

Motion

Question Paper [CODE - 27685]

NEET PATTERN TEST Brahmastra Semi Major Test-06 (New pattern)

13th NEET - Phase 12

KOTA

Date: 02-Mar-2025

Duration: 3 Hours

Max Marks: 720

IMPORTANT INSTRUCTIONS

- The test is of **3 hours** duration and the Test Booklet contains **180** multiple-choice questions (four options with a single correct answer) from Physics (**45 Ques.**), Chemistry (**45 Ques.**) and Biology (**90 Ques.**). [All Questions are compulsory]
- 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 score. The **maximum marks** are **720**.
- Rough work is to be done in the space provided for this purpose in the Test Booklet only.
- Blank papers, Clipboards, Log tables, Slide Rule, Calculators, Cellular Phones, Pagers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.

GENERAL INSTRUCTION FOR FILLING THE OMR

- Use **Blue/Black Ball Point Pen** only for marking responses on Answer Sheet (OMR sheet).
- Indicate the correct answer for each question by filling appropriate bubble in your OMR answer sheet.
- While filling the bubbles please be careful about Question Number

महत्वपूर्ण निर्देश

- परीक्षा अवधि **3** घंटा है एवं परीक्षा पुस्तिका में भौतिकी, (**45** प्रश्न), रसायनशास्त्र (**45** प्रश्न) एवं जीव विज्ञान (**45** प्रश्न) विषयों से कुल **180** वहुविकल्पीय प्रश्न हैं (4 विकल्पों में से एक सही उत्तर है)। [**सभी प्रश्न अनिवार्य हैं**]
- प्रत्येक प्रश्न **4** अंक का है। प्रत्येक सही उत्तर के लिए परीक्षार्थी को **4** अंक दिए जाएँगे। प्रत्येक गलत उत्तर के लिए कुल योग में से एक अंक घटाया जाएगा। अधिकतम अंक **720** है।
- एफ कार्ड इस परीक्षा पुस्तिका में केवल निर्धारित स्थान पर ही करें।
- खाली पेपर, विलप बोर्ड, लॉग टेबल, स्लाइड रूल, कैलकुलेटर, सेल्फ्युलर फोन, पेजर और इलेक्ट्रोनिक गैजेट्स को किसी भी रूप में परीक्षा हॉल के अंदर ले जाने की अनुमति नहीं है।

OMR भरने के लिए सामान्य निर्देश

- उत्तर पुस्तिका (OMR पुस्तिका) पर निशान लगाने के लिए केवल नीले/काले बॉल पॉइंट पेन का प्रयोग करें।
- उत्तर अपनी OMR उत्तर पुस्तिका में उपयुक्त गोले भरके प्रत्येक प्रश्न के लिए सही उत्तर अंकित करें।
- उत्तर गोले भरते समय प्रश्न संख्या पर ध्यान दें।

PHYSICS

[PHYSICS]

- Q 1.** Which one of the following statement regarding electrostatics is wrong? **5.**
- Charge is quantized
 - Charge is conserved
 - There is an electric field near an isolated charge at rest
 - A stationary charge produces both electric and magnetic fields
- Q 2.** Two mutually perpendicular insulated long conducting wires carrying equal currents I , intersect at origin. Then the resultant magnetic induction at point P (2m, 3m) will be -
-
- $\frac{\mu_0 I}{5a}$
 - $\frac{5\mu_0 I}{2\pi}$
 - $\frac{\mu_0 I}{12\pi}$
 - 0
- Q 3.** The number of photons per second on an average emitted by the source of monochromatic light of wavelength 5000 Å when it delivers the power of 2.2×10^{-3} W is
- $\frac{9}{5} \times 10^{16}$
 - $\checkmark \frac{5}{9} \times 10^{16}$
 - $\frac{5}{9} \times 10^{12}$
 - $\frac{9}{5} \times 10^{12}$
- Q 4.** The refractive index of a converging lens is 1.4. What will be the focal length of this lens if it is placed in a medium of same refractive index? Assume the radii of curvature of the faces of lens are R_1 and R_2 respectively.
- Zero
 - $\frac{R_1 R_2}{R_1 - R_2}$
 - Infinite
 - 1
- Q 5.** In a region of space the electric field is in the x -direction and proportional to x , i.e., $\vec{E} = E_0 x^2 \hat{i}$. Consider an imaginary cubical volume of edge 'a' with its edges parallel to the axes of coordinates. The charge inside this volume will be :
- Zero
 - $\epsilon_0 E_0 a^4$
 - $\frac{1}{\epsilon_0} E_0 a^4$
 - $\frac{1}{6} \epsilon_0 E_0 a^4$
- Q 6.** Energy is stored in the choke coil in the form of -
- Heat
 - Electric field
 - Magnetic field
 - None
- Q 7.** Let p and E denote the linear momentum and energy of a photon. If the wavelength is decreased, then
- Both p and E increase
 - p increases and E decreases
 - p decreases and E increases
 - Both p and E decrease
- Q 8.** A microscope is focused on an object at the bottom of a bucket. If liquid with refractive index $\frac{5}{3}$ is poured inside the bucket, then microscope have to be raised by 30 cm to focus the object again. The height of the liquid in the bucket is :
- 12 cm
 - 50 cm
 - 18 cm
 - 75 cm
- Q 9.** Two charges each Q are released when the distance between them is d . Then the velocity of each charge of mass m each when the distance between them is $2d$ is:
- $\frac{Q}{\sqrt{8\pi\epsilon_0 dm}}$
 - $\frac{Q}{\sqrt{4\pi\epsilon_0 dm}}$
 - $\frac{Q}{4\sqrt{\pi\epsilon_0 dm}}$
 - $\frac{Q}{\sqrt{2\pi\epsilon_0 dm}}$

