



## CLASSROOM CONTACT PROGRAMME

(Academic Session : 2023-2024)

NEET (UG)

MAJOR (AIOT)

21-04-2024

## PRE-MEDICAL : ENTHUSIAST, LEADER &amp; ACHIEVER COURSE PHASE - ALL PHASE

Test Booklet Code

This Booklet contains 28 pages.

P1

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

**Important Instructions :**

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and the Test Booklet contains **200** multiple-choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** questions in each subject are divided into **two Sections (A and B)** as per details given below :
  - (a) **Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos - 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.
  - (b) **Section B** shall consist of **15 (Fifteen)** questions in each subject (Question Nos - 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In Section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject.

**Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated.**
3. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. **The maximum marks are 720**.
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
6. On completion of the test, the candidate **must hand over the Answer Sheet (ORIGINAL and OFFICE Copy) to the Invigilator** before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
8. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
9. Each candidate must show on-demand his/her Allen ID Card to the Invigilator.
10. No candidate, without special permission of the Invigilator, would leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet **twice**. **Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
12. Use of Electronic/Manual Calculator is prohibited.
13. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
14. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
15. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
16. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.

Name of the Candidate (in Capitals) : \_\_\_\_\_

Form Number : in figures \_\_\_\_\_

: in words \_\_\_\_\_

Centre of Examination (in Capitals) : \_\_\_\_\_

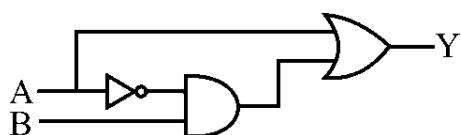
Candidate's Signature : \_\_\_\_\_ Invigilator's Signature : \_\_\_\_\_

**Your Target is to secure Good Rank in Pre-Medical 2024**

## SECTION - A ( PHYSICS )

1. For a diamagnetic material :-
  - (1)  $\mu_r < 1, \chi < 0$
  - (2)  $\mu_r > 1, \chi < 1$
  - (3)  $\mu_r > 1, \chi > 1$
  - (4)  $\mu_r < 1, \chi > 0$
2. Plane wavefront is incident on a single slit of width 0.2 mm by which Fraunhoffer diffraction pattern is formed by lens of focal length 1 m. If the second minima is formed at a distance of 3 mm from the centre then find the wavelength of light.
  - (1) 1500 Å
  - (2) 3000 Å
  - (3) 4500 Å
  - (4) 6000 Å
3. In electromagnetic wave -
  - (1) Constant  $\vec{E}$  &  $\vec{B}$  are there
  - (2) Oscillating  $\vec{E}$  produces constant  $\vec{B}$
  - (3) Oscillating  $\vec{B}$  produces constant  $\vec{E}$
  - (4) Oscillating  $\vec{E}$  &  $\vec{B}$  regenerate each other
4. A refrigerator absorbs 2000 cal of heat from ice trays. If the coefficient of performance is 4, then the work done by the motor is :-
  - (1) 2100 J
  - (2) 4200 J
  - (3) 8400 J
  - (4) 500 J
5. The fundamental frequency of a closed organ pipe is equal to the first overtone frequency of an open organ pipe. If the length of the open pipe is 60 cm. What is the length of the closed pipe ?
  - (1) 15 cm
  - (2) 30 cm
  - (3) 60 cm
  - (4) 7.5 cm
6. What is the current through an ideal PN-junction diode shown in figure below :-
  - (1) zero
  - (2) 10 mA
  - (3) 20 mA
  - (4) 50 mA

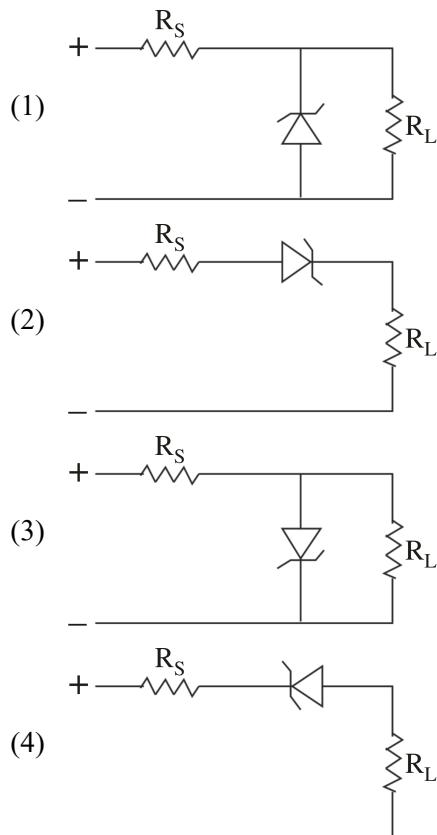
7. Two spherical bodies A (radius 6 cm) and B (radius 18 cm) are at temperature  $T_1$  and  $T_2$ , respectively. The maximum intensity in the emission spectrum of A is at 500 nm and in that of B is at 1500 nm. Considering them to be black bodies, what will be the ratio of the rate of total energy radiated by A to that of B ?
  - (1) 1
  - (2) 3
  - (3) 6
  - (4) 9
8. A pendulum clock is 5 sec fast at temperature of 15°C and 10 seconds slow at a temperature of 30°C . At what temperature does it give the correct time ?
  - (1) 18°C
  - (2) 20°C
  - (3) 22°C
  - (4) 25°C
9. A photon and an electron have equal energy E.  $\lambda_{\text{photon}}/\lambda_{\text{electron}}$  is proportional to -
  - (1)  $\sqrt{E}$
  - (2)  $1/\sqrt{E}$
  - (3)  $1/E$
  - (4) Does not depend upon E
10. For a prism, angle of minimum deviation is 30° and prism angle is 60°. The refractive index of prism material is :-
  - (1)  $\sqrt{7}$
  - (2)  $\sqrt{5}$
  - (3)  $\sqrt{2}$
  - (4)  $\sqrt{3}$
11. Figure shows the cross-sectional view of the hollow cylindrical conductor with inner radius 'R' and outer radius '2R'. Cylinder is carrying uniformly distributed current i along its axis. The magnetic induction at point 'P' at a distance  $\frac{3R}{2}$  from the axis of the cylinder will be :-
  - (1) Zero
  - (2)  $\frac{5\mu_0 i}{72\pi R}$
  - (3)  $\frac{7\mu_0 i}{18\pi R}$
  - (4)  $\frac{5\mu_0 i}{36\pi R}$

- 3
12. When a metal surface is illuminated with monochromatic light of wavelength  $\lambda$ , the stopping potential is  $5V_0$ . When the same metal surface is illuminated with light of wavelength  $4\lambda$ , the stopping potential is  $V_0$ . The threshold wavelength for this surface is
- (1)  $6\lambda$       (2)  $1.33\lambda$   
 (3)  $16\lambda$       (4)  $8\lambda$
13. If heat is supplied to an ideal gas in an isothermal process.
- (1) the internal energy of the gas will increase  
 (2) the gas will do positive work  
 (3) the gas will do negative work  
 (4) the said process is not possible
14. A astronomical telescope has objective and eye piece of focal length 20 cm and 2cm respectively to view an object 100 cm away from the objective, the lenses must be separated by a distance :-
- (1) 22 cm      (2) 25 cm  
 (3) 26 cm      (4) 27 cm
15. In the following circuit, the output Y for all possible inputs A and B is expressed by the truth table :-
- 
- |     |   |   |   |
|-----|---|---|---|
| (1) | A | B | Y |
| 0   | 0 | 0 | 0 |
| 0   | 1 | 0 | 1 |
| 1   | 0 | 0 | 1 |
| 1   | 1 | 1 | 0 |
- |     |   |   |   |
|-----|---|---|---|
| (2) | A | B | Y |
| 0   | 0 | 1 | 1 |
| 0   | 1 | 1 | 1 |
| 1   | 0 | 1 | 1 |
| 1   | 1 | 0 | 0 |
- |     |   |   |   |
|-----|---|---|---|
| (3) | A | B | Y |
| 0   | 0 | 1 | 0 |
| 0   | 1 | 0 | 1 |
| 1   | 0 | 0 | 1 |
| 1   | 1 | 0 | 1 |
- |     |   |   |   |
|-----|---|---|---|
| (4) | A | B | Y |
| 0   | 0 | 0 | 0 |
| 0   | 1 | 1 | 1 |
| 1   | 0 | 1 | 1 |
| 1   | 1 | 1 | 1 |
16. A bullet of mass 10 g moving with a speed of 20 m/s hits an ice block of mass 990 g kept fixed on a floor and gets stuck in it. How much ice will melt, if 50 % of the lost KE goes to ice ? (initial temperature of the ice block and bullet = 0°C)
- (1) 0.001 g      (2) 0.002 g  
 (3) 0.003 g      (4) 0.004 g
17. When the electron jumps from a level n=4 to n=1, the momentum of the recoiled hydrogen atom will be :-  
 $(R = 1.09 \times 10^7 \text{ m}^{-1})$
- (1)  $6.8 \times 10^{-27} \text{ kg-ms}^{-1}$   
 (2)  $12.75 \times 10^{-19} \text{ kg-ms}^{-1}$   
 (3)  $13.6 \times 10^{-19} \text{ kg-ms}^{-1}$   
 (4) zero
18. The average emf induced in a coil in which the current changes from 2 ampere to 4 ampere in 0.05 second is 8 volt. What is the self inductance of the coil :-
- (1) 0.1 H      (2) 0.2 H  
 (3) 0.4 H      (4) 0.8 H
19. For a series R-L-C circuit :-
- (a) Voltage across L and C are differ by  $\pi$  phase  
 (b) Current through L and R are in same phase  
 (c) Voltage across R and L differ by  $\pi/2$  phase  
 (d) Voltage across L and current through C are differ by  $\pi/2$  phase
- (1) a, b, c      (2) b, c, d  
 (3) c, d, a      (4) All
20. The ratio of the velocity of sound in hydrogen ( $\gamma = 7/5$ ) to that in helium ( $\gamma = 5/3$ ) at the same temperature is.
- (1)  $\sqrt{\frac{5}{42}}$       (2)  $\sqrt{\frac{5}{21}}$   
 (3)  $\frac{\sqrt{42}}{5}$       (4)  $\frac{\sqrt{21}}{5}$

