

Course : NEET-UG (Pre-Medical)

Full Syllabus : Class-12th

Name of the Candidate (in Capitals) : _____

Form Number : in figures _____
: in words _____

Centre of Examination (in Capitals) : _____

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

Important Instructions :

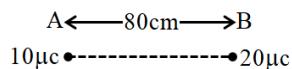
1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and the Test Booklet contains **200** 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.

SECTION - A (PHYSICS)

1. In the given figure distance of the point from A where the electric field is zero is



- (1) 20 cm (2) 10 cm (3) 33 cm (4) 25 cm

2. If E is the electric field intensity of an electrostatic field then the electrostatic energy density is proportional to

- (1) E (2) E^2 (3) $1/E^2$ (4) $1/E$

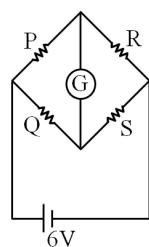
3. A proton and an electron are placed in a uniform electric field

- (1) The electric force acting on them will be equal
 (2) The magnitude of the forces will be equal
 (3) Their acceleration will be equal
 (4) The magnitude of their acceleration will be equal

4. The S.I unit of electric flux is

- (1) Weber (2) Newton per coulomb
 (3) Volt \times Meter (4) Joule per coulomb

5. In the wheatston network given $P = 10 \Omega$, $Q = 20 \Omega$, $R = 15 \Omega$, $S = 30 \Omega$. The current passing through the battery



- (1) 0.36 A (2) 1 A
 (3) 0.18 A (4) 0.72 A

6. The drift velocity of free electrons in a conductor is V when a current i is flowing in it. If both the radius and current are doubled, then drift velocity will be -

- (1) V (2) $\frac{V}{2}$ (3) $\frac{V}{4}$ (4) $\frac{V}{8}$

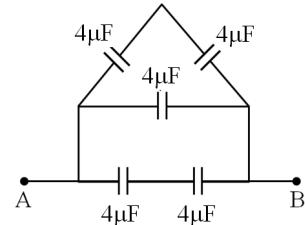
7. In order to increase the sensitivity of galvanometer

- (1) The suspension wire should be made stiff
 (2) Area of the coil should be reduced
 (3) The magnetic field should be increased
 (4) The number of turns in the coil should be reduced

8. Two parallel plates condensers of capacity of $20 \mu\text{F}$ and $30 \mu\text{F}$ are charged to the potential of 30V and 20 V respectivity. If likely charged plates are connected together then the common potential difference will be

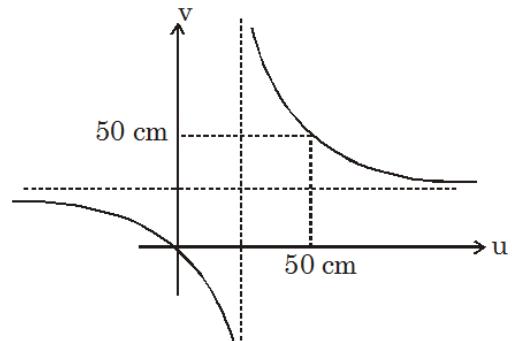
- (1) 100 V (2) 50 V
 (3) 24 V (4) 10 V

9. Equivalent capacitance between A and B



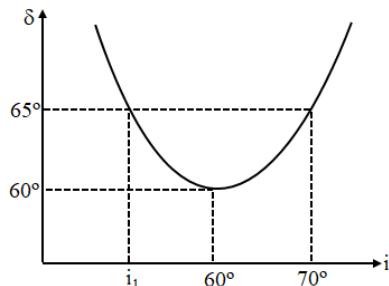
- (1) $8 \mu\text{F}$
 (2) $6 \mu\text{F}$
 (3) $26 \mu\text{F}$
 (4) $\frac{10}{3} \mu\text{F}$

10. u-v graph for a convex mirror is shown in figure. A real object placed 25cm away from mirror will have transverse magnification :



- (1) 2 (2) 0.75 (3) 0.5 (4) -0.5

11. The angle of deviation (δ) vs angle of incidence (i) is plotted for a prism. Pick up the incorrect statements.



- (1) The angle of prism is 60°
 - (2) The refractive index of the prism is $n = \sqrt{3}$
 - (3) For deviation to be 65° the angle of incidence $i_1 = 55^\circ$
 - (4) The curve of ' δ ' vs ' i ' is parabolic

13. Young's double slit experiment is first performed in air and then in a medium other than air. It is found that 8^{th} bright fringe in the medium lies where 5^{th} dark fringe lies in air. The refractive index of the medium is nearly :-

(1) 1.59 (2) 1.69 (3) 1.78 (4) 1.25

14. An unpolarized light beam is incident on the polarizer of a polarization experiment and the intensity of light beam emerging from the parallel analyzer is measured as 100 Lumens. Now, if the analyzer is rotated around the horizontal axis (direction of light) by 30° in clockwise direction, the intensity of emerging light will be Lumens.

- (1) 50 (2) 75 (3) 100 (4) None

15. Consider the diffraction pattern obtained from the sunlight incident on a pinhole of diameter $0.1 \mu\text{m}$. If the diameter of the pinhole is slightly increased, it will affect the diffraction pattern such that :

- (1) its size decreases, and intensity decreases
 - (2) its size increases, and intensity increases
 - (3) its size increases, but intensity decreases
 - (4) its size decreases, but intensity increases

16. Consider a tightly wound 100 turn coil of radius 10 cm, carrying a current of 1 A. What is the magnitude of the magnetic field at the centre of the coil ?

- (1) 3.14×10^{-3} T (2) 6.28×10^{-4} T
 (3) 12.8×10^{-6} T (4) 1.8×10^{-5} T

17. A solenoid of length 0.5 m has a radius of 1 cm and is made up of 500 turns. It carries a current 5A. What is the magnitude of the magnetic field inside the solenoid ?

- (1) $4\pi \times 10^{-4}$ T (2) $2\pi \times 10^{-4}$ T
 (3) $6\pi \times 10^{-3}$ T (4) $2\pi \times 10^{-3}$ T

18. A long straight wire in the horizontal plane carries a current of 50 A in north to south direction. Give the magnitude and direction of \mathbf{B} at a point 2.5 m east of the wire.

- (1) 4×10^{-6} T, Vertical down
 - (2) 2×10^{-6} T, Vertical up
 - (3) 4×10^{-6} T, Vertical up
 - (4) 8×10^{-4} T, Vertical down

19. Two long and parallel straight wires A and B carrying currents of 8.0 and 5.0 A in the same direction are separated by a distance of 4.0 cm. Estimate the force on a 10 cm section of wire A.

- (1) 2×10^{-5} N, Repulsive
 (2) 4×10^{-6} N, attractive
 (3) 2×10^{-5} N, attractive
 (4) 8×10^{-6} N, Repulsive

20. A galvanometer of resistance $100\ \Omega$ contains 100 division. It gives a deflection of one division on passing a current of 10^{-4} A . Find the resistance (in ohms) to be connected to it, so that it becomes a voltmeter of range 10V.

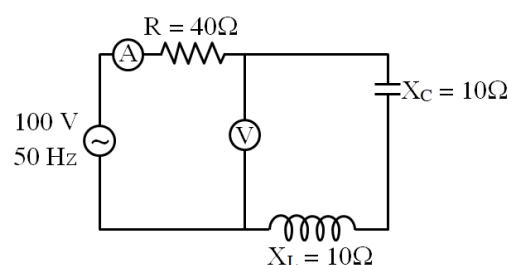
(1) $\frac{500}{9}\Omega$ (2) 500Ω (3) $\frac{100}{9}\Omega$ (4) 900Ω

21. Ohm's law in terms of current density J, Electric field E and electrical conductivity ' σ ' is given by -

$$(1) \sigma = \left(\frac{J}{E} \right)^{1/2} \quad (2) J = \sigma E$$

$$(3) J = \frac{\sigma}{E} \quad (4) E = \sigma J$$

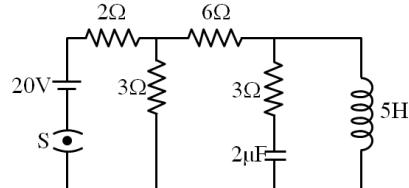
22.



Find reading of Ammeter and voltmeter in given circuit.

- (1) 2A, 20V (2) 2.5A, 40V
 (3) 2.5A, Zero (4) Zero, Zero

23.



Calculate the current after long time of closing the key 'S' :-

- (1) 2.5 Amp (2) 5 Amp
 (3) 7 Amp (4) 3 Amp

24. A closed coil of copper whose area is $1\text{ m} \times 1\text{ m}$ is free to rotate about an axis. The coil is placed perpendicular to a magnetic field of 0.10 Wb/m^2 . It is rotated through 180° in 0.01 s . The average induced emf and average induced current in the coil will, respectively, be (The resistance of the coil is $2.0\ \Omega$)

- (1) 20 V, 1 A (2) 10 V, 10 A
 (3) 20 V, 10 A (4) 5 V, 5 A

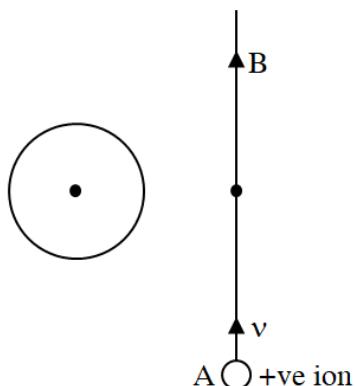
25. **Statement-I :** Lenz's law gives the direction of induced current in a coil in the phenomenon of electromagnetic induction.

Statement-II : Lenz's law is another form of law of conservation of energy.

