother breast-feeds the infant upto two years
 - (c) Intra-uterine devices like copper-T are effective contraceptives
 - (d) Contraceptive pills may be taken upto one week after coitus to prevent conception
- (1) a, c
 - (2) a, b
 - (3) b, c
 - (4) c, d
162. Match the following and select the correct option.
- | Column I | Column II |
|-----------------|---------------------------------|
| (a) Sponge | (p) IUCD |
| (b) LNG-20 | (q) Morning after pill |
| (c) Mala D | (r) Spermicide |
| (d) Unwanted 72 | (s) Combined contraceptive pill |
- (1) a - r, b - p, c - s, d - q
 - (2) a - s, b - q, c - r, d - p
 - (3) a - p, b - q, c - s, d - r
 - (4) a - q, b - p, c - r, d - s



- 163.** Stanley L. Miller performed the first successful experiment to assess the validity of the claim for origin of organic molecules in the primeval earth condition. The apparatus contained every arrangement except that it was devoid of :
- (1) ammonia (2) methane
(3) oxygen (4) energy source
- 164.** Which of the following is the correct sequence of events in the origin of life?
- I. Formation of protobionts
II. Synthesis of organic monomers
III. Synthesis of organic polymers
IV. Formation of DNA-based genetic systems
- (1) I, II, III, IV (2) I, III, II, IV
(3) II, III, I, IV (4) II, III, IV, I
- 165.** Which of the following statements is/are correct?
- (a) Big bang theory attempts to explain to us the origin of universe.
(b) In the solar system of the milky way galaxy, earth was supposed to have been formed about 6 billion years back
(c) Life appeared 500 million years after the formation of earth
(d) Early Greek thinkers thought units of life called spores were transferred to different planets including earth
- (1) (a) and (c) (2) (c) and (d)
(3) (a), (c) and (d) (4) (a), (b) and (c)
- 166.** Given below are four statements (P - S) each with one or two blanks.
- (P) Wings of butterfly and birds look alike and are the results of _(i)_ evolution.
(Q) Miller showed that CH_4 , H_2 , NH_3 and _(i)_ when exposed to electric discharges in a flask resulted in formation of _(ii)_
(R) Vermiform appendix is a _(i)_ organ and an _(ii)_ evidence of evolution
(S) According to Darwin, evolution took place due to _(i)_ and the _(ii)_ of the fittest.
- Select the option which correctly fills up the blanks in two statements.
- (1) (P) - (i) convergent;
(S) - (i) small variations, (ii) survival
(2) (P) - (i) convergent; (Q) - (i) oxygen, (ii) nucleosides
(3) (Q) - (i) water vapour, (ii) amino acids;
(R) - homologous, (ii) anatomical
(4) (R) - (i) vestigial, (ii) anatomical;
(S) - (i) mutations, (ii) multiplication
- 167.** Match the terms in column A with suitable terms in column B.
- | Column A | Column B |
|---|------------------------|
| i. Latimeria | a. Analogous organs |
| ii. Connecting link | b. Man and ape |
| iii. Functional auricular muscles in man | c. Missing link |
| iv. Leaves of Citrus and cladode of <i>Ruscus</i> | d. Biogeographic realm |
| v. Hind limbs of python | e. Alligators |
| vi. Seymouria | f. Peripatus |
| vii. Oriental | g. Palaeontology |
| viii. Molecular homology | h. Lung fish |
| ix. Discontinuous distribution | i. Vestigial organs |
| x. Fossils | j. Atavism |
- (1) i - f, ii - h, iii - j, iv - a, v - i, vi - c, vii - d, viii - b, ix - e, x - g
(2) i - h, ii - f, iii - j, iv - a, v - i, vi - c, vii - d, viii - b, ix - e, x - g
(3) i - f, ii - a, iii - j, iv - c, v - e, vi - b, vii - g, viii - d, ix - h, x - i
(4) i - i, ii - h, iii - j, iv - a, v - f, vi - b, vii - c, viii - g, ix - b, x - d
- 168.** The theory of spontaneous generation stated that :
- (1) life arose from living forms only
(2) life can arise from both living and non-living
(3) life can arise from non-living things only
(4) life arises spontaneously, neither from living nor from the non-living
- 169.** Palaeontological evidences for evolution refer to the
- (1) development of embryo
(2) homologous organs
(3) fossils
(4) analogous organs
- 170.** Appearance of antibiotic-resistant bacteria is an example of :
- (1) Adaptive radiation
(2) Transduction
(3) Pre-existing variation in the population
(4) Divergent evolution
- 171.** The pioneers in the field of 'Organic evolution' are :
- (1) Darwin, Hugo de Vries, Lamarck, Huxley
(2) Karl Landsteiner, Hugo de Vries, Malthus, Darwin
(3) Lamarck, Karl Landsteiner, Malthus, De Vries
(4) Darwin, Lamarck, Karl Landsteiner, De Vries