21. Two large conducting plates are placed parallel to each other with a separation of  $d$  between them. An electron starting from rest near one of the plates reaches the other plate in time  $t$ . If  $e$  is the charge on the electron and  $m$  is its mass, then the surface charge density on the inner surface is :-

- (1)  $\frac{dme}{4\pi\epsilon_0 t^2}$
- (2)  $\frac{dm\epsilon_0}{4\pi et^2}$
- (3)  $\frac{2dm\epsilon_0}{et^2}$
- (4) none of these

22. A zener diode is to be used as a voltage regulator. Identify the correct set up –



23. **Assertion :-** The brightness of light bulb in a room decreases when heavy current appliance is switched on.

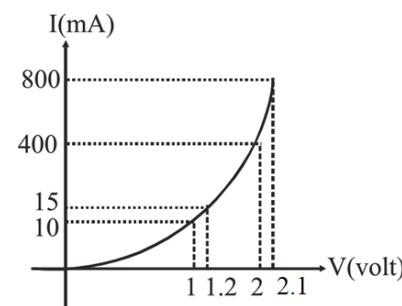
**Reason :-** There will be no change in brightness of bulb if source is ideal and for non ideal source voltage drop across bulb decreases.

- (1) Both assertion & reason are true & the reason is a correct explanation of the assertion.
- (2) Both assertion & reason are true but reason is not a correct explanation of the assertion.
- (3) Assertion is true but the reason is false.
- (4) Both assertion & reason are false.

24. The distance between an object and the screen is 80 cm. A lens produces an image on the screen when the lens is placed at either of the positions 20 cm apart. Focal length of the lens is :-

- (1) 18.75 cm
- (2) 20.5 cm
- (3) 10.5 cm
- (4) 24.5 cm

25. The I-V characteristic of a p-n junction diode is shown in figure. Find the approximate dynamic resistance of the p-n junction when a forward bias of 1 volt is applied -

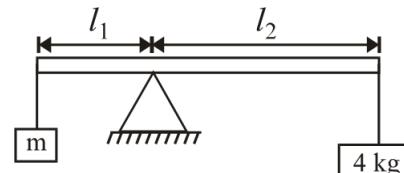
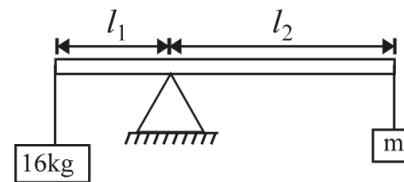


- (1)  $20 \Omega$
- (2)  $40 \Omega$
- (3)  $11 \Omega$
- (4)  $15.5 \Omega$

26. The intensity of gravitational field at a point situated at a distance 8000 km from the centre of Earth is 6.0 N/kg. The gravitational potential at that point in Nm/kg will be :-

- (1) 6
- (2)  $4.8 \times 10^7$
- (3)  $8 \times 10^5$
- (4)  $4.8 \times 10^2$

27. In an experiment with a beam balance an unknown mass  $m$  is balanced by two known masses of 16 kg and 4 kg as shown in figure.



Find the value of the unknown mass  $m$  in kg.

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

28. A solid sphere, a hollow sphere and a disc, all having same mass and radius are placed at the top of an smooth incline and released. Least time will be taken in reaching the bottom by :-

- (1) the solid sphere
- (2) the hollow sphere
- (3) the disc
- (4) all will take same time

29. A particle moves along a circle of radius  $(\frac{20}{\pi})$  m with constant tangential acceleration. If the velocity of the particle is 80 m/s at the end of the second revolution after motion has begun, the tangential acceleration is :-

- (1)  $40 \text{ m/s}^2$
- (2)  $640 \pi \text{ m/s}^2$
- (3)  $160 \pi \text{ m/s}^2$
- (4)  $40 \pi \text{ m/s}^2$

30. The position vector of a particle is,

$$\vec{r} = (a \cos \omega t) \hat{i} + (a \sin \omega t) \hat{j}$$

The velocity of the particle is:

- (1) parallel to position vector
- (2) perpendicular to position vector
- (3) directed towards the origin
- (4) directed away from the origin

31. A particle is performing vertical circular motion with the help of a string of length '  $\ell$  '. What should be the minimum speed at lowest position so that it can complete vertical circular motion :-

- (1)  $2\sqrt{5g\ell}$
- (2)  $\sqrt{10g\ell}$
- (3)  $\sqrt{5g\ell}$
- (4) None

32. The escape velocity is 11 km/s at the surface of the earth. If the planet have radius twice of the earth and equal density as earth then the escape velocity at the surface of the planet is :-

- (1) 11 km/s
- (2) 22 km/s
- (3) 5.5 km/s
- (4) 2.25 km/s

33. If magnitude of vector addition of two unit vectors is 2 units then magnitude of their vector difference is :

- |                |       |
|----------------|-------|
| (1) $\sqrt{3}$ | (2) 1 |
| (3) 0          | (4) 2 |

34. A particle is moving with velocity  $v=(4t^3+3t^2-1)\text{m/s}$ . The displacement of particle in time  $t=1$  sec to  $t=2$  sec will be :-

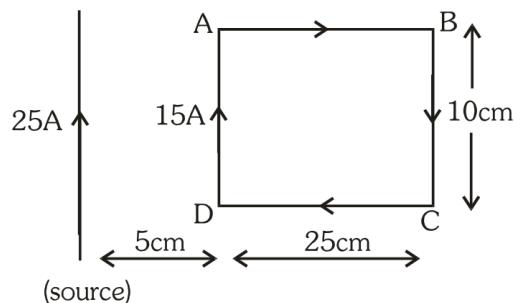
- |          |          |
|----------|----------|
| (1) 21 m | (2) 17 m |
| (3) 13 m | (4) 9 m  |

35. A student measured the diameter of a small steel ball using a screw gauge of least count 0.001 cm. The main scale reading is 5 mm and 25 divisions of circular scale coincide with the reference level. If screw gauge has a zero error of  $-0.004$  cm, the correct diameter of the ball is :-

- (1) 0.521 cm
- (2) 0.525 cm
- (3) 0.053 cm
- (4) 0.529 cm

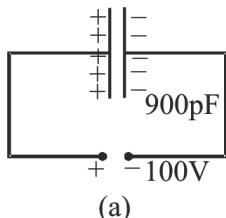
## SECTION - B ( PHYSICS )

36. A rectangular loop ABCD is placed near to an infinite length current carrying wire. Magnetic force on the loop is :-

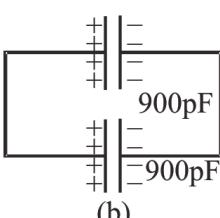


- (1)  $1.25 \times 10^{-4}$  N, Attraction
- (2)  $1.25 \times 10^{-4}$  N, Repulsion
- (3)  $12.5 \times 10^{-4}$  N, Repulsion
- (4)  $12.5 \times 10^{-4}$  N, Attraction

37. The energy stored in the capacitor as shown in the figure (a) is  $4.5 \times 10^{-6}$  J. If the battery is replaced by another capacitor of 900 pF as shown in figure (b), then the total energy of system is :-



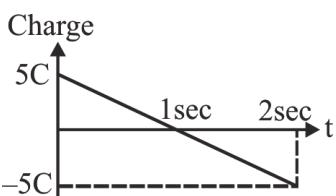
- (a)
- (1)  $4.5 \times 10^{-6}$  J      (2)  $2.25 \times 10^{-6}$  J  
 (3) Zero      (4)  $9 \times 10^{-6}$  J