Find correct option regarding above statements :-

- (1) Both **Statement I** and **Statement II** are True
 (2) Both **Statement I** and **Statement II** are False
 (3) **Statement I** is True but **Statement II** is False
 (4) **Statement I** is False but **Statement II** is True

26. A positive ion moves with a constant velocity along line AB, which lies in same plane of conducting circular loop, as shown in the figure. The directions of current induced in loop over its entire journey from A to B is :

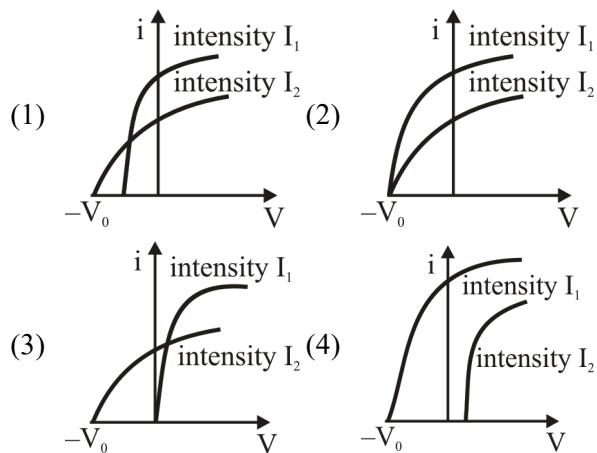


- (1) zero for all instants
 (2) anticlockwise for all instants
 (3) clockwise for all instants
 (4) first clockwise then anticlockwise

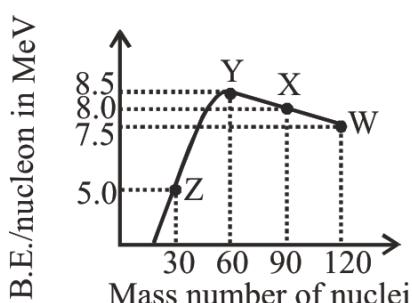
27. In photoelectric effect if the intensity of light is doubled at same frequency then maximum kinetic energy of photoelectrons will become :-

- (1) double
 (2) half
 (3) four times
 (4) no change

28. The curves (1), (2) (3) and (4) show the variation between the applied potential difference (V) and the photoelectric current (i), at two different intensities of light ($I_1 > I_2$). In which figure is the correct variation shown :-



29. Binding energy per nucleon versus mass number curve for nuclei is shown in the figure. W, X, Y and Z are four nuclei indicated on the curve. The process that would release energy is :-



- (1) $Y \rightarrow 2Z$
- (2) $W \rightarrow X + Z$
- (3) $W \rightarrow 2Y$
- (4) $X \rightarrow Y + Z$

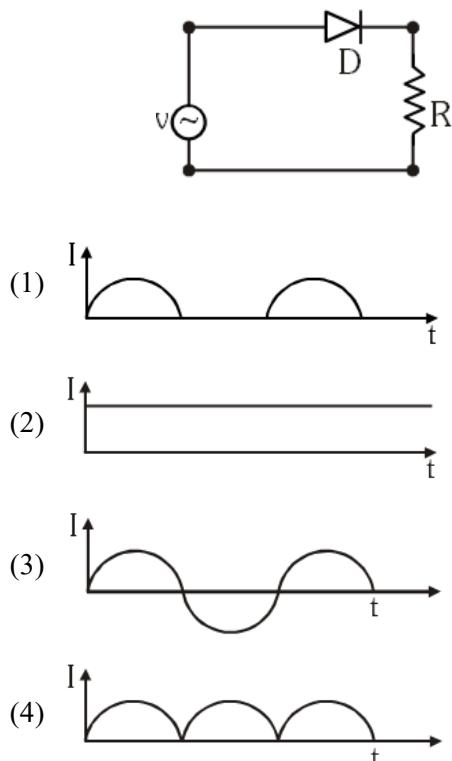
30. Incorrect statement for nuclear force is :-

- (1) Shows saturation
- (2) Short range force
- (3) Always attractive
- (4) Charge independent

31. When all the inputs of a NAND gate are connected together, the resulting circuit is :-

- (1) a NOT gate
- (2) an AND gate
- (3) an OR gate
- (4) a NOR gate

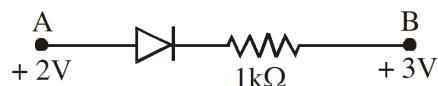
32. A p-n junction diode (D) shown in the figure can act as a rectifier. An alternating current source (V) is connected in the circuit. The current (I) in the resistor (R) can be shown by :-



33. Which of the following statement is true :

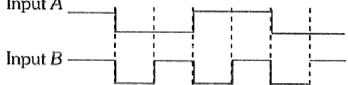
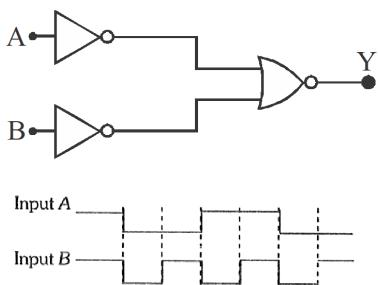
- (1) Doping of pure Ge with a trivalent impurity gives n-type semiconductor
- (2) Resistivity of pure Ge increases with temperature
- (3) Majority carriers in p-type semiconductor are holes
- (4) Doping of pure Ge with a pentavalent impurity increases its resistivity

34. Consider the junction diode as ideal, the value of current flowing through AB is :



- (1) 10^{-2} A
- (2) 0 A
- (3) 10^{-1} A
- (4) 10^{-3} A

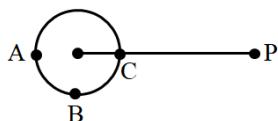
35. The logic circuit shown below has the input waveforms 'A' and 'B' as shown. Pick out the correct output waveform.



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

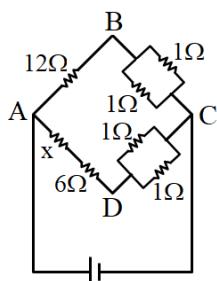
SECTION - B (PHYSICS)

36. A hollow conducting sphere is placed in an electric field produced by a point charge placed at P as shown in figure. Let V_A, V_B, V_C be the potential at point A, B and C respectively. Then



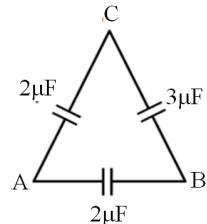
- (1) $V_C > V_B$
- (2) $V_B > V_C$
- (3) $V_A > V_B$
- (4) $V_A = V_C$

37. For what value of unknown resistance x the potential difference between B and D will be zero in the circuit shown in the figure



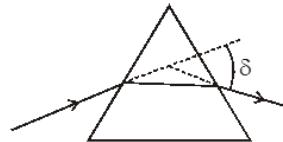
- (1) 4Ω
- (2) 6Ω
- (3) 2Ω
- (4) 5Ω

38. Three capacitors are connected in the arms of a triangle ABC as shown in figure. A 5V cell is applied between A and B. The voltage between B and C is



- (1) 2 V
- (2) 1 V
- (3) 3 V
- (4) 1.5 V

39. The angle of deviation through an equilateral prism is minimum when

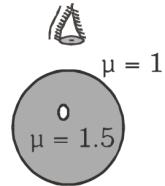


- (A) Incident ray and emergent ray are symmetric to the prism
- (B) The refracted ray inside the prism becomes parallel to its base
- (C) Angle of incidence is equal to that of the angle of emergence
- (D) When angle of emergence is double the angle of incidence

Choose the correct answer from the options given below :

- (1) Statements (A), (B) and (C) are true
- (2) Only statement (D) is true
- (3) Only statements (A) and (B) are true
- (4) Statements (B) and (C) are true

40. There is a small air bubble inside a glass sphere ($\mu = 1.5$) of radius 10 cm. The bubble is 4 cm below the surface and is viewed normally from the outside as shown in figure. Find the apparent depth of the bubble.

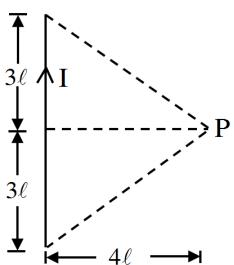


- (1) 10 cm
- (2) 3.1 cm
- (3) 5.3 cm
- (4) 6.2 cm

41. In a Young's double slit experiment, the slits are separated by 0.3 mm and the screen is 1.5 m away from the plane of slits. Distance between fourth bright fringes on both sides of central bright is 2.4 cm. The frequency of light used is $\text{_____} \times 10^{14} \text{ Hz}$.

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

42. Find magnetic field at point 'P' due to current carrying wire in following.



- (1) $\frac{\mu_0 I}{20\pi\ell} \otimes$ (2) $\frac{3\mu_0 I}{40\pi\ell} \otimes$
 (3) $\frac{7\mu_0 I}{10\pi\ell} \odot$ (4) $\frac{3\sqrt{2}\mu_0 I}{80\pi\ell} \otimes$

43. A point source of radiation having average power output ' P_0 '. Then find amplitude of electric field at distance 'r' from it

$$(1) E_o = \frac{P_o}{4\pi\epsilon_o r^2} \quad (2) E_o = \frac{P_o}{4\pi\epsilon_o c r^2}$$

$$(3) E_o = \sqrt{\frac{P_o}{2\pi\epsilon_o c r^2}} \quad (4) E_o = \sqrt{\frac{P_o}{8\pi\epsilon_o c r^2}}$$

44. **Statement 1 :** The drift velocity of electrons in a metallic wire decreases when the temperature of the wire is increased.

Statement 2 : On increasing the temperature, the conductivity of a metallic wire increases.

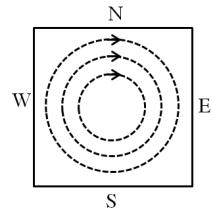
- (1) Both statement-1 and statement-2 are true.
 (2) Both statement-1 and statement-2 are false.
 (3) Statement-1 is true but statement-2 is false
 (4) Statement-1 is false but statement-2 is true.