172. The tendency of population to remain in genetic equilibrium may be disturbed by :
- (1) lack of migration
 - (2) lack of mutations
 - (3) lack of random mating
 - (4) random mating
173. Industrial melanism as observed in peppered moth proves that :
- (1) The melanic form of the moth has no selective advantage over lighter form in industrial area
 - (2) The lighter-form moth has no selective advantage either in polluted industrial area or non-polluted area
 - (3) Melanism is a pollution-generated feature
 - (4) The true black melanic forms arise by a recurring random mutation
174. Artificial selection to obtain cows yielding higher milk output represents :
- (1) stabilizing selection as it stabilizes this character in the population
 - (2) directional as it pushes the mean of the character in one direction
 - (3) disruptive as it splits the population into two, one yielding higher output and the other lower output
 - (4) stabilizing followed by disruptive as it stabilizes the population to produce higher yielding cows
175. Following is the diagrammatic representation of the operation of natural selection of different traits. Which of the following options correctly identifies all the three graphs P, Q and R?



- | | | |
|-----------------|-------------|-------------|
| (1) Directional | Stabilizing | Disruptive |
| (2) Stabilizing | Disruptive | Disruptive |
| (3) Disruptive | Stabilizing | Disruptive |
| (4) Disruptive | Disruptive | Stabilizing |

176. When the functioning of one or more organs or systems of body is adversely affected characterised by different signs and symptoms, termed :
- (1) disease
 - (2) allergy
 - (3) toxicity
 - (4) immunity
177. Match the type of immunity listed in Column I with the examples listed in Column II. Choose the answer that gives the correct combination of alphabets of the two columns.
- | Column I
(Type of Immunity) | Column II
(Example) |
|--------------------------------|--|
| (a) Natural active | (p) Immunity developed by heredity |
| (b) Artificial passive | (q) From mother to foetus through placenta |
| (c) Artificial active | (r) Injection of antiserum to travellers |
| (d) Natural passive | (s) Fighting infections naturally |
| | (t) Induced by vaccination |
- (1) a = s, b = t, c = q, d = r
 - (2) a = t, b = s, c = r, d = q
 - (3) a = p, b = q, c = r, d = t
 - (4) a = s, b = r, c = t, d = q

178. "Brown sugar" is the commonly used name for :
- (1) LSD
 - (2) Hashish
 - (3) Heroin
 - (4) Barbiturates
179. Which of the following has been recently used for increasing productivity of super milk cows?
- (1) Artificial insemination by a pedigree bull only
 - (2) Superovulation of a high production cow only
 - (3) Embryo transplantaion only
 - (4) A combination of superovulation, artificial insemination and embryo transplantaion into a carrier cow (surrogate mother)
180. Reduced fertility and productivity in animals due to continued inbreeding can be overcome by
- (1) mating superior males of one breed with superior females of other breed
 - (2) mating animals within same breed but having no common ancestors for upto 4-6 generations
 - (3) mating between animals of some breed for 4-6 generations
 - (4) mating between male and female animals of two different species