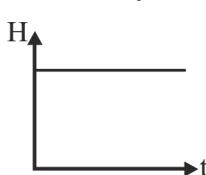
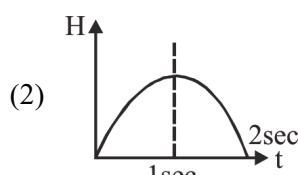
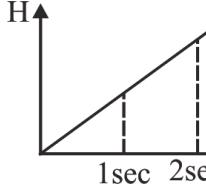
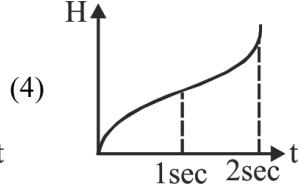


38. A uniform rope of length L and mass 5 kg hangs vertically from a rigid support. A block of mass 4 kg is attached to the free end of the rope. A transverse pulse of wavelength  $\lambda_1$  is produced at the lower end of the rope. The wave length of the pulse, when it reaches the top of the rope, is  $\lambda_2$ . The ratio of  $\lambda_2/\lambda_1$  is :-

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

39. A charge passing through a resistor is varying with time as shown in the figure. The amount of heat generated in time 't' is best represented (as a function of time) by:



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

40. In Young's double slit experiment the two slits are d distance apart. Interference pattern is observed on a screen at a distance D >> d from the slits. A dark fringe is observed on the screen directly opposite to one of the slits. The wavelength of light is :-

- (1)  $\frac{D^2}{2d}$       (2)  $\frac{d^2}{2D}$   
 (3)  $\frac{D^2}{d}$       (4)  $\frac{d^2}{D}$

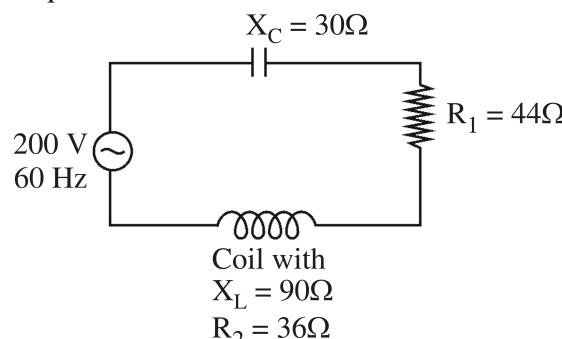
41. An  $\alpha$ -particle of 10 MeV collides head-on with a copper nucleus ( $Z = 29$ ) and is deflected back. Then, the minimum distance of approach between the centres of the two is :-

- (1)  $8.4 \times 10^{-15}$  cm      (2)  $8.4 \times 10^{-15}$  m  
 (3)  $4.2 \times 10^{-15}$  m      (4)  $4.2 \times 10^{-15}$  cm

42. The molecules of a given mass of a gas have r.m.s. velocity of 200 m/s at 127°C and  $1.0 \times 10^5$  N/m<sup>2</sup> pressure. When the temperature and pressure of the gas are respectively, 227°C and  $0.05 \times 10^5$  N/m<sup>2</sup>, the r.m.s. velocity of its molecules is :

- (1)  $100\sqrt{2}$  ms<sup>-1</sup>      (2)  $\frac{400}{\sqrt{3}}$  ms<sup>-1</sup>  
 (3)  $\frac{100\sqrt{2}}{3}$  ms<sup>-1</sup>      (4)  $100\sqrt{5}$  ms<sup>-1</sup>

43. As given in the figure, a series circuit connected across a 200 V, 60 Hz line consists of a capacitor of capacitive reactance  $30 \Omega$ , a non-inductive resistor of  $44 \Omega$ , and a coil of inductive reactance  $90\Omega$  and resistance  $36\Omega$ . The power dissipated in the coil is



- (1) 320 W      (2) 176 W  
 (3) 144 W      (4) 0 W

- 44.** For real object match the corresponding entries of column-1 with column-2 (where  $m$  is the magnification produced by the mirror) :-

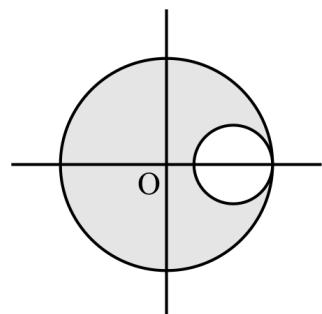
	<b>Column-1</b>		<b>Column-2</b>
(A)	$m = -4$	a	Convex mirror
(B)	$m = -1/4$	b	Concave Mirror
(C)	$m = +3$	c	Real image
(D)	$m = +1/3$	d	Virtual image

- (1) A-a and c, B-a and d, C-a and b, D-c and d
  - (2) A-a and d, B-b and c, C-b and d, D-b and d
  - (3) A-c and d, B-b and d, C-b and c, D-a and d
  - (4) A-b and c, B-b and c, C-b and d, D-a and d

45. A copper calorimeter of mass 1.5 kg has 200 g of water at 25°C. 510 g of water at 50°C is poured into it such that the equilibrium temperature become 40°C. If specific heat capacity of copper is 390 J/Kg °C then find specific heat capacity of water in kJ/kg °C :

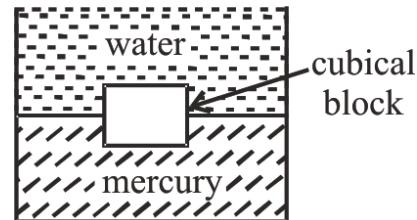


46. From a uniform circular disc of radius  $R$  and mass  $9M$ , a small disc of radius  $\frac{R}{3}$  is removed as shown. The moment of inertia of the remaining disc about an axis perpendicular to the plane of the disc and passing through O is :



- (1)  $4MR^2$       (2)  $\frac{40}{9}MR^2$   
 (3)  $40 MR^2$       (4)  $\frac{38}{9} MR^2$

47. A tank contains water on top of mercury as shown in fig. A cubical block of side 10cm is in equilibrium inside the tank. The depth of the block inside mercury is (Relative density of the material of block = 8.56, Relative density of mercury = 13.6) :-





- 48.** A body of mass 1 kg begins to move under the action of a time dependent force  $\vec{F} = (2\hat{i} + 3t^2\hat{j} + 4t^3\hat{k})N$  where  $\hat{i}, \hat{j}, \hat{k}$  are unit vectors along x, y and z axis. What power will be developed by the force at the time 't' :-

- (1)  $(2t^2 + 3t^3) W$
  - (2)  $(2t^3 + 3t^5 + 4t^7) W$
  - (3)  $(2t^2 + t^3 + t^4) W$
  - (4)  $(2t+1) W$

- 49.** A circular road of radius 1000 m has banking angle  $45^\circ$ . The maximum safe speed of a car having a mass 2000 kg will be, if the coefficient of friction between tyre and road is 0.5 :-

- (1) 172 m/s                          (2) 124 m/s  
(3) 99 m/s                            (4) 86 m/s

50. An air bubble of radius 1 cm rises from the bottom of a liquid of density  $1.5 \text{ g/cm}^3$  at a constant speed of  $0.25 \text{ cm/s}$ . If the density of air is neglected, the coefficient of viscosity of liquid is approximately (in Pa-s)

## SECTION-A ( CHEMISTRY )

51. Which of the following is correct regarding 15<sup>th</sup> group elements?

- (1) In case of nitrogen all oxidation states from +1 to +4 tend to disproportionate in acidic solution.
- (2) In case of phosphorous nearly all intermediate oxidation states disproportionate in to +5 and -3 both in alkali and acid.
- (3) The tendency to exhibit -3 oxidation state decreases down the group.
- (4) All of these

52. In which of the following reaction 'Mn' doesn't change it's oxidation state ?

- (1)  $\text{KMnO}_4 + \text{HCl} \rightarrow$
- (2)  $\text{KMnO}_4 + \text{H}_2\text{S} \xrightarrow{\text{H}^+}$
- (3)  $\text{KMnO}_4 + \text{Conc. H}_2\text{SO}_4 \rightarrow$
- (4)  $\text{KMnO}_4 + \text{FeSO}_4 \xrightarrow{\text{H}^+}$

53. **Statement-I:** Generally hydroxide of Lanthanoid is basic in nature.

**Statement-II:** The common oxidation state of Lanthanoid is +3.

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

54. Choose correct match.

	<b>Complex compound</b>		<b>No. of isomers</b>
(A)	$\text{Pt}(\text{NH}_3)(\text{Br})(\text{I})(\text{H}_2\text{O})$	(P)	6
(B)	$[\text{Co}(\text{en})_2(\text{NH}_3)_2]^{+3}$	(Q)	2
(C)	$[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$	(R)	3
(D)	$[\text{Pt}(\text{SCN})_2(\text{NH}_3)_2]$	(S)	4

- (1) A→R, B→R, C→Q, D→P
- (2) A→R, B→S, C→P, D→Q
- (3) A→R, B→R, C→Q, D→S
- (4) A→Q, B→R, C→S, D→P

55. **Assertion:** In permanganate titration dil.  $\text{H}_2\text{SO}_4$  is used in place of dil HCl.