45. Match the following :-

Currents		RMS value	
(a)	$a \sin\omega t$	(i)	a
(b)	$a \sin\omega t \cos\omega t$	(ii)	$\frac{a}{\sqrt{2}}$
(c)	$a \sin\omega t + a \cos\omega t$	(iii)	$\frac{a}{2\sqrt{2}}$

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

46. A metal sheet placed in magnetic field which changes from zero to maximum, If figure shows direction of eddy currents then directions of magnetic field is :-



- (1) Perpendicular to the plane of the paper & inwards
 (2) Perpendicular to the plane of the paper & outwards
 (3) From west to east
 (4) From North to South

47. An ac generator consists of a coil of 500 turns and area 2 m^2 rotating at an angular speed of 30 rad s^{-1} in a uniform magnetic field $B = 0.20\text{ T}$ between two fixed pole pieces. The resistance of the circuit including that of the coil is 1000Ω . What is the maximum current drawn from the generator?

- (1) 2 A (2) 4 A (3) 3 A (4) 6 A

48. A proton and an α -particle are accelerated through a potential difference of 100 V. The ratio of the wavelength associated with the proton to that associated with an α -particle is

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

49. The binding energy per nucleon for C^{12} is 7.68 MeV and that for C^{13} is 7.47 MeV. What is the energy required to remove a neutron from C^{13} .

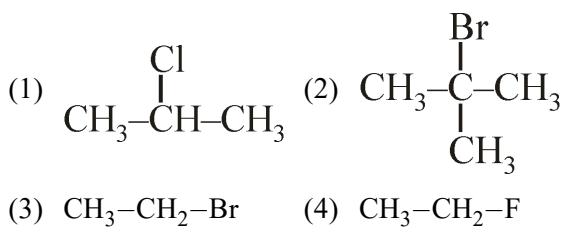
- (1) 0.21 MeV (2) 2.52 MeV
 (3) 4.95 MeV (4) 2.75 MeV

50. If a semiconductor has an intrinsic carrier concentration of $1.41 \times 10^{16}\text{ m}^{-3}$, when doped with 10^{21} m^{-3} phosphorus, then the concentration of holes at room temperature will be

- (1) $2 \times 10^{21}/\text{m}^3$ (2) $2 \times 10^{11}/\text{m}^3$
 (3) $1.41 \times 10^{10}/\text{m}^3$ (4) $1.41 \times 10^{16}/\text{m}^3$

SECTION-A (CHEMISTRY)

51. Most reactive alkyl halide towards dehydrohalogenation with Alc. KOH, Δ ?



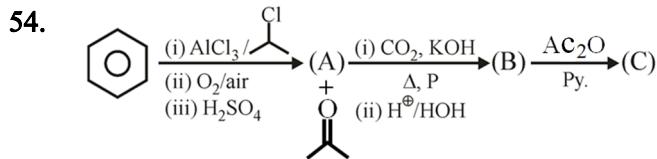
52. Which reagent can be used to distinguish between CH_3CHO and $\text{CH}_3\text{CH}_2\text{CHO}$?

- (1) Tollen's reagent (2) Fehling solution
 (3) NaHSO_3 (4) $\text{I}_2 + \text{NaOH}$

53. Match the following

a	$2\text{CH}_3\text{C}(=\text{O})\text{H} \xrightarrow[\Delta]{\text{(i) dil.NaOH}} \text{CH}_3\text{CH}=\text{CH}-\text{C}(=\text{O})\text{H}$	i	Reimer Tiemann Reaction
b	$2\text{H}-\text{C}(=\text{O})\text{H} \xrightarrow{\text{(i) Conc.KOH}} \text{CH}_3\text{OH} + \text{HCOOK}^{\oplus}$	ii	Aldol condensation
c		iii	Cannizaro reaction
d	$\text{R}-\text{OH} + \text{SOCl}_2 \rightarrow \text{R}-\text{Cl} + \text{SO}_2 + \text{HCl}$	iv	Darzen's reaction

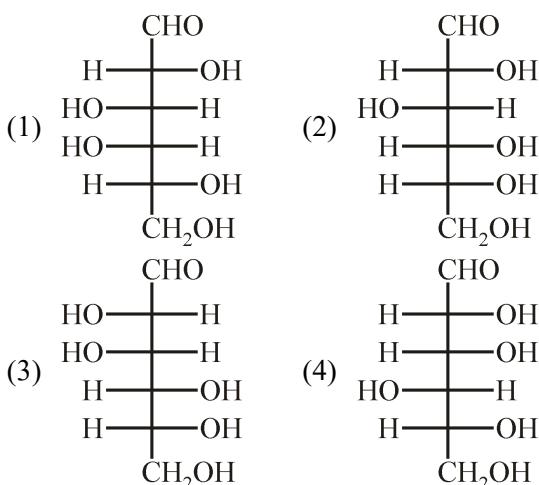
- (1) a - i, b - ii, c - iii, d - iv
 (2) a - iii, b - ii, c - i, d - iv
 (3) a - ii, b - iii, c - i, d - iv
 (4) a - iv, b - iii, c - ii, d - i



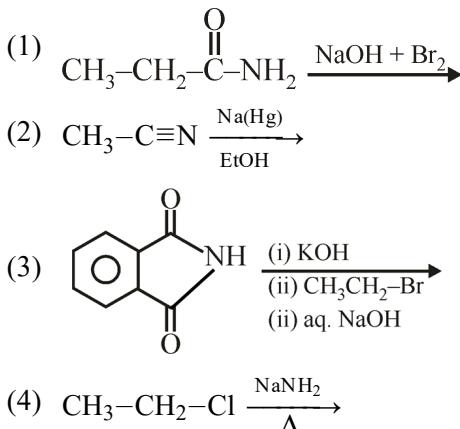
Incorrect statement about product "C" in above reaction.

- (1) Contains phenolic group
 (2) Contain ester group
 (3) Contains carboxylic group
 (4) is used as antipyretic and analgesic

55. D-Galactose is :



56. Which reaction will not give ethylamine as major products?

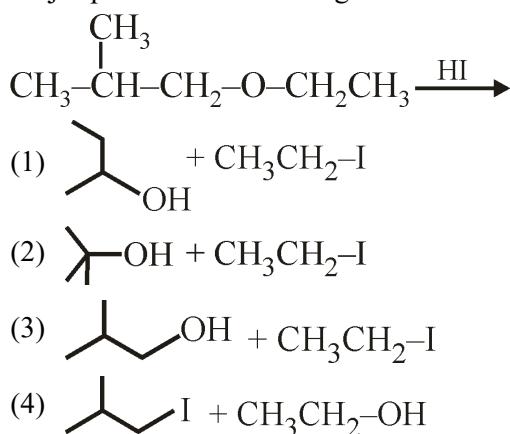


57. Match the column

	Column-I	Column-II
(i)	$\text{CH}_3\text{CH}_2\text{NH}_2 + \text{CHCl}_3 + 3\text{KOH} \rightarrow$	(a) HVZ reaction
(ii)	$\text{CH}_3\text{CH}_2\text{NH}_2 + \text{C}_6\text{H}_5\text{SOCl} \xrightarrow{\text{NaOH}} \text{A} \rightarrow$	(b) Hinsberg test
(iii)	$\text{CH}_3\text{CH}_2\text{COOH} \xrightarrow[\text{(ii) HOH}]{\text{(i) Cl}_2 + \text{Red P}} \text{CH}_3\text{CH}(\text{Cl})\text{COOH}$	(c) Friedel-Craft's reaction
(iv)	OCH_3 $+ \text{CH}_3\text{Cl} \xrightarrow[\text{CS}_2]{\text{AlCl}_3} \text{OCH}_3$	(d) Carbyl-amine reaction

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

58. Major products of following reaction :-



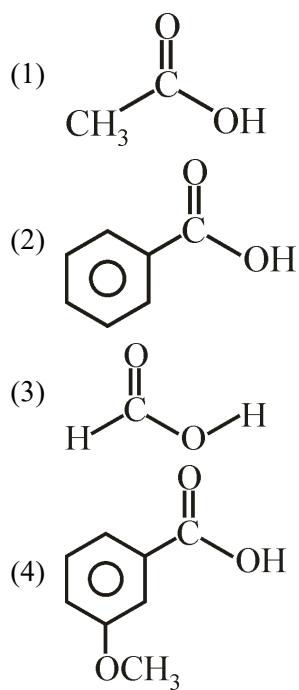
59. Reagent used in Wolf-Krishner reduction is:-

- (1) $\text{H}_2/\text{Ni}, \Delta$
 (2) $\text{NH}_2-\text{NH}_2/\text{H}^\oplus$, followed by heating in presence
 of Base OH^-
 (3) Zn-Hg + Conc HCl
 (4) Red P + HI

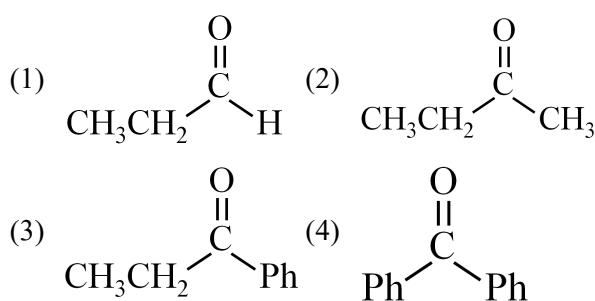
60. Rickets and osteromalacia is a deficiency disease caused by deficiency of which vitamin ?

- (1) Vitamin A (2) Vitamin C
 (3) Vitamin D (4) Vitamin B₁

61. Most reactive carboxylic acid towards esterification reaction with ethanol in presence of H_2SO_4 is :-



62. Most reactive carbonyl compound towards NAR (nucleophilic addition reaction) ?



63. A 5.2 molal aqueous solution of methyl alcohol, CH_3OH is supplied. What is the mole fraction of methyl alcohol in the solution ?