10. A magnet of magnetic moment M is rotated through 360° in a magnetic field B ; the work done will be :

- (1) MB
- (2) $2MB$
- (3) $2\pi MB$
- (4) zero

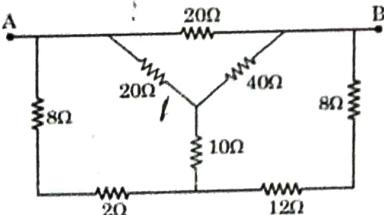
11. In an experiment on photoelectric effect, the slope of the cut-off voltage versus frequency of incident light is found to be $4.12 \times 10^{-15} \text{ Vs}$. Calculate the value of Planck's constant.

- (1) $6.592 \times 10^{-34} \text{ Js}^{-1}$
- (2) $6.592 \times 10^{-32} \text{ Js}^{-1}$
- (3) $6.290 \times 10^{-32} \text{ Js}^{-1}$
- (4) $6.290 \times 10^{-34} \text{ Js}^{-1}$

12. Consider a light ray travelling in air is incident into a medium of refractive index $\sqrt{2n}$. The incident angle is twice that of refracting angle. Then, the angle of incidence will be:

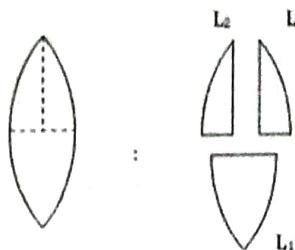
- (1) $\sin^{-1}(\sqrt{n})$
- (2) $\cos^{-1}\left(\sqrt{\frac{n}{2}}\right)$
- (3) $\sin^{-1}(\sqrt{2n})$
- (4) $2\cos^{-1}\left(\sqrt{\frac{n}{2}}\right)$

13. Equivalent resistance between A and B will be



- (1) 20Ω
- (2) 80Ω
- (3) 60Ω
- (4) 10Ω

14. A convex lens has power P . It is cut into two halves along its principal axis. Further one piece (out of the two halves) is cut into two halves perpendicular to the principal axis (as shown in figures). Choose the incorrect option for the reported pieces.



- (1) Power of $L_1 = \frac{P}{2}$
- (2) Power of $L_2 = \frac{P}{2}$
- (3) Power of $L_3 = \frac{P}{2}$
- (4) Power of $L_1 = P$

15. An electron moves with a velocity $1 \times 10^3 \text{ m/s}$ in a magnetic field of induction 0.3 T at an angle 30° . If $\frac{e}{m}$ of electron is $1.76 \times 10^{11} \text{ C/kg}$ the radius of the path is nearly:

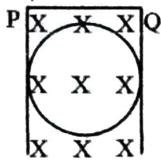
- (1) 10^{-8} m
- (2) $2 \times 10^{-8} \text{ m}$
- (3) 10^{-6} m
- (4) 10^{-10} m

16. Charge passing through a conductor is given by $Q = \alpha t - \beta t^2$, where α and β are constants. Find

- (i) time for which current is passing through conductor.
- (ii) total amount of charge flow through the conductor.

- (1) $\frac{\alpha}{2\beta}, \frac{\alpha^2}{4\beta}$
- (2) $\frac{\alpha}{\beta}, \frac{\alpha^2}{2\beta}$
- (3) $\frac{3\alpha}{\beta}, \frac{2\alpha^2}{3\beta}$
- (4) None

17. A vertical ring of radius r and resistance R falls vertically. It is in contact with two vertical rails which are joined at the top. The rails are without friction and resistance. There is a horizontal uniform magnetic field of magnitude B perpendicular to the plane of the ring and the rails. When the speed of the ring is v , the current in the section PQ is -



(1) zero

(2) $\frac{2Brv}{R}$

(3) $\frac{4Brv}{R}$

(4) $\frac{8Brv}{R}$

18. The speed of light in media 'A' and 'B' are $2.0 \times 10^{10} \text{ cm/s}$ and $1.5 \times 10^{10} \text{ cm/s}$ respectively. A ray of light enters from the medium B to A at an incident angle ' θ '. If the ray suffers total internal reflection, then