**Reason :**  $\text{KMnO}_4$  oxidise HCl into  $\text{Cl}_2$ .

- (1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
- (2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
- (3) Assertion is True but the Reason is False.
- (4) Both Assertion & Reason are False.

	<b>List-I (Molecule)</b>		<b>List-II (Characteristic odour)</b>
(A)	$\text{CO}_2$	(P)	Rotten egg smell
(B)	$\text{I}_2$	(Q)	Violet Fumes
(C)	$\text{H}_2\text{S}$	(R)	Reddish brown vapours
(D)	$\text{Br}_2$	(S)	Odour less

- (1) A→S, B→Q, C→P, D→R
- (2) A→S, B→P, C→Q, D→R
- (3) A→S, B→R, C→Q, D→P
- (4) A→P, B→Q, C→R, D→S

57. Reddish-Brown (chocolate) ppt are formed with -

- (1)  $\text{Cu}^{+2}$  and  $[\text{Fe}(\text{CN})_6]^{4-}$
- (2)  $\text{Ba}^{+2}$  and  $\text{SO}_4^{-2}$
- (3)  $\text{Pb}^{+2}$  and  $\text{I}^-$
- (4)  $\text{Cu}^{+2}$  and  $\text{KCN}$

58. Which of the following order of energies of molecular orbitals of  $\text{N}_2$  is correct?

- (1)  $(\pi 2p_y) < (\sigma 2p_z) < (\pi^* 2p_x) \simeq (\pi^* 2p_y)$
- (2)  $(\pi 2p_y) > (\sigma 2p_z) > (\pi^* 2p_x) \simeq (\pi^* 2p_y)$
- (3)  $(\pi 2p_y) < (\sigma 2p_z) > (\pi^* 2p_x) \simeq (\pi^* 2p_y)$
- (4)  $(\pi 2p_y) > (\sigma 2p_z) < (\pi^* 2p_x) \simeq (\pi^* 2p_y)$

59. Which of the following is correct statement?

- (1)  $\text{Al}^+$  is more stable than  $\text{In}^+$
- (2)  $\text{Ga}^+$  is more stable than  $\text{Al}^+$
- (3)  $\text{Al}^+$  is more stable than  $\text{Ga}^+$
- (4)  $\text{Ga}^+$  is more stable than  $\text{In}^+$

60. Which of the following molecule have diagonal hybridization?

- (1)  $\text{C}_2\text{H}_2$
- (2)  $\text{BeCl}_2$
- (3)  $\text{SnCl}_2$
- (4) Both 1 and 2

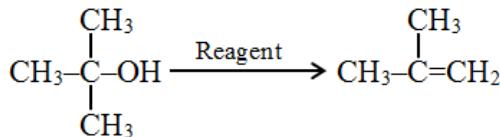
61. Which of the following statements is/are correct?

- (1) Non-metal and metalloids exist only in the p-block of the periodic table.
- (2) The Non-metallic character of elements decreases down the group.
- (3) The heaviest element in each p-block group is the most metallic in nature.
- (4) All of these

62. Which of the following is not a pair of reducing sugar :

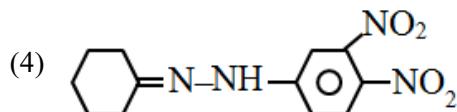
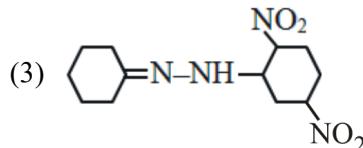
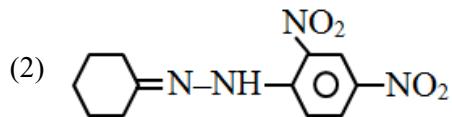
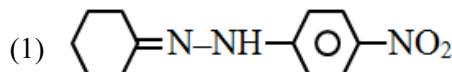
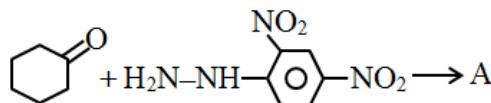
- (1) D-glucose and D-fructose
- (2) Lactose and Sucrose
- (3) Lactose and maltose
- (4)  $\alpha$ -D-glucose and  $\beta$ -D-glucose

63. Which reagent can't be used in this process?

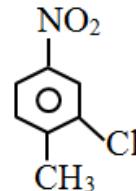


- (1) conc.  $\text{H}_2\text{SO}_4 / 443 \text{ K}$
- (2) 20%  $\text{H}_3\text{PO}_4 / 358 \text{ K}$
- (3) Cu/573 K
- (4) alc. KOH/ $\Delta$

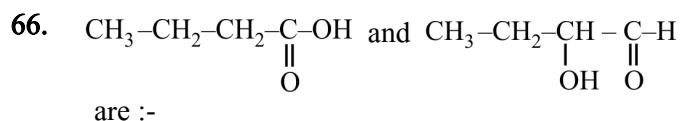
64. Identify product (A) in given reaction :-



65. The IUPAC name of given compound is :-



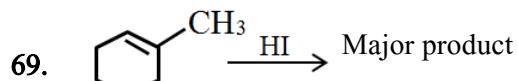
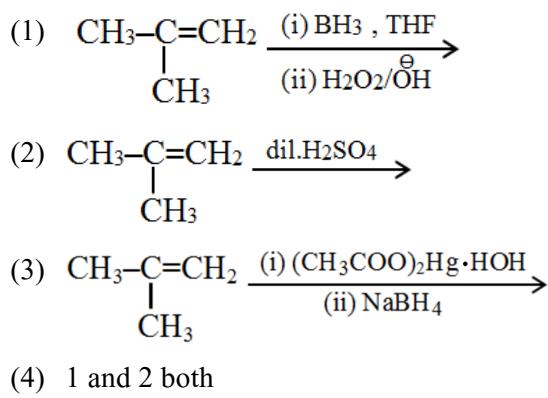
- (1) 2-chloro-1-methyl-4-nitro benzene
- (2) 4-methyl-5-chloro nitro benzene
- (3) 1-chloro-2-methyl-5-nitro benzene
- (4) 1-chloro-6-methyl-3-nitro benzene



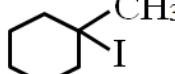
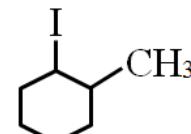
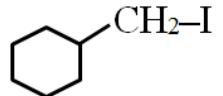
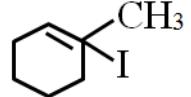
- Positional Isomer
- Chain Isomer
- Functional group isomer
- Metamer

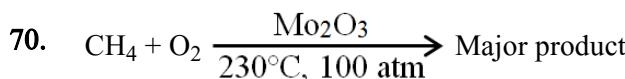
67. Which of the following intermediate has complete octet ?
- Carbocation
  - Carbanion
  - Carbon free radical
  - Carbene

68. In which of the following reaction Primary alcohol can be formed as major product -

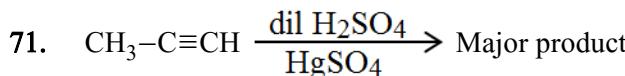


Major product is -

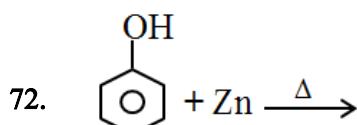
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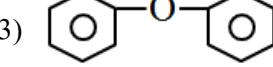
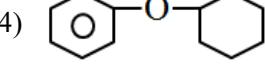


- $\text{CH}_3\text{---OH}$
- $\text{HCHO}$
- $\text{HCOOH}$
- $\text{CO}$



- $\text{CH}_3\text{---C}(\text{O})\text{---CH}_3$
- $\text{CH}_3\text{---CH}(\text{OH})=\text{CH}_2$
- $\text{CH}_3\text{---C}(\text{OH})=\text{CH}_2$
- $\text{CH}_3\text{---CH}_2\text{---C}(\text{O})\text{---H}$



- 
- 
- 
- 

73. In sulphur estimation 0.157 gm of an organic compound gave 0.4813 gm of barium sulphate. What is the percentage of sulphur in the compound ?