- (1) 1.100 (2) 0.090
 (3) 0.086 (4) 0.050

64. The vapour pressure of acetone at 20°C is 185 torr. When 1.2 g of a non-volatile substance was dissolved in 100 g of acetone at 20° C, its vapour pressure was 183 torr. The molar mass (g mol^{-1}) of the substance is

- (1) 32 (2) 64 (3) 128 (4) 488

65. 1×10^{-3} m solution of $\text{Pt}(\text{NH}_3)_2\text{Cl}_4$ in H_2O shows depression in freezing point by 0.0054°C. The ionisable Cl^- ions will be
 (Given, $K_f(\text{H}_2\text{O}) = 1.860 \text{ K kg mol}^{-1}$)

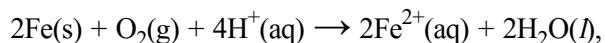
- (1) 1 (2) 2 (3) 3 (4) 4

66. **Assertion (A)** When non-volatile solute is added to solvent, the vapour pressure of the solution decreases.

Reason (R) As number of solvent molecules escaping from the surface is reduced, the vapour pressure of the solution is also reduced.

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

67. Consider the following cell reaction



$$E^\circ = 1.67 \text{ V}$$

At $[\text{Fe}^{2+}] = 10^{-3} \text{ M}$, $p_{\text{O}_2} = 0.1 \text{ atm}$ and $\text{pH} = 3$, the cell potential at 25° C is

- (1) 1.47 V
- (2) 1.77 V
- (3) 1.87 V
- (4) 1.57 V

68. Same amount of electricity is passed through the solutions of HCl and CuSO_4 . If 6.35 g of copper is deposited from CuSO_4 solution, the amount of hydrogen liberated at STP will be

- (1) 0.01 g
- (2) 0.2 g
- (3) 0.001 g
- (4) 0.1 g

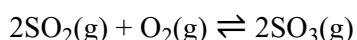
69. Match the following columns.

Column I (Substance)		Column II (Product after electrolysis)	
A.	Aqueous solution of AgNO_3 using Ag electrodes	p.	Oxygen is produced at anode
B.	Aqueous solution of AgNO_3 using Pt electrodes	q.	Hydrogen is produced at cathode
C.	Dilute solution of H_2SO_4 using Pt electrodes	r.	Silver is deposited at cathode
D.	Aqueous solution of CuCl_2 using Pt electrodes	s.	Neither O_2 nor H_2 is produced

Codes

- | A | B | C | D |
|---------|-------|-----|-------|
| (1) r,q | p,q | q,s | p,s |
| (2) r,q | p,q,s | q,s | q,r,s |
| (3) p | q | r | s |
| (4) r,s | r,p | p,q | s |

70. Contact process is used in the formation of sulphur trioxide,



The rate of reaction can be expressed as

$$\frac{-\Delta[\text{O}_2]}{\Delta t} = 2.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$$

Then rate of disappearance of $[\text{SO}_2]$ will be

- (1) $50.0 \times 10^{-5} \text{ mol L}^{-1} \text{ s}^{-1}$
- (2) $3.75 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$
- (3) $2.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$
- (4) $4.12 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$

71. 10 g of a radioactive isotope is reduced to 1.25 g in 12 yr. Calculate the half-life period of the isotope.

- (1) 4 yr
- (2) 3 yr
- (3) 8 yr
- (4) 24 yr

72. **Assertion (A)** : E_a (activation energy) of the forward reaction is higher than that of the backward reaction in a reversible endothermic reaction.

Reason (R) : Threshold energy of the forward reaction is more than that of backward reaction.

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

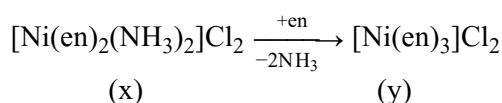
73. Match List-I with List-II :

	List-I Cations		List-II Group of cation
(A)	Ba^{2+}	(I)	Group-IV
(B)	Fe^{3+}	(II)	Group-V
(C)	Cu^{2+}	(III)	Group-III
(D)	Zn^{2+}	(IV)	Group-II

Choose the correct option given below :

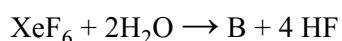
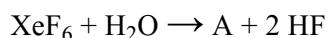
- (1) A-I, B-IV, C-II, D-IV
- (2) A-IV, B-I, C-III, D-II
- (3) A-II, B-III, C-IV, D-I
- (4) A-I, B-II, C-III, D-IV

74. Which statement must be correct for given reaction?



- (1) Stability of (x) > (y)
 - (2) Magnetic moment of (x) > (y)
 - (3) Number of total stereo isomers (x) > (y)
 - (4) Number of unpaired electron (x) > (y)

- 75.** Consider the following reactions :



Select correct about A, B and C :

- (1) Hybridisation of Xe in A, B, C is same
 - (2) Number of lone pairs on Xe in A, B, C are same
 - (3) Number of surrounding atoms in A,B,C are same.
 - (4) All bond angles in A,B,C respectively are same.

76. Which of the following electronic configuration is possible for low spin octahedral complex ?

- (1) $t_{2g}^6 e_g^0$ (2) $t_{2g}^3 e_g^0$
 (3) $t_{2g}^6 e_g^2$ (4) $t_{2g}^3 e_g^2$

77. Which of the following statements are correct for $[\text{Ag}(\text{NH}_3)_2][\text{Ag}(\text{CN})_2]$:

- (A) IUPAC name - diamminesilver (I) dicyanidosilver (I)
 - (B) Number of coordination isomer = 2
 - (C) Hybridisation of Ag in each ion = sp.
 - (D) Shape around central atom in each ion = linear.
 - (E) Complex is paramagnetic (attracted by magnetic field)

Choose the correct option from given below :

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

78. **Assertion (A)** : In metal carbonyls, the metal to ligand bonding creates a synergic effect which strengthens the bond between CO and the metal

Reason (R) : The metal carbon bond in metal carbonyls posses both σ and π characters.

Choose the correct answer from the options given below :

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

- 79.** Which of the following compound is expected to absorb light of lowest frequency ?

- (1) $[\text{Cr}(\text{en})]^3+$
 - (2) $[\text{CrCl}_6]^3-$
 - (3) $[\text{Cr}(\text{NH}_3)_6]^3+$
 - (4) $[\text{Cr}(\text{CN})_6]^3-$

- 80. Assertion (A) :** PbF_4 is a stable compound.

Reason (R) : Fluoride stabilizes higher oxidation state of an element.

Choose the correct answer from the option given below.

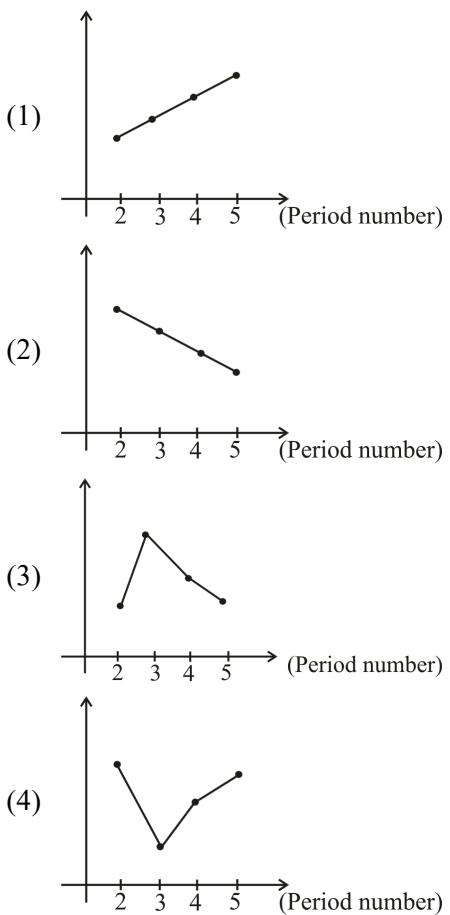
- (1) Both **Assertion** and **Reason** are true but **Reason** is NOT the correct explanation of **Assertion**.

(2) **Assertion** is true but **Reason** is false.

(3) **Assertion** is false but **Reason** is true.

(4) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

81. Which of the following graph represents approximate variation of boiling point of the hydrides of group 16 elements ?



- 82.** Select incorrect statement :

- (1) Graphite is thermodynamically most stable allotrope of carbon.
 - (2) Buckminsterfullerene has aromatic character.
 - (3) Diamond is used as an abrasive for sharpening hard tools.
 - (4) Carbon-carbon distance within the layer and between the layers in graphite is equal.

83. Amongst the following d-block ion, find the number of ion which give coloured aqueous solution.

Zn^{2+} , Cu^{2+} , Ti^{4+} , Fe^{2+} , Sc^{3+} , Cr^{3+} , Co^{2+} , Ni^{2+}

84. Select the incorrect statement for lanthanoid contraction:

- (1) The cumulative effect of the contraction of the lanthanoid series is known as lanthanoid contraction.
 - (2) The radii of the members of the third transition series is very similar to those of the corresponding members of the second series.
 - (3) Lanthanoid contraction is greater than actinoid contraction from element to element.
 - (4) Lanthanoid contraction is due to the imperfect shielding of one 4f electron by another.