- 42.10 %
- 4.210 %
- 0.421 %
- 32 %

74. Match the Column-I with Column-II.

	<b>Column-I (Example of solution)</b>		<b>Column-II (Type of solution)</b>
(A)	Solution of camphor in N <sub>2</sub> gas	(P)	Gaseous solution
(B)	Oxygen dissolved in water	(Q)	Liquid solution
(C)	Solution of hydrogen in palladium	(R)	Solid solution
(D)	Solution of starch in water	(S)	Lyophilic sol

Correct match is :-

- (1) A→R, B→S, C→P, D→Q
  - (2) A→P, B→Q, C→S, D→R
  - (3) A→P, B→Q, C→R, D→S
  - (4) A→R, B→P, C→S, D→Q
75. The cell potential is called EMF of the cell when :
- (1) Platinum electrodes are used in the cell.
  - (2) One ampere current is drawn through the cell.
  - (3) No current is drawn through the cell.
  - (4) Concentration of ions is 1M, pressure is 1 bar and temperature is 298 K.
76. Boiling point of water at 747 mm Hg is 99.48°C. How much KCl is to be added to 500 g of water such that it boils at 100°C? K<sub>b</sub> for water is 0.52 K kg mol<sup>-1</sup>.
- (1) 74.5 g
  - (2) 37.25 g
  - (3) 18.625 g
  - (4) 14.625 g

77. The electrical resistance of a column of 0.05 mol L<sup>-1</sup> HCl solution of diameter 2 cm and length 0.50 m is 100 ohm. The molar conductivity of this solution is :-

- (1) 31.8 S cm<sup>2</sup> mol<sup>-1</sup>
- (2) 3.18 S m<sup>2</sup> mol<sup>-1</sup>
- (3) 0.318 S m<sup>2</sup> mol<sup>-1</sup>
- (4) 0.318 S cm<sup>2</sup> mol<sup>-1</sup>

78. Which of the following indicator is a weak base and is yellow in colour in the unionised form?

- (1) Phenolphthalein
- (2) KMnO<sub>4</sub>
- (3) Phenol red
- (4) Methyl orange

79. Which of the following expressions about Bohr's atomic model is/are correct?

- (1)  $E_n = -2.18 \times 10^{-18} \times \frac{Z^2}{n^2}$  J/atom
- (2)  $\Delta E = 2.18 \times 10^{-18} \times Z^2 \left( \frac{1}{n_i^2} - \frac{1}{n_f^2} \right)$  J
- (3)  $r_n = 52.9 \times \frac{n^2}{Z}$  pm
- (4) All of the above

80. Match the column-I and column-II.

	<b>Column-I (Species)</b>		<b>Column-II (Conjugate base)</b>
(a)	HCO <sub>3</sub> <sup>-</sup>	(p)	OH <sup>-</sup>
(b)	H <sub>2</sub> O	(q)	SO <sub>4</sub> <sup>2-</sup>
(c)	NH <sub>3</sub>	(r)	CO <sub>3</sub> <sup>2-</sup>
(d)	HSO <sub>4</sub> <sup>-</sup>	(s)	NH <sub>2</sub> <sup>-</sup>

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



88. In which of the following options order of arrangement does not agree with the variation of property indicated against it?

- (A)  $\text{Al}^{+3} < \text{Mg}^{+2} < \text{Na}^+ < \text{F}^-$  (Increasing ionic size)  
 (B)  $\text{Be} < \text{C} < \text{N} < \text{F}$  (Increasing first ionisation enthalpy)  
 (C)  $\text{Te} < \text{Se} < \text{O} < \text{S}$  (Increasing electron gain enthalpy)  
 (D)  $\text{Be} < \text{Mg} < \text{Ca} < \text{Sr}$  (Increasing metallic radius)

Choose correct option.

- (1) Only B and D      (2) Only C  
 (3) Only B and C      (4) Only A, B and C

89. Match the species given in column-I with examples given in column-II.

	<b>Column-I</b>	<b>Column-II</b>
(i)	Hydrogen bond	(a) SiC
(ii)	Resonance	(b) LiF
(iii)	Ionic solid	(c) $\text{H}_2$
(iv)	Covalent solid	(d) HF
		(e) $\text{O}_3$

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

90. Choose correct match.

(1)	$\text{SeO}_2$	Amphoteric
(2)	$\text{SnO}_2$	Acidic
(3)	SnO	Amphoteric
(4)	GeO	Basic

91. Benzene diazonium chloride gives various types of reaction. Which of the following reaction is an electrophilic substitution?

- (1)  $\text{ArN}_2\text{Cl} \xrightarrow{\text{Cu}_2\text{Cl}_2/\text{HCl}}$   
 (2)  $\text{ArN}_2\text{Cl} \xrightarrow[\text{(ii)} \Delta]{\text{(i)} \text{NaBF}_4}$   
 (3)  $\text{ArN}_2\text{Cl} \xrightarrow{\text{C}_2\text{H}_5\text{OH}}$   
 (4)  $\text{ArN}_2\text{Cl} \xrightarrow[\text{OH}^-]{\text{PhOH}}$

92. Match the following column.

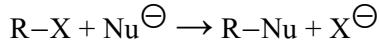
	<b>Column-I (Pair of compound)</b>		<b>Column-II (Differentiate method)</b>
(A)	Acetone and acetaldehyde	(P)	$\text{Br}_2 + \text{H}_2\text{O}$ (Bromine water)
(B)	Ethanol and methanol	(Q)	dil. alkaline $\text{KMnO}_4$ (Bayer's reagent)
(C)	Phenol and cyclohexanol	(R)	$\text{NH}_4\text{Cl} + \text{AgNO}_3$ (Tollen's reagent)
(D)	n-Pentane and 2-pentene	(S)	NaOI (Iodoform test)

- (1) A→S, B→R, C→P, D→Q  
 (2) A→R, B→S, C→P, D→Q  
 (3) A→R, B→S, C→Q, D→P  
 (4) A→R, B→P, C→S, D→Q

93. Find the incorrect statement for physical properties of alkyl halide :-

- (1) Bromoderivatives of hydrocarbon are heavier than water.  
 (2) Boiling point of ter. butyl bromide greater than n-butyl bromide.  
 (3) For same alkyl group, the boiling point decrease in the order.  
 $\text{RI} > \text{RBr} > \text{RCI} > \text{RF}$
- (4) Haloalkane are very slightly soluble in water than alcohol.

94. In haloalkane, halogen is good leaving group they shows different type of nucleophilic substitution reaction.

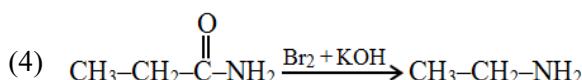
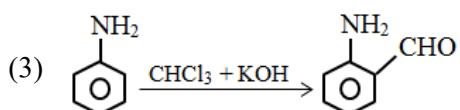
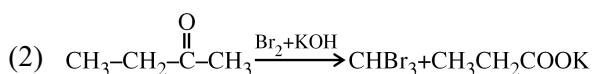
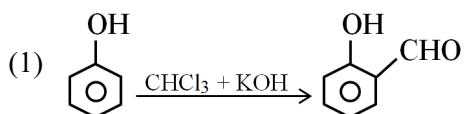


(From reagent)

Which is not correctly matched?

	<b>Reagent</b>	<b>Product</b>
(1)	KCN	RCN
(2)	AgCN	RNC
(3)	aq KOH	ROH
(4)	$\text{KNO}_2$	$\text{RNO}_2$

95. Incorrect reaction is :-



96. Which of the following has maximum number of atoms :

(1) 1 gram - molecules of  $\text{CO}_2$

(2) 2 moles of  $\text{H}_2$

(3) 1 Kilogram of  $\text{H}_2\text{O}$

(4) 11.2 L  $\text{C}_2\text{H}_6$  gas at NTP

97. Select the correct statement among the following.

(a) Copper sulphate solution can't be stored in a zinc pot.

(b) The potential of individual half cell can be measured at 298 K and 1 bar.

(c) Superconductors show zero resistivity.

(d) The cell constant is usually determined by measuring the resistance of the cell generally containing a solution of KCl whose conductivity is already known.

(e) In a galvanic cell, anode has positive potential with respect to the solution.

(1) a, c and d

(2) b, d and e

(3) only b and c

(4) a, b and e

98. **Statement-I:** The peak of the distribution curve showing energies among gaseous molecules corresponds to most probable kinetic energy.

**Statement-II:** For a first order reaction, the time required for 99% completion is twice the time required for the completion of 90% of reaction. Choose the correct option from the following:

(1) Statement-I is correct but statement-II is incorrect.

(2) Statement-I is incorrect but statement-II is correct.

(3) Both Statement-I and statement-II are correct.

(4) Both Statement-I and statement-II are incorrect.

99. The time required for 20% completion of a first order reaction at 300 K is equal to that required for its 60% completion at 320 K. Activation energy ( $E_a$ ) of the reaction is :-

(1) 88.43 kcal

(2) 38.42 kcal

(3) 13.55 kcal

(4) 6.95 kcal

100. Which of the following statements are false?

(A) Line emission spectra is used in chemical analysis to identify unknown atoms.

(B) Two electrons occupying the same orbital are distinguished by magnetic quantum number.

(C) The outer electronic configuration of the ground state of chromium atom is  $3d^4, 4s^2$ .

(D) Smaller the size of the orbit, lower is the energy of the orbit.