85. The variability of oxidation states, a characteristic of transition metal, arises due to participation of these electrons:

- (1) (ns) electrons only
 - (2) $(n - 1)d$ electron only
 - (3) Both (ns) and $(n - 1)d$ electron
 - (4) (ns), (np) and $(n - 1)$ electrons

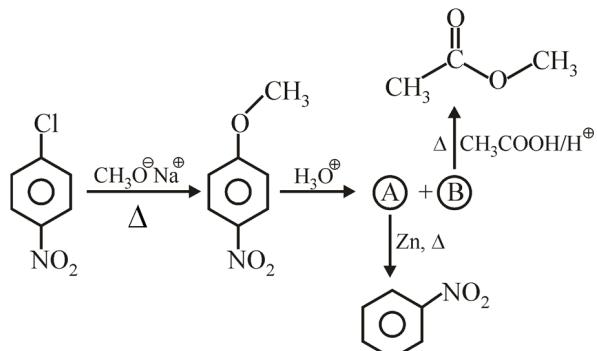
SECTION-B (CHEMISTRY)

- 86.** Correct match the following

(i)		(a)	Wurtz reaction
(ii)	$\text{CH}_3\text{--CH}_2\text{--Cl} \xrightarrow[\text{Dry ether}]{\text{Na}}$ $\text{CH}_3\text{--CH}_2\text{--CH}_2\text{--CH}_3$	(b)	Fittig reaction
(iii)	$\text{CH}_3\text{CH}_2\text{--Cl} \xrightarrow[\text{acetone}]{\text{NaI}}$ $\text{CH}_3\text{CH}_2\text{--I} + \text{NaBr}$	(c)	Finkelstein reaction
(iv)	$\text{CH}_3\text{--CH}_2\text{--Cl} \xrightarrow[\text{DMSO}]{\text{AgF}}$ $\text{CH}_3\text{CH}_2\text{--F} + \text{AgCl}$	(d)	Swarts reaction

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

87.



Identify A and B in above reaction ?

- (1) A =  ; B = $\text{CH}_3\text{CH}_2-\text{OH}$

(2) A =  ; B = $\text{CH}_3\text{CH}_2-\text{OH}$

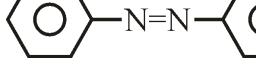
(3) A =  ; B = CH_3-OH

(4) A =  ; B = $\text{CH}_3\text{CH}_2-\text{OH}$

88. Kjeldahl method can detect the presence of nitrogen in which organic compound ?

- (1) 

(2) 

(3) 

(4) $\text{CH}_3\text{CH}_2-\text{NO}_2$

89. Select incorrect statement :-

- (1) All polysaccharides are non-reducing in nature
 - (2) Amylose is water soluble component of starch and is long branched chain polymer of β -D glucose
 - (3) Sucrose is non-reducing disaccharide
 - (4) Amino acids show amphoteric behaviour as they react both with acids and bases.

90. Paper chromatography is a type of

- (1) Partition chromatography
 - (2) Column chromatography
 - (3) Thin layer chromatography
 - (4) Adsorption chromatography

91. Which of the following statements is/are true ?

I. Different gases have different K_H values at the same temperature.

II. K_H is a function of the nature of the gas.

Choose the correct option.

- (1) Only I (2) Only II
(3) Both I and II (4) None of these

92. Resistance of 0.2 M solution of an electrolyte is 50Ω . The specific conductance of the solution is 1.3 Sm^{-1} . If resistance of the 0.4 M solution of the same electrolyte is 260Ω , its molar conductivity is

- (1) $6250 \text{ S m}^2 \text{ mol}^{-1}$
 - (2) $6.25 \times 10^{-4} \text{ S m}^2 \text{ mol}^{-1}$
 - (3) $625 \times 10^{-4} \text{ S m}^2 \text{ mol}^{-1}$
 - (4) $62.5 \text{ S m}^2 \text{ mol}^{-1}$

93. Given $E_{\text{Cr}^{3+}/\text{Cr}}^{\circ} = -0.74\text{V}$; $E_{\text{MnO}_4^-/\text{Mn}^{2+}}^{\circ} = 1.51\text{V}$;
 $E_{\text{Cr}_2\text{O}_7^{2-}/\text{Cr}^{3+}}^{\circ} = 1.33\text{ V}$; $E_{\text{Cl}_2/\text{Cl}^-}^{\circ} = 1.36\text{V}$;
 Based on the data given above strongest oxidising agent will be

- (1) Cl_2 (2) Cr^{3+}
 (3) Mn^{2+} (4) MnO_4^-

94. **Assertion (A)** Conductivity of all electrolytes decreases on dilution.

Reason (R) On dilution number of ions per unit volume decreases.

- Both Assertion and Reason are correct and the Reason is the correct explanation of Assertion.
- Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- Assertion is correct but the Reason is incorrect.
- Assertion is incorrect but Reason is correct.

95. Match the statements given in Column I and Column II.

Column I		Column II	
A.	Catalyst alters the rate of reaction.	1.	Cannot be fraction or zero
B.	Molecularity	2.	Proper orientation is not there.
C.	Second half-life of first order reaction.	3.	By lowering the activation energy
D.	$e^{-E_a/RT}$	4.	Is same as the first
E.	Energetically favourable reactions are sometimes slow.	5.	Total probability is one.
F.	Area under the Maxwell, Boltzmann curve is constant.	6.	Refers to the fraction of molecules with energy equal to or greater than activation energy.

- | | A | B | C | D | E | F |
|-----|---|---|---|---|---|---|
| (1) | 3 | 1 | 4 | 6 | 2 | 5 |
| (2) | 4 | 3 | 1 | 6 | 2 | 5 |
| (3) | 1 | 3 | 4 | 2 | 6 | 5 |
| (4) | 6 | 2 | 5 | 4 | 3 | 1 |

96. Which of the following will give chocolate brown precipitate on adding potassium ferrocyanide ($K_4[Fe(CN)_6]$) ?

- $ZnCl_2$
- $FeCl_3$
- $CuSO_4$
- $AgCl$

97. Which of the following complex is less stable as compared to their respective linkage isomers ?

- $[Pt(NH_3)_4(SCN)_2]^{2+}$
- $[Fe(CN)_6]^{4-}$
- $[Cr(NH_3)_5(NO_2)]^{2+}$
- $[Pd(NCO)_4]^{2-}$

98. Match the List I with List II

	List-I Compounds		List-II Structures
(A)	Decacarbonyldimanganese (0)	(I)	Tetrahedral
(B)	Hexacarbonylchromium (0)	(II)	Octahedral
(C)	Pentacarbonyliron (0)	(III)	Two square pyramidal
(D)	Tetracarbonylnickel (0)	(IV)	Trigonal bipyramidal

Choose the correct answer from the option given below :

- A-II, B-III, C-I, D-IV
- A-III, B-II, C-IV, D-I
- A-II, B-III, C-IV, D-I
- A-I, B-IV, C-III, D-II

99. On thermal decomposition of lead nitrate ($Pb(NO_3)_2$), a red brown gas (A) is obtained. Gas (A) on cooling dimerises to give colourless gas (B), which on further cooling solidifies and exists as ion pair. Hybridisation of central atom in its anion is :

- sp
- sp^2
- sp^3
- sp^3d

100. Select incorrect reaction :

- $2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$
- $10I^- + 2MnO_4^- + 16H^+ \rightarrow 2Mn^{2+} + 8H_2O + 5IO_3^-$
- $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$
- $2MnO_4^- + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^+$

SECTION - A (BOTANY)

- 101.** Correct sequence of embryogenesis in dicot plant is :
- Zygote → Heart shape → Globular shape
→ Mature embryo
 - Zygote → Globular shape → Heart shape
→ Mature embryo
 - Zygote → Globular shape → Mature embryo → Heart shape
 - Zygote → Heart shape → Mature embryo
→ Globular shape
- 102.** The drinking portion of tender coconut (coconut water) is _____ endosperm :
- Cellular
 - Nuclear
 - Helobial
 - Both cellular and nuclear
- 103.** Which of the following is incorrect regarding post fertilization changes ?
- Ovary → Fruit
 - Ovule → Seed
 - Nucellus → Perisperm
 - Integument → Fruit wall
- 104.** In which of the following plant seeds, endosperm is present even after seed maturation ?
- Bean, Pea
 - Coconut, Castor
 - Groundnut, Pea
 - Pea, Castor
- 105.** Which of the following is correct about fertilization in angiosperms ?
- Triple fusion absent
 - Double fertilization present
 - Endosperm forms by syngamy
 - Zygote forms by triple fusion

- 106.** Which structure forms after fusion of male gamete and secondary nucleus ?
- Nucellus
 - Primary endosperm nucleus
 - Zygote
 - Embryo
- 107.** Read the following statements ?
- The life cycle of endoparasites are more complex because of extreme specialisation.
 - Mycorrhizal association is an example of critical link species.
 - Parasites are "Prudent" in nature.
 - Study of the relation of a single species with its environment is known as synecology.
- How many of the above statements are incorrect ?
- 4
 - 1
 - 2
 - 3
- 108.** Which one example is related to Pseudocopulation?
- Pronuba* and *Yucca* flower
 - Bee and Orchid flower
 - Fig and wasp
 - Lichens
- 109.** Vertical distribution of different species occupying different levels is called _____ ?
- Stratification
 - Diversification
 - Succession
 - Dominance species
- 110.** Match the column
- | | Column-I | | Column-II |
|-----|-----------------|-------|------------------|
| (a) | Consumer | (i) | Fungi |
| (b) | Decomposer | (ii) | Phytoplankton |
| (c) | Producer | (iii) | Zooplankton |
- a-(iii), b-(i), c-(ii)
 - a-(i), b-(iii), c-(ii)
 - a-(iii), b-(ii), c-(i)
 - a-(ii), b-(i), c-(iii)