(1) B, C

(2) A, D

(3) C, D

(4) A, B

**Topic : FULL SYLLABUS**

**SECTION - A ( BOTANY )**

- 101.** Match the Column-I with Column-II and select correct option :

	<b>Column-I</b>		<b>Column-II</b>
(I)	Tracheids	(a)	Have obliterated central lumen
(II)	Vessels	(b)	Elongated tube like cells
(III)	Xylem fibres	(c)	Presence of perforation on common wall
(IV)	Ray parenchymatous cells	(d)	Radial conduction of water

- (1) I-b, II-a, III-c, IV-d
- (2) I-b, II-c, III-a, IV-d
- (3) I-a, II-b, III-c, IV-d
- (4) I-b, II-c, III-d, IV-a

- 102.** **Statement-I** : In dicotyledonous roots, vascular cambium is partly primary and partly secondary in origin.

**Statement-II** : In dicotyledonous stems vascular cambium is completely secondary in origin.

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

- 103.** Which hormone plays important role in seed development, maturation, dormancy and helps seeds to withstand desiccation ?

- (1) Auxin
- (2) Gibberellin
- (3) Ethylene
- (4) Abscisic acid

- 104.** Match Column-I and Column-II.

	<b>Column-I</b>		<b>Column-II</b>
A.	Adenine derivative.	I.	ABA.
B.	Gaseous nature.	II.	Cytokinin.
C.	Terpenes.	III.	Auxin.
D.	Indole compounds.	IV.	Gibberellin.
E.	Carotenoid derivative.	V.	Ethylene.

- (1) A-IV, B-V, C-I, D-III, E-II
- (2) A-II, B-V, C-III, D-I, E-IV.
- (3) A-III, B-V, C-IV, D-II, E-I.
- (4) A-II, B-V, C-IV, D-III, E-I

- 105.** Read the following statements carefully and identify two incorrect statements :

- (A) The spores of slime mould have true cell wall and usually dispersed by water
- (B) In *Agaricus* karyogamy and meiosis take place in the basidium producing four basidiospores.
- (C) The viruses are non-cellular organisms and are obligate saprophytes.
- (D) *Neurospora*, "a member of Ascomycetes", is used extensively in biochemical and genetic work.

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

- 106.** In which of the following male gamete is small and motile while female gamete is large and static ?

- (1) *Laminaria*
- (2) *Spirogyra*
- (3) *Porphyra*
- (4) *Ulothrix*

- 107.** Which of the following can fix atmospheric nitrogen in specialized cells called heterocyst ?

- (1) *Nostoc*
- (2) *E.coli*
- (3) Methanogen
- (4) *Rhizobium*

- 108.** Which of the following kingdom have unicellular organism with well defined nucleus and other membrane bound cell organelles according to five kingdom system of classification ?

  - Monera
  - Plantae
  - Animalia
  - Protista

**109.** Housefly is classified in :

  - Order-Diptera
  - Class-Muscidae
  - Phylum-non Chordata
  - All of the above

**110.** *Indigofera* and lupin belong to which family ?

  - Solanaceae
  - Liliaceae
  - Brassicaceae
  - Fabaceae

**111.** Parthenocarpic fruit develops from :

  - Fertilized ovary
  - Fertilized ovule
  - Unfertilized ovule
  - Unfertilized ovary

**112.** Which of the following cofactors of enzymes are organic or inorganic compounds and are tightly bound to the apoenzyme?

  - Metal ion
  - Coenzyme
  - Prosthetic group
  - Both 1 and 2

**113.** When the electrons pass from one carrier to another via complex I to IV in the electron transport chain they are coupled to A for the production of ATP from ADP and inorganic phosphate. Blank 'A' represents :-

  - Complex I (NADH dehydrogenase)
  - Complex II (Succinate dehydrogenase)
  - Complex V (ATP synthase)
  - Complex IV (Cytochrome Oxidase)

**114.** **Statement I :** There are three major ways in which different cells handle pyruvic acid produced by glycolysis.

**Statement II :** The reducing agent is  $\text{NAD}^+$  which is oxidized to  $\text{NADH} + \text{H}^+$  in both alcoholic fermentation and lactic acid fermentation.

  - Both Statement I and Statement II are correct.
  - Both Statement I and Statement II are incorrect
  - Statement I is incorrect while Statement II is correct
  - Statement I is correct while Statement II is incorrect.

**115.** If in a pond there were 40 lotus plants last year and through reproduction 16 new plants are added then the birth rate in the population is..... offspring per lotus per year.

  - 2.5
  - 0.4
  - 1.0
  - 0.1

**116.** Between which, among the following, the relationship is an example of mutualism ?

  - Cuscuta* and hedge plant
  - Fig and wasp
  - Sea anemone and clown fish
  - Whale and barnacles

**117.** Given below are two statements : One is labelled as **Assertion A** and the other is labelled as **Reason R** :

**Assertion (A) :-** Plants have evolved an astonishing variety of morphological and chemical defences against herbivores.

**Reason (R) :-** The problem of predation is particularly severe for plants as unlike animals, they cannot run away from their predators.

In the light of the above statements, choose the **correct** answer from the options given below :

  - Both **A** and **R** are true but **R** is NOT the correct explanation of **A**
  - Both **A** and **R** are true and **R** is the correct explanation of **A**
  - A** is true but **R** is false
  - A** is false but **R** is true

118. **Assertion (A) :-** Photorespiration may take place in C<sub>3</sub> plants during day time.

**Reason (R) :-** Photolysis of water and activity of RuBisCO both take place in chloroplast of mesophyll cells in C<sub>3</sub> plants.

- (1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (2) (A) is correct but (R) is not correct
- (3) (A) is incorrect but (R) is correct
- (4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

119. Match the following with respect to early experiments of photosynthesis :

	Column-A		Column-B
(A)	Jan Ingenhousz	(I)	Prepared first action spectrum of photosynthesis
(B)	Julius Von Sachs	(II)	Inferred that O <sub>2</sub> evolved by green plants come from H <sub>2</sub> O
(C)	Cornelius Van Niel	(III)	Provided evidence for production of glucose when plants grow
(D)	Engelmann	(IV)	Green parts of the plant could release oxygen

- (1) A-II, B-III, C-IV, D-I
- (2) A-III, B-IV, C-I, D-II
- (3) A-IV, B-III, C-II, D-I
- (4) A-IV, B-III, C-I, D-II

120. Read the following four statements A, B, C and D and select the right option having both correct statements.

**Statements :**

- (A)** Cyclic photophosphorylation takes place probably to meet the difference in number of ATP and NADPH.H<sup>+</sup> used in the dark reaction.  
**(B)** Plastoquinone removes many protons from the stroma while transporting an electron.  
**(C)** Phosphorylation take place only in light reaction but not in dark reaction.  
**(D)** Stroma lamellae have PS-I only and lack NADP reductase.

**Options :**

- |             |             |
|-------------|-------------|
| (1) C and D | (2) A and B |
| (3) B and C | (4) A and D |

121. Read the following statements and choose the correct set of statements :

- (a) RNA was the first genetic material
- (b) RNA polymerase binds to start codon and initiates translation.
- (c) The cellular factory responsible for synthesising proteins is the ribosome
- (d) In lac operon polycistronic structural gene is regulated by a common promoter and regulatory genes

Choose the correct answer from the options given below :

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

122. Match List-I with List-II :

	List-I		List-II
(a)	Release factor	(i)	Splicing
(b)	SnRNA	(ii)	Translation
(c)	Probe	(iii)	Transcription
(d)	Rho factor	(iv)	DNA fingerprinting

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

123. The z gene codes for beta-galactosidase ( $\beta$ -gal), which is primarily responsible for the hydrolysis of the disaccharide into :

- (1) glucose and glycogen
- (2) galactose and glucose
- (3) glucose and fructose
- (4) glucose and lactose

- 124.** Which of the following is a not a correct statement with respect to polymorphism :

  - Polymorphism arises due to mutations
  - Polymorphisms ranging from single nucleotide change to very large scale changes
  - For evolution and speciation, polymorphisms play very important role
  - The probability of polymorphism to be observed in coding DNA sequence would be higher

**125.** In dsDNA adenine pair with thymine and guanine pair with cytosine by how many hydrogen bonds respectively ?

  - 1, 2
  - 2, 3
  - 2, 1
  - 3, 2

**126.** Given below are two statements one is labelled as Assertion(A) and the other is labelled as Reason(R).

**Assertion(A) :-** Genetic make-up of an organism or an individual lies in the DNA sequences.

**Reason(R) :-** More than 98 percent of the human genome codes for proteins.

In the light of above statements, choose the most appropriate answer from the options given below :

  - Both (A) and (R) are correct and (R) is the correct explanation of (A)
  - Both (A) and (R) are correct and (R) is not the correct explanation of (A)
  - (A) is correct but (R) is not correct
  - (A) is not correct but (R) is correct

**127.** The microsporangia develop further and become :

  - Pollen sacs
  - Megasporangia
  - Microspore
  - Pollen grain

**128.** Select the correct match pairs from the following :

(a)	Hilum	Junction between ovule and funicle
(b)	Chalaza	Basal part of the ovule
(c)	<i>Lupinus articus</i>	1000 years of seed dormancy
(d)	<i>Phoenix dactylifera</i>	200 years of seed dormancy

  - (c) and (d) only
  - (a) and (b) only
  - (b), (c) and (d) only
  - (a), (b), (c) and (d)

**129.** Sacred groves is also one of the important mean of Biodiversity conservation. In respect of this find out the odd one :-

  - Khasi & Jaintia – Meghalaya
  - Aravalli hills – Rajasthan
  - Sarguja, Chanda, Bastar – Mizoram
  - Western Ghat – Maharashtra

**130.** **Statement-I :-** "The unidirectional flow of energy in ecosystems begins with consumers and ends with producers."