- 111.** **Assertion :** When certain exotic species are introduced into a geographical area, they become invasive and start spreading fast.
Reason : The invaded land does not have its natural predators.
- (1) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.
 - (2) Both **Assertion** and **Reason** are true but **Reason** is NOT the correct explanation of **Assertion**.
 - (3) **Assertion** is false but **Reason** is true.
 - (4) **Assertion** is true but **Reason** is false.
- 112.** **Assertion :** Predators are prudent in nature
Reason : If a predator is too efficient and over-exploits its prey, then the prey might become extinct and following it the predator will also become extinct for lack of food.
- (1) Both assertion and Reason are correct and Reason is the correct explanation of Assertion
 - (2) Both assertion and Reason are correct but Reason is not the correct explanation of Assertion
 - (3) Assertion is correct but Reason is incorrect
 - (4) Both Assertion and Reason is incorrect
- 113.** The annual net primary productivity of the whole biosphere is :-
- (1) 10 billion tons
 - (2) 170 billion tons
 - (3) 55 billion tons
 - (4) 1 billion tons
- 114.** Fill in the blanks with most correct option :
In an airplane (____'x'____) all parts are joined together using thousands of rivets (____'y'____)
- (1) x = Species, y = Biome
 - (2) x = Ecosystem, y = Key stone species
 - (3) x = Ecosystem, y = Species
 - (4) x = Biome, y = Species
- 115.** **Statement-I :** In *in-situ* conservation threatened animals and plant are taken out from natural habitat.
Statement-II : Sacred grooves are example of *in-situ* conservation.
- (1) Statement I and II both are correct.
 - (2) Statement I and II both are incorrect.
 - (3) Only Statement I is correct.
 - (4) Only Statement II is correct.
- 116.** **Statement-I :** Alien species invasion is the most important cause driving animals and plant to extinction.
Statement-II : Many species extinctions in the last 500 years (Steller's Sea cow, Passenger Pigeon) were due to Habitat loss and fragmentation.
- (1) Statement I and II both are correct
 - (2) Statement I and II both are incorrect
 - (3) Only Statement I is correct
 - (4) Only Statement II is correct
- 117.** If in a pond, there are 48 fishes last year and through reproduction 10 new fishes are added taking the current population to 58. What will be the birth rate per fish per year?
- (1) 0.172 (2) 0.827 (3) 0.208 (4) 4.8
- 118.** Asymptote in a logistic growth curve is obtained during :
- (1) $K > N$
 - (2) $K < N$
 - (3) The value of 'r' approaches zero
 - (4) $K = N$
- 119.** Select the incorrectly matched pair regarding biological control of pest ?
- (1) Lady Bird - Aphids
 - (2) Dragon flies - Mosquitoes
 - (3) *Trichoderma* - flies
 - (4) Baculovirus - Arthropods

120. Bacteria grows anaerobically on cellulosic material, produce large amount of _____ along with CO_2 and H_2 . Complete the sentence -
 (1) O_2 (2) Ozone (3) NO_2 (4) Methane
121. Full potential of Penicillin as an effective antibiotic established by -
 (1) Ernest chain (2) Howard Florey
 (3) Alexander Flemming (4) 1 and 2 both
122. Alexander Fleming discovered Penicillin, accidentally, while working on -
 (1) *Penicillium* (2) Staphylococci
 (3) *Lactobacillus* (4) Yeast
123. Lactic acid bacteria responsible for-making of -
 (1) Curd (2) Ethanol
 (3) Antibiotics (4) Drug-Cyclosporine A
124. Microbe which is commonly used for making of bread & wine ?
 (1) Lactic acid Bacteria (2) *Saccharomyces*
 (3) Penicillin (4) Staphylococci
125. Select incorrect statement from the given option -
 1. Pea plant is easy to cultivate
 2. It has many contrasting traits
 3. Pea plant is annual plant with 2-3 year life cycle.
 4. Natural self pollination is present
 (1) 4 (2) 1 (3) 3 (4) 2
126. Match column I with column II and select correct match ?
- | | Column I | | Column II |
|---|--------------|-----|-----------------------------|
| A | Honey bee | I | XX female - XY male |
| B | Grass-hopper | II | ZW female - ZZ male |
| C | Birds | III | Haploid & diploid mechanism |
| D | Human | IV | XX-female - XO male |
- (1) A - I, B - II, C - III, D - IV
 (2) A - IV, B - III, C - II, D - I
 (3) A - III, B - IV, C - II, D - I
 (4) A - I, B - III, C - II, D - IV

127. **Assertion :** Characters are controlled by discrete units called factors
Reason : Law of dominance explains the proportion of 3 : 1 obtained at the F_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.
128. Dominance is not an autonomous feature of a gene or the product, when
 (1) More than one gene influence the same phenotype
 (2) More than one phenotype is influenced by the same gene
 (3) More than one genotype is influenced by the same gene
 (4) More than one allele is there for a character
129. In Morgan's experiment, what will be percentage of recombination in case of body colour and eye colour?
 (1) 37.2% (2) 1.3 %
 (3) 98.7% (4) 27.3%
130. Which of the following structure was discovered by Henking ?
 (1) y-body (2) Bar body
 (3) x-body (4) Nu-body
131. One strand of DNA has base sequence 3'-GTCAGCCTA-5', what will be the sequence of bases in mRNA :
 (1) AGCCTACTA
 (2) GUCAGCCUC
 (3) CAGUCGGAU
 (4) GACTAGCTA

132. Fill in the blanks :

____(A)____ has evolved from ____(B)____ with chemical modification that make it ____(C)____.

- (1) RNA, DNA, less stable
- (2) DNA, RNA, less stable
- (3) RNA, DNA, more stable
- (4) DNA, RNA, more stable

133. Fill in the blanks :

The anticodon of ____(A)____ recognises its complimentary sequence on ____(B)____.

- (1) mRNA, tRNA (2) tRNA, mRNA
- (3) tRNA, rRNA (4) rRNA, mRNA

134. The average rate of polymerisation of DNA by DNA polymerase in *E.coli* has to be approximately :

- (1) 2000 bp per second
- (2) 200 bp per second
- (3) 1000 bp per second
- (4) 20000 bp per second

135. Histones are rich in the basic amino acid residues ____A____ and ____B____ :

- (1) A-Methionine, B-Serine
- (2) A-Leucine, B-Isoleucine
- (3) A-Methionine, B-Lysine
- (4) A-Lysine, B-Arginine

SECTION - B (BOTANY)

136. Pollen–Pistil interaction is a dynamic process involving pollen recognition followed by _____ of the pollen :

- (1) Promotion
- (2) Inhibition
- (3) Suspension
- (4) Promotion or inhibition

137. Which of the following is correct ?

- (1) In about 60% of angiosperm, pollination occurs at 3-celled stage.
- (2) In about 40% of angiosperm pollination occurs at 2-celled stage.
- (3) Generative cell divides meiotically to form two male gametes.
- (4) In over 60% of angiosperm, pollination occurs when a pollen grain at least form a vegetative cell and a generative cell.

138. Read the following statements :

- (i) Clown fish and sea anemone - Commensalism
- (ii) Termite and *Trichonympha* - Mutualism
- (iii) Orchid growing on tree - Parasitism
- (iv) Lianas growing on other tree - commensalism

How many of the above statements are correct ?

- (1) One
- (2) Two
- (3) Three
- (4) Four

139. Which one of the following example is basically concerned with four levels of Biological organisation ?

- (1) Organism, Population, Community and Ecosystem
- (2) Organism, Population, Community and Biomes
- (3) Organism, Population, Community and Biosphere
- (4) Organism, Population, Ecosystem and Biome

140. Choose the incorrect option for following food chain:-

- Grass → Insect → Sparrow → Hawk
- (a) Hawk is ecologically weak
 - (b) Sparrow is predator
 - (c) Insect is phytophagous
 - (d) Energy from insect is completely transferred to sparrow
- (1) only d
 - (2) only a
 - (3) a, b, c
 - (4) a & d

- 141.** Read the following statements carefully and choose the options having correct statements :
- Tilman found that plots with more species showed less year to year variation in total biomass.
 - Stable community can show too much variation in year to year productivity.
 - Alien species invasions provide stability to the stable community.
 - According to Tilman biomass can be increased without increasing diversity.
- How many statement are correct ?
- Three
 - One
 - Two
 - Four
- 142.** In classical experiment of Mendel on pea plant, How many of the following characters were studied by Mendel ?
Seed shape, Flower position, Pod color, pod length.
- 4
 - 3
 - 2
 - 1
- 143.** In a linear chromosome map distance between four loci are as follow :
 $p - q = 20$, $q - r = 8$, $p - s = 6$, $p - r = 12$
the cross over frequency between r & s is
- 3%
 - 18%
 - 6 or 18%
 - 6%
- 144.** Which of following is incorrect regarding human pedigree ?
- Sex unspecified -
 - Marriage -
 - Abortion -
 - Male -
- 145.** On selfing a dihybrid ($AaBb$) produce 9 types of phenotypic categories, then dihybrid plant shows:
- Dominance of two genes
 - Incomplete dominance of two genes
 - Dominance of one gene and incomplete dominance of another gene
 - Pleiotropy
- 146.** The terminator is located in transcription unit, at :
- 3'-end of the non-coding strand
 - 5'-end of the non-coding strand
 - 3'-end of the coding strand
 - 5'-end of the coding strand
- 147.** Fill in the blanks :
RNA function as (A), (B) and in some cases it also acts as a (C).
- Replication, Joining, Structural
 - Adapter, Structural, Catalyst (Ribozyme)
 - Genetic material, Replication, Polymerisation
 - Filling of gap, structural, polymerisation
- 148.** The following are the few examples of eukaryotic RNAs. How many of them is/are transcribed by RNA polymerase-II ?
5s rRNA, 5.8s rRNA, 18s rRNA, 28s rRNA, hnRNA, tRNA, SnRNA :
- Three
 - One
 - Four
 - Two
- 149.** In the experiments of Avery, Macleod and McCarty, they discovered that proteases and RNase did not affect transformation. Digestion with DNase did inhibit transformation which means the transformation was caused by :
- DNase
 - RNA
 - DNA
 - Protein
- 150.** Fill in the blanks :
Semiconservative experiments involving use of radioactive thymidine to detect distribution of newly synthesised DNA in the chromosomes was performed on A by B :
- E.coli*, Watson and Crick
 - Vicia faba*, Meselson & Stahl's
 - E.coli*, Meselson, Stahl's
 - Vicia faba*, Taylor

SECTION - A (ZOOLOGY)