**Statement-II :-** "The detritus food chain/web in ecosystems is initiated by photosynthesis".

  - Statement I is correct and II is incorrect
  - Statement I is incorrect and II is correct
  - Both statements are incorrect
  - Both statements are correct

**131.** Which one of the following reasons is proposed for the greater species diversity in tropical environments compared to temperate ones ?

  - Less solar energy in tropics
  - More frequent glaciations in tropics
  - Relatively constant environments in tropics
  - Shorter evolutionary time in tropics

**132.** **Statement-1 :** Competition occurs when two closely related species compete for the same resources that are limited.

**Statement-2 :** If two species compete for the same resources, they could avoid competition by resource partitioning.

  - Statement-1 is true, Statement-2 is true but Statement-2 is not the correct explanation of Statement-1.
  - Statement-1 is false, Statement-2 is true.
  - Statement-1 is true, Statement-2 is false.
  - Statement-1 is true, Statement-2 is true and Statement-2 is the correct explanation of Statement-1.

133. A plant having the genotype AABbCC will produce \_\_\_\_ kinds of gametes :
- (1) 5
  - (2) 4
  - (3) 3
  - (4) 2

134. In sickle cell anaemia glutamic acid is replaced by valine which of the following triplet code for valine :
- (1) GGG
  - (2) AAG
  - (3) GAA
  - (4) GUG

135. Statin, which reduce blood cholesterol levels, are made by :
- (1) Bacteria
  - (2) Viruses
  - (3) Algae
  - (4) Yeast

## SECTION - B (BOTANY)

136. Sporophyte in pteridophytes and gymnosperms is differentiated in :
- (1) Archegonium and antheridium
  - (2) Foot, seta and capsule
  - (3) Holdfast, stipe and frond
  - (4) Root, stem and leaves

137. When the respiratory substrate is protein then it will enter into Kreb's cycle in the form of :-
- (1) PGAL
  - (2) Acetyl CoA
  - (3) Pyruvic acid
  - (4) PEP

138. In which of the following interactions none of the partners get benefited ?
- (1) Predation
  - (2) Parasitism
  - (3) Competition
  - (4) Commensalism

139. Match List-I with List-II.

	List-I		List-II
(A)	Exponential growth	(I)	A plot of N in relation to time (t) results in a sigmoid curve
(B)	Emigration	(II)	Additive effect on population density (N)
(C)	Logistic growth	(III)	A plot of N in relation to time (t) results in a J-shaped curve
(D)	Immigration	(IV)	Subtractive effect on population density (N)

Choose the **correct** answer from the options given below :

- (1) A-III, B-II, C-IV, D-I
- (2) A-IV, B-I, C-III, D-II
- (3) A-III, B-IV, C-I, D-II
- (4) A-I, B-IV, C-III, D-II

140. Given below are two statements :

**Statement-I** :- If both strands of DNA act as a template, they would code for RNA molecule with same sequences.

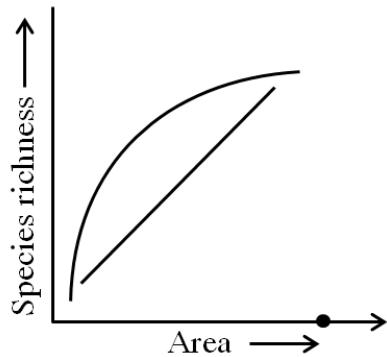
**Statement-II** :- DNA has evolved from RNA with chemical modifications that make it more stable.

In the light of above Statements choose the correct answer from the options given below :

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

141. For the transmission of genetic information which one is better :

- (1) DNA
- (2) Protein
- (3) Carbohydrate
- (4) RNA



Above graph shows relation between species richness and area for a wide variety of taxa turns out to be a rectangular hyperbola. On a logarithmic scale, the relationship shown by straight line.

In which area slope of line to be much steeper?

- (1) Grass land
  - (2) Temperate region
  - (3) Tropical rain forest
  - (4) Tundra

- 145.** If a genetic disease is transferred from a phenotypically normal but carrier female to only some of the male progeny, the disease is :

  - (1) Autosomal dominant
  - (2) Sex linked Recessive
  - (3) Autosomal recessive
  - (4) Sex linked dominant

**146.** *Bacillus thuringiensis* is used for :

  - (1) Fermentation of beer (2) Biopesticide
  - (3) Antibiotics (4) None

**147.** Read the following statements : – Large holes in swiss cheese are due to production of CO<sub>2</sub>. – Bacteria is used for commercial production of ethanol. – Streptokinase produced by the yeast Streptococcus. – Statin produced by yeast.  
How many above statements are correct :  
(1) 1 (2) 3 (3) 2 (4) 4

**148.** How many plants of given list show free central placentation ?  
*Argemone*, pea, china-rose, mustard, *Dianthus*, tomato, *Primrose*, lemon, sunflower, marigold.  
(1) One (2) Two (3) Three (4) Four

**149.** Environmental heterophylly is observed in :-  
(1) Larkspur (2) Buttercup  
(3) Cotton (4) Coriander

**150.** Consider the following statements and select the incorrect statement :-  
(1) Axillary bud is derived from shoot apical meristem  
(2) In sunflower stem, sclerenchymatous pericycle is located just above phloem bundle in semi-lunar patches  
(3) In conjoint vascular bundle phloem usually located on the inner side of xylem  
(4) Phloem parenchyma is usually not present in monocot stem.

## **Topic : FULL SYLLABUS**

## **SECTION - A ( ZOOLOGY )**

162. The site for active ribosomal RNA synthesis is :-

- (1) Nucleoplasm      (2) Nucleolus
- (3) Plastids      (4) Chromatin

163. (A) Anything less than a complete structure of a cell does not ensure independent living.  
 (B) The Onion cell is a typical plant cell  
 (C) All organisms are composed of cells  
 (D) The shape of the cell may vary with the function they perform.

- (1) Statement A, C and D are wrong.
- (2) Statement A, B and D are not correct.
- (3) Statement A, B, C & D all are correct
- (4) Statement B, C and D are not correct.

164. Who reported that cells had a thin outer layer which is today known as the plasma membrane :-

- (1) Robert brown
- (2) Rudolf virchow
- (3) Matthias schleiden
- (4) Theodore schwann

165. In animal cells lipid - like steroid hormones are synthesised in :-

- (1) SER      (2) RER
- (3) Golgi apparatus      (4) Lysosome

166. Read the following statements and select incorrect statement -

- (1) Four haploid cells are formed at the end of meiosis-I
- (2) A very significant contribution of mitosis is cell repair
- (3) Growth and reproduction are characteristics of cells, indeed of all living organisms.
- (4) The stage between two meiotic divisions is called interkinesis.

	Phase	Characteristic feature
(i)	Leptotene	Compaction of chromosomes continues
(ii)	Anaphase	Nucleolus, golgi complex and ER reform
(iii)	Prophase	Initiation of condensation of chromosomal material.
(iv)	S-phase	DNA synthesis or replication takes place

Which of the above are correctly matched ?

- (1) Only (i) and (ii)      (2) (i), (iii) and (iv)
- (3) Only (iii)      (4) Only (i) and (iv)

168. Ventricular systole increases the ventricular pressure causing the

- (1) Closure of semilunar valves
- (2) Closure of tricuspid and bicuspid valves
- (3) Opening of semilunar valves
- (4) Opening of tricuspid and bicuspid valves

169. Identify the correct match from column-I, II & III :

	Column-I		Column-II		Column-III
(A)	Brain coral	(a)	<i>Hemidactylus</i>	(i)	Three chambered heart
(B)	Parrot	(b)	<i>Psittacula</i>	(ii)	Air sacs
(C)	Whale	(c)	<i>Meandrina</i>	(iii)	Cnidocytes
(D)	Wall lizard	(d)	<i>Balaenoptera</i>	(iv)	Mammary glands

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

170. Which of the following pairs are not correctly matched ?

- (A) Bony fishes – *Exocoetus & Pristis*
  - (B) Gnathostomates – *Myxine & Chelone*
  - (C) Cyclostomates – *Lamprey & Myxine*
  - (D) Cephalochordates – *Ascidia & Branchiostoma*
- (1) A & B      (2) A, B & C
  - (3) A, B & D      (4) B & C

171. **Assertion :-** *Scoliodon* has to swim constantly to avoid sinking.