151. How many of the following methods are related to invitro fertilization technique ?

GIFT, AI, ZIFT, IUT, ICSI

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

152. Hormone releasing IUD is :-

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

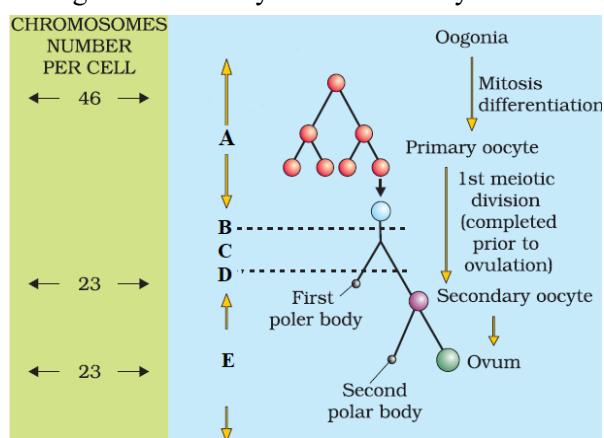
153. Read the following statements and find out option having correct statements :-

- (a) Outer layer of blastocyst called trophoblast
 (b) The blastocyst become embedded in the myometrium of the uterus
 (c) An inner group of cells attached to the trophoblast is called the "inner cell mass"

Option :-

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

154. The following refers to schematic representation of oogenesis. Identify A to E correctly :-



- (1) (A) Foetal life, (B) Birth, (C) Puberty,
 (D) Adult reproductive life, (E) Child hood
 (2) (A) Foetal life, (B) Birth, (C) Child hood,
 (D) Puberty, (E) Adult reproductive life
 (3) (A) Adult reproductive life, (B) Birth,
 (C) Puberty, (D) Childhood, (E) Foetal life
 (4) (A) Birth, (B) Childhood, (C) Foetal life,
 (D) Puberty, (E) Adult reproductive life

155. Which one of the following option gives correct categorisation ?

	Haploid	Diploid
(1)	Spermatid	Oogonia
(2)	Spermatid	Ootid
(3)	Primary Oocyte	Spermatogonia
(4)	Secondary Oocyte	Spermatozoa

156. Which scientist disapproved the "Good humor hypothesis" ?

- (1) Hippocrates
 (2) Indian Ayurvedic System of Medicine
 (3) William Harvey
 (4) (1) and (2)

157. **Statement I :** Primary oocyte within the tertiary follicle grows in size and completes its first meiotic division.

Statement II : The second meiotic division occurs in secondary oocyte in graafian follicle and results in the formation of a second polar body and a haploid ovum (ootid).

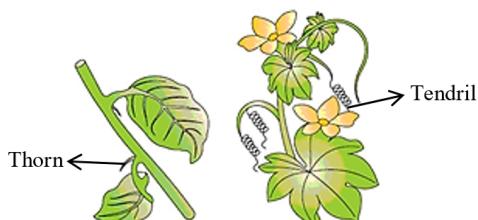
- (1) Both statements are correct
 (2) Statement I is correct and II is incorrect
 (3) Statement I is incorrect and II is correct
 (4) Both statements are incorrect

158. Which statement is correct regarding male reproductive system.

- (1) Epididymis located along the anterior surface of each testis.
 (2) The urethra originates from the ureter and extends through the penis to its external opening called urethral meatus
 (3) Interstitial cells synthesise and secrete testicular hormones called androgens
 (4) Prostate and bulbourethral glands found in paired form

- 159.** The region outside the seminiferous tubule in which small blood vessels, interstitial cells and immunologically competent cells are present is called :-
- Perivitelline space
 - Peritesticular space
 - Interstitial space
 - Inguinal space
- 160.** The spermatid are transformed into spermatozoa (sperm) by the process called :-
- Spermiogenesis
 - Spermiation
 - Spermatogenesis
 - Oogenesis
- 161.** Bean shaped large organ has the lymphocytes and phagocytes and is the reservoir for erythrocytes. The organ is :-
- Primary lymphoid organ
 - Secondary lymphoid organ
 - Lymph node
 - Tonsil
- 162.** Which statement is incorrect ?
- The world population was 2 million in 1900 which increased to 6 million in 2000.
 - At the time of independence, Indian population was 350 million.
 - 14th day of menstrual cycle-ovulation
 - Decline in death rate, MMR and IMR are causes of rapid increase in population.
- 163.** Lips and finger nails may turn gray to bluish in colour in which of the following disease ?
- Common cold
 - Typhoid
 - Pneumonia
 - Malaria
- 164.** The hominid fossil discovered in java in 1891 revealed a stage in human evolution which is called:
- Homo erectus
 - Dryopithecus
 - Australopithecus
 - Homo habilis
- 165.** Branching descent and natural selection are the two key concepts of
- Darwinian theory of Evolution
 - Lamarckism theory of Evolution
 - Eltonian theory of Evolution
 - Lindeman's theory of Evolution
- 166.** Which of the following sets do not have analogous organs?
- Wings of butterfly and birds
 - Eye of octopus and mammals
 - Flippers of Penguins and Dolphins
 - Forelimbs of Whale, bat and Cheetah
- 167.** Which of the following disease can spread through droplet infection ?
- Pneumonia
 - Typhoid
 - Common cold
 - Both (1) and (3)
- 168.** Sugar glider does not show adaptive radiation with.
- Kangaroo
 - Tiger cat
 - Flying squirrel
 - (1) and (2) both
- 169.** **Assertion :** Homology based on divergent evolution.
Reason : Analogous structures are a result of convergent evolution.
Find out the correct answer from the options given below :
- Both assertion and reason are correct and reason is the correct explanation of assertion.
 - Both assertion and reason are correct but reason is not the correct explanation of assertion.
 - Assertion is true but reason is false.
 - Both assertion and reason are false.

170.



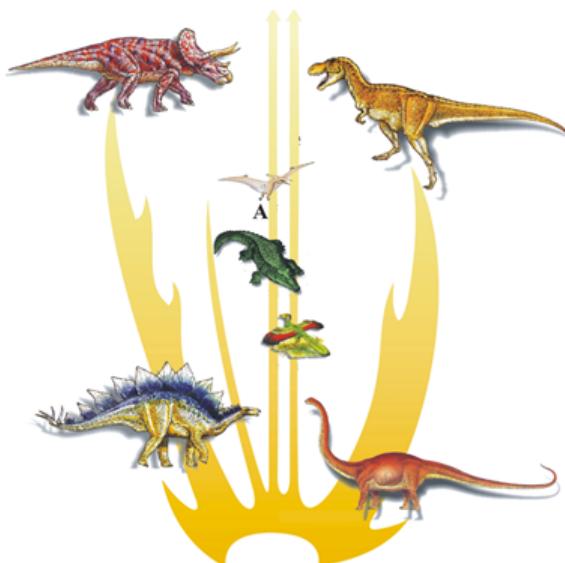
is example of ?

- (1) Homology
- (2) Analogy
- (3) Artificial selection
- (4) All of the above

171. Why a female does not ovulate during the pregnancy?

- (1) Her fallopian tube gets blocked temporarily.
- (2) High level of HCG prevents fusion of sperm and ovum.
- (3) High level of estrogen and progesterone inhibits secretion of gonadotropin
- (4) All of the above

172. Identify Animal-A in the family tree of dinosaurs in the adjacent figure ?

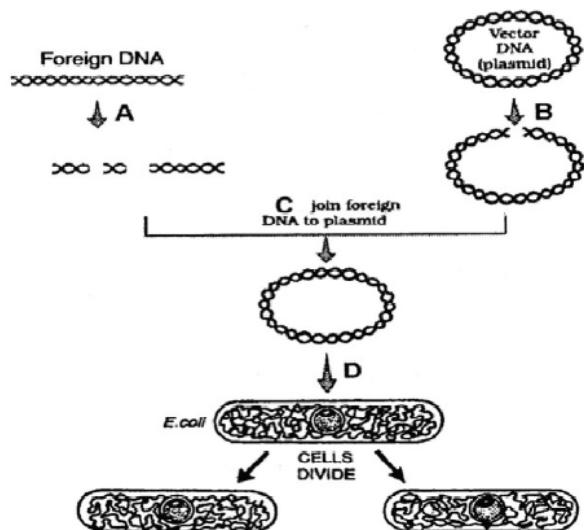


- (1) Stegosours
- (2) Pelycosaurs
- (3) Pteranodon
- (4) Triceratop

173. In which of the following immature lymphocytes differentiate into antigen sensitive lymphocytes ?

- (1) Thymus
- (2) Spleen
- (3) Appendix
- (4) Lymph node

174.



The above diagram refers to recombinant DNA technology. Identify A to D.

	A	B	C	D
(1)	Exonuclease	Endonuclease	DNA ligase	Transformation
(2)	Exonuclease	Exonuclease	DNA ligase	Transformation
(3)	Exonuclease	Endonuclease	Hydrolase	Transduction
(4)	Restriction Endonuclease	Restriction Endonuclease	DNA ligase	Transformation

175.

	Column-I	Column-II
I.	PCR	A. Large scale culture
II.	Bioreactor	B. To introduce alien DNA in host cell
III.	Gene gun	C. Restriction endonuclease
IV.	Eco RI	D. Amplification of gene

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

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

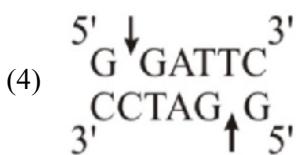
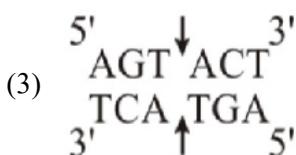
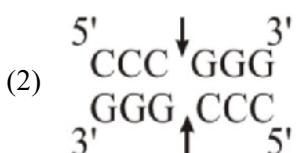
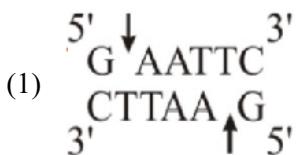
(3) I - D, II - A, III - C, IV - B

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

176. The first restriction endonuclease reported was :

- (1) Hind II
- (2) EcoRI
- (3) Hind III
- (4) BamHI

177. Which of the following palindromic sequence is recognised by EcoRI ?



- 178.** Intestinal perforation and death may occur in severe cases of which disease ?

- (1) Typhoid
 - (2) Pneumonia
 - (3) Filariasis
 - (4) Malaria

- 179. Assertion :** Both passenger and vehicle DNAs are cleaved by using the same restriction endonuclease enzyme.

Reason : If we use same restriction enzyme on both passenger and vehicle DNAs, they produce complementary sticky ends.

- (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.

- 180.** The proteins encoded by the genes cry I Ac and cry II Ab are effective against :-

- (1) Corn borer (2) Cotton bollworms
(3) Nematodes (4) Mosquitoes

- 181.** Identify the correct statement with respect to development of transgenic animals for study of diseases :-

- (1) Transgenic animals are designed to increase our understanding of role of genes in disease.
 - (2) Animals are developed as model for human diseases to investigate new methods of treatments
 - (3) Models exist for Alzheimer's and cystic fibrosis
 - (4) All of these

- 182.** Select the true statements from the following regarding insulin :-

- (A) Insulin from animal source, may develop allergy in some patients
 - (B) Recombinant insulin do not induce unwanted immunological response
 - (C) C-peptide is present in mature insulin
 - (D) Insulin can be administered orally to diabetic patient.

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

183. Penicillin is obtained from:-

- (1) Yeast (2) Bacteria
(3) Fungi (4) Algae

- 184.** Bt-toxin is produced as inactive protoxin and gets converted into active form in insect gut due to:-

- (1) Alkaline pH
 - (2) Acidic pH
 - (3) Neutral pH
 - (4) High amount of silicon

185. **Statement A :** RNA interference takes place in all eukaryotic organisms as a method of cellular defense.

Statement B : Protein encoded by crylAb gene controls corn borer. Choose the correct option.

Select the correct answer from the option given below :

- (1) Only A is correct
- (2) Only B is correct
- (3) Both A and B are correct
- (4) Both A and B are incorrect

SECTION - B (ZOOLOGY)

186. A transgenic food crop which may help in solving the problem of night blindness in developing countries is:-

- (1) Bt Soybean (2) Golden rice
- (3) Flavr Savr tomatoes (4) Starlink maize

187. What is antisense technology ?

- (1) When a piece of RNA that is complementary in sequence is used to stop expression of a specific gene
- (2) RNA polymerase producing DNA
- (3) A cell displaying a foreign antigen used for synthesis of antigens
- (4) Production of somaclonal variants in tissue cultures

188. Please read following sentences carefully .

- (A) Each antibody molecule consists of four types of polypeptide chains
- (B) Hemophilus generally enter alveoli through droplet infection
- (C) In severe cases of typhoid intestinal perforation may occur
- (D) common cold is caused by *rhabdo* virus

Which of the above mentioned statements are not incorrect ?

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

189. Fragments of DNA formed after treatment with endonucleases are separated by the technique

- (1) Polymerase chain reaction
- (2) Treating with divalent cation
- (3) Treating with lysing enzyme
- (4) Electrophoresis

190. An antibiotic resistance gene of plasmid vector which get inactivated due to insertion of alien DNA, helps in the selection of:

- (1) Transformants
- (2) Recombinants
- (3) Non-Transformants
- (4) (2) & (3) both

191. The drugs, which are commonly abused are opioid, cannabinoids and coca alkaloid. Majority of these are obtained from..... while some are obtained from

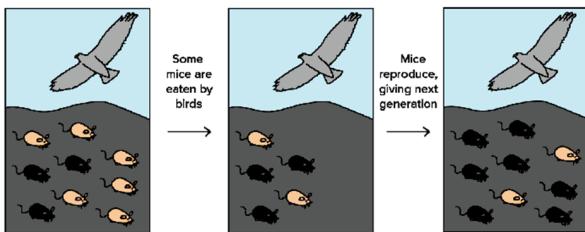
- (1) Fungi, non-flowering plants
- (2) Flowering plants, fungi
- (3) Fungi, flowering plants
- (4) Non flowering plants, fungi

192. For the completion of fertilization which sequence of layers (outer to inner) are crossed by sperm ?

- (1) Theca externa—Theca media—Corona radiata — Zona pellucida—Plasma membrane of oocyte
- (2) Corona radiata — Zona pellucida — Perivitelline space — Plasma membrane of oocyte
- (3) Zona pellucida — Corona radiata — Theca externa
- (4) Theca interna — Zona pellucida — Corona radiata — Plasma membrane of oocyte

<p>193. Read the following statements and choose option having correct statements :-</p> <p>(a) By the end of the second month of pregnancy, the foetus develops limbs and digits. (b) By the end of 24th week the body is covered with fine hair. (c) The first sign of growing foetus may be noticed by listening to the heart sound through the stethoscope.</p> <p>(1) a, b (2) a, c (3) b, c (4) a, b, c</p>	<p>196. Match the following :-</p> <table border="1" data-bbox="885 208 1488 864"> <tbody> <tr> <td>(A)</td><td>Non-medicated IUDSs</td><td>(a)</td><td>Multiload 375</td><td>(i)</td><td>Makes the Uterus unsuitable for implantation</td></tr> <tr> <td>(B)</td><td>Copper releasing IUDS</td><td>(b)</td><td>Non-Steroid</td><td>(ii)</td><td>Phagocytise the sperms</td></tr> <tr> <td>(C)</td><td>Hormone releasing IUDs</td><td>(c)</td><td>Lippes loop</td><td>(iii)</td><td>Suppress sperm motility</td></tr> <tr> <td>(D)</td><td>Saheli</td><td>(d)</td><td>LNG-20</td><td>(iv)</td><td>Weekly oral pill</td></tr> </tbody> </table> <p>(1) A-b-i, B-c-ii, C-d-iii, D-a-iv (2) A-c-iv, B-a-iii, C-d-i, D-d-ii (3) A-c-ii, B-a-iii, C-d-i, D-b-iv (4) A-a-iii, B-c-ii, C-d-ii, D-b-iv</p>	(A)	Non-medicated IUDSs	(a)	Multiload 375	(i)	Makes the Uterus unsuitable for implantation	(B)	Copper releasing IUDS	(b)	Non-Steroid	(ii)	Phagocytise the sperms	(C)	Hormone releasing IUDs	(c)	Lippes loop	(iii)	Suppress sperm motility	(D)	Saheli	(d)	LNG-20	(iv)	Weekly oral pill
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(D)	Saheli	(d)	LNG-20	(iv)	Weekly oral pill																				
<p>194. A man is facing with sterility problems when his hormonal analysis was done. FSH was normal but level of testosterone was disturbed. Which of the part must be dysfunctional ?</p> <p>(1) Anterior pituitary gland (2) Epididymis (3) Sertoli cells of testis (4) Leydig cell</p>	<p>197. The original variety of beak in Darwin's finch was:</p> <p>(1) Seed-eating (2) Cactus-eating (3) Insectivorous (4) Woodpecker</p>																								
<p>195. Match the following and give the answer for correct match:</p>	<p>198. Which of the following statements is true about the phenomenon of industrial melanism observed in peppered moth in England ?</p>																								
<table border="1" data-bbox="177 1358 774 1796"> <tbody> <tr> <td>A</td> <td>ZIFT</td> <td>i</td> <td>More than 8 blastomere stage transfer into the uterus</td> </tr> <tr> <td>B</td> <td>IUT</td> <td>ii</td> <td>Sperm is directly injected into the cytoplasm of ovum.</td> </tr> <tr> <td>C</td> <td>GIFT</td> <td>iii</td> <td>Zygote upto 8 blastomere could be transfer into the fallopian tube.</td> </tr> <tr> <td>D</td> <td>ICSI</td> <td>iv</td> <td>Transfer of an ovum collected from ovary into the fallopian tube</td> </tr> </tbody> </table>	A	ZIFT	i	More than 8 blastomere stage transfer into the uterus	B	IUT	ii	Sperm is directly injected into the cytoplasm of ovum.	C	GIFT	iii	Zygote upto 8 blastomere could be transfer into the fallopian tube.	D	ICSI	iv	Transfer of an ovum collected from ovary into the fallopian tube	<p>(1) Before industrialization, the frequency of white-winged moths was more in comparison to dark-winged moths. (2) Before industrialization, the frequency of dark-winged moths was more in comparison to white-winged moths. (3) After industrialization, the frequency of dark-winged moths became equal to the frequency of white-winged moths. (4) Dark-winged moths survived more after industrialization due to thick growth of lichens on tree trunks.</p>								
A	ZIFT	i	More than 8 blastomere stage transfer into the uterus																						
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<p>(1) A-i B-ii C-iii D-iv (2) A-iv B-iii C-ii D-i (3) A-iv B-iii C-i D-ii (4) A-iii B-i C-iv D-ii</p>																									

199. A population of mice has moved into a new area where the rocks are very dark. Due to natural genetic variation some mice are black while others are white. White mice are more visible to predatory birds. Thus white mice are eaten at higher frequency than black mice. Only the surviving mice reach reproductive age and leave offspring. Because black mice had a higher chance of leaving offspring than white mice, the next generation contains a higher fraction of black mice than the previous generation. It is an example of which type of natural selection ?



- (1) Stabilising (2) Disruptive
(3) Directional (4) Artificial

- 200.** Evolution by anthropogenic action includes :

- (A) Natural selection of herbicide resistant varieties.
 - (B) Natural selection of pesticide resistant varieties.
 - (C) Evolution by human action.
 - (1) A & B
 - (2) B & C
 - (3) A, B & C
 - (4) Only C