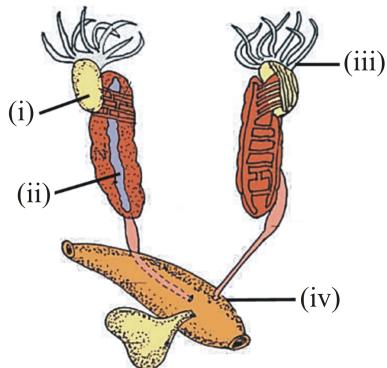
**Reason :-** In *scoliodon* air bladder is absent.

- (1) Both Assertion & Reason are True and the Reason is a correct explanation of the assertion
- (2) Both Assertion & Reason are True and the Reason is not a correct explanation of the assertion
- (3) Assertion is true but Reason is false
- (4) Both Assertion & Reasons are false

172. A Tetrasaccharide made up of four monosaccharide units; A, B, C & D. If their molecular weight is respectively 120, 180, 210, 230, then what will be the  $M_w$  of that tetrasaccharide ?

- |         |         |
|---------|---------|
| (1) 740 | (2) 704 |
| (3) 686 | (4) 722 |

173. Given below is the diagram of reproductive system of an animal labelled by (i), (ii), (iii) and (iv), identify the animal with correct labelling of (i) to (iv)



- (1) Male frog-(i) Testes (ii) Adrenal gland (iii) Fat bodies (iv) Cloaca
- (2) Female frog-(i) Kidney (ii) Adrenal gland (iii) Ovary (iv) Cloaca
- (3) Male frog-(i) Testes (ii) Bidder canal (iii) Adrenal gland (iv) Cloaca
- (4) Female frog-(i) Ovary (ii) Oviduct (iii) Adrenal gland (iv) Cloaca

174. Compound epithelium is made of more than one layer (multi-layered) of cells and is commonly found in :

- (1) Skin
- (2) Buccal cavity and pharynx
- (3) Inner lining of ducts of salivary glands and of Pancreas
- (4) All of the above

175. Read the following options and choose the correct answer :

- (1) Sympathetic and parasympathetic neural system are division of somatic neural system.
- (2) In neuron, Nissl's granules are seen in cell body, Dendrites and Axon.
- (3) Bipolar neurons are present in retina of eye.
- (4) During repolarisation axon membrane is more permeable to sodium ions

176. The maximum volume of air a person can breathe in after a forced expiration :

- (1) Tidal volume
- (2) Residual volume
- (3) Functional Residual capacity
- (4) Vital capacity

177. In which part of sperm possesses numerous mitochondria ?

- (1) Head (2) Neck (3) Middle (4) Tail

178. The functions of male sex accessory ducts and glands are maintained by :

- (1) FSH (2) LH
- (3) Androgen (4) ICSH

179. Which of the following statements incorrect about oogenesis ?

- (1) No more oogonia are formed and added after birth
- (2) It is initiated during the embryonic development of female
- (3) First meiotic division get temporarily arrested at prophase-I stage
- (4) It results in the formation of four haploid gametes

180. Match the following correct option :

(A)	$\alpha$ -antitrypsin	(i)	Molecular diagnosis
(B)	Rosie cow	(ii)	Mice
(C)	Polio vaccine	(iii)	Alpha lactalbumin
(D)	P.C.R.	(iv)	Emphysema
(E)	Super bug	(v)	<i>Pseudomonas putida</i>

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

181. **Assertion (A) :-** Ti plasmid are used as vectors in gene transfer.

**Reason (R) :-** Down stream processing vary from product to product.

- (1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (2) (A) is correct but (R) is not correct
- (3) (A) is incorrect but (R) is correct
- (4) Both (A) and (R) are correct but (R) is the correct explanation of (A)

182. Match List-I with List-II :

	List-I		List-II
(a)	Elution	(i)	Cloning vector
(b)	Ampicillin resistant gene	(ii)	Obtaining DNA fragments with sticky ends
(c)	Ti plasmid	(iii)	Selectable marker
(d)	Restriction enzyme	(iv)	Obtaining bands of DNA from agarose gel

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

183. Cutting of gel for removal of DNA is called :

- (1) Elution
- (2) Up stream processing
- (3) Transformation
- (4) Down stream processing

184. Given below are two statements :

**Statement-I :-** In pBR-322 restriction site of BamHI present on Ampicillin resistance gene.

**Statement-II :-** RNAi technique use in formation of Nematode resistance plant.

In the light of above Statement choose the correct answer from the options given below :

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

185. Incorrect about P.C.R. :

- (1) It makes the copies of DNA
- (2) It can detect HIV
- (3) It can detect cancer
- (4) It is based upon antigen antibody reaction

## SECTION - B ( ZOOLOGY )

186. Anatomical unit of muscle is :-

- (1) Sarcomere
- (2) Muscle fibre
- (3) A-band
- (4) Sarcolemma

187. Which of the following is an example of innate immunity ?

- (1) B-lymphocyte
- (2) T-lymphocyte
- (3) Natural killer cell
- (4) Antibody

188. Match List-I with List-II

	List-I (Endocrine gland)		List-II (Disease)
(a)	Thyroid gland	(i)	Acromegaly
(b)	Adrenal gland	(ii)	Diabetes mellitus
(c)	Pituitary gland	(iii)	Grave's disease
(d)	Pancreas	(iv)	Addisons Disease

Choose the correct answer from the options given below :

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

189. Which of the following statements are correct ?

- (A) A fall in glomerular blood flow can activate the JG cells to release renin.
- (B) Angiotensin II is powerful vasodilator.
- (C) Angiotensin II also activates the adrenal medulla to release aldosterone.
- (D) Aldosterone causes reabsorption of  $\text{Na}^+$  and water from the distal parts of the tubule.
- (E) Renin converts angiotensinogen in blood to angiotensin I and further to angiotensin II.

Choose the correct answer from the options given below :

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

190. What will be number of chromosome in a plant cell in S phase if cell has 10 chromosome at metaphase :

- (1) 20
- (2) 10
- (3) 30
- (4) 40

191. **Statement-I** : Our body is capable of altering the stroke volume as well as heart rate thereby the cardiac output.

**Statement-II** : During each cardiac cycle two prominent sounds are produced which can not be easily heard through a stethoscope.

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

192. Which of the following is not a basis of classification among animals ?

- (1) Arrangement of cells
- (2) Body symmetry
- (3) Presence of cell membrane
- (4) Nature of coelom

193. Phospholipid is :

- (1) Only polar
- (2) Only non polar
- (3) Amphipathic
- (4) Only hydrophilic

194. Match the column-I with column-II and choose correct option :-

	Column-I		Column-II
(A)	Adipose tissue	(i)	Perform cementing to keep neighbouring cell together
(B)	Dense regular connective tissue	(ii)	Have a hard and non-pliable ground substance rich in calcium salts and collagen fibres
(C)	Bone	(iii)	Located mainly beneath the skin
(D)	Adhering junction	(iv)	Tendon and ligaments

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

195. **Assertion (A) :-** Neurotransmitters are chemical messenger that transmit signals between neurons.

**Reason (R) :-** Neurotransmitters are released from axon terminals of the neuron and bind to receptor on dendrites or cell body of other neuron, facilitate transmission of nerve impulse.

- (1) Assertion and reason both are correct but (R) is not correct explanation of (A)
- (2) Both (A) & (R) are correct and (R) is correct explanation of (A)
- (3) (A) is correct but (R) is incorrect
- (4) (A) is incorrect but (R) is correct

196. Given below are two statements :

**Statement-I :-** The role of oxygen in the regulation of respiratory rhythm is quite insignificant.

**Statement-II :-** Every 100 ml of deoxygenated blood delivers approximately 4 ml of CO<sub>2</sub> to the alveoli.

In the light of the above statements, choose the correct answer from the options given below :

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

197. Which of the following IUD make the uterus unsuitable for implantation ?

- (1) CuT
- (2) LNG-20
- (3) Lippes loop
- (4) Multiload 375

198. Which of the following hormones are secreted in women only during pregnancy ?

- (a) Relaxin
- (b) Oxytocin
- (c) hCG
- (d) hPL
- (e) estrogen

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

199. The first letter of the name of restriction endonuclease came from the :

- (1) Genus of organism
- (2) Species of organism
- (3) Family of organism
- (4) Class of organism

200. \_\_A\_\_ first transgenic cow \_\_B\_\_, produce human protein enriched Milk. This milk possess a human protein \_\_C\_\_.

Select the correct option :

- (1) A-1997, B-Rosie
- (2) A-1990, B-Andi
- (3) A-Andi, C- $\alpha$  lactalbumin
- (4) C- $\gamma$  globulin, A-1990



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