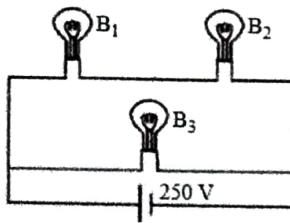
(1) $\theta = \sin^{-1}\left(\frac{3}{4}\right)$

(2) $\theta > \sin^{-1}\left(\frac{2}{3}\right)$

(3) $\theta < \sin^{-1}\left(\frac{3}{4}\right)$

(4) $\theta > \sin^{-1}\left(\frac{3}{4}\right)$

19. A 100 W bulb B_1 , and two 60 W bulbs B_2 and B_3 , are connected to a 250 V source, as shown in the figure. Now W_1 , W_2 and W_3 are the output power of the bulbs B_1 , B_2 and B_3 respectively. Then,



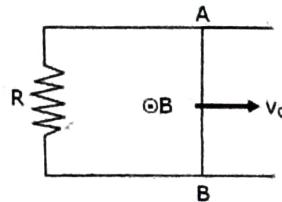
(1) $W_1 > W_2 = W_3$

(2) $W_3 > W_2 > W_1$

(3) $W_1 > W_2 > W_3$

(4) $W_1 = W_2 = W_3$

20. Two long parallel metallic wires with a resistance R forms a horizontal plane. A conducting AB is on the wires as shown here. The space has a magnetic field pointing vertically upwards. The rod is given an initial velocity v_0 . There is no friction and no resistance in the wires and the rod. After a time t , the velocity of the rod will be v such that



(1) $v > v_0$

(2) $v < v_0$

(3) $v = v_0$

(4) $v = -v_0$

21. If the distance between object and its two times magnified virtual image produced by a curved mirror is 15 cm, the focal length of the mirror must be:

(1) $10 / 3 \text{ cm}$

(2) -12 cm

(3) -10 cm

(4) 15 cm

22. A $500 \mu\text{F}$ capacitor is charged at the steady rate of $100 \mu\text{C/s}$. How long will it take to raise the potential difference between the plates of the capacitor to 10 V?

(1) 5 s

(2) 10 s

(3) 50 s

(4) 100 s

23. The mutual inductance of an induction coil is 5 H. In the primary coil, the current reduces from 5 A to zero in 10^{-3} sec. What is the induced emf in the secondary coil?

(1) 2500 V

(2) 25000 V

(3) 2510 V

(4) Zero

24. After radioactive γ -decay of an element, the change occurs -

(1) only in atomic number

(2) only in mass number

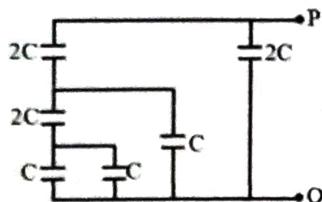
(3) in atomic number and mass number both

(4) neither in atomic number nor in mass number

25. In Young's double slit experiment when wavelength of 700 nm is used then fringe width of 0.7 mm is obtained. If wavelength of 500 nm is used then what is the fringe width?

- (1) 0.35 mm
- (2) 0.5 mm
- (3) 3.5 mm
- (4) 5 mm

26. The resultant capacitance of given circuit between points P and Q is



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

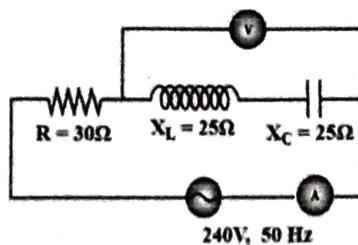
27. An alternating current having peak value 14 A is used to heat a metal wire. To produce the same heating effect, a constant current i can be used where i is

- (1) 14 A
- (2) about 20 A
- (3) 7 A
- (4) about 10 A

28. Two capacitors are joined in series. The first has a capacity $4\mu F$ and is designed for maximum voltage 10 V, second has a capacity $6\mu F$ and is designed for maximum voltage 6 V. What is the maximum voltage that can be applied across this combination?

- (1) 10V
- (2) 18V
- (3) 15V
- (4) 8V

29. In the circuit shown in figure, if source resistance is neglected, then the voltmeter and ammeter readings will, respectively, be



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

30. When boron is added as an impurity to silicon, the resulting material is:

- (1) n-type semiconductor
- (2) n-type conductor
- (3) p-type conductor
- (4) p-type semiconductor

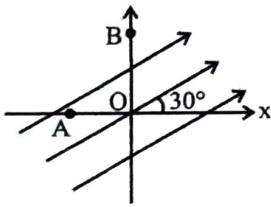
31. In Young's double slits experiment, the position of 5th bright fringe from the central maximum is 5 cm. The distance between slits and screen is 1 m and wavelength of used monochromatic light is 600 nm. The separation between the slits is:

- (1) $48\mu m$
- (2) $36\mu m$
- (3) $12\mu m$
- (4) $60\mu m$

32. A beam of light of wavelength $\lambda = 600$ nm from a distant source falls on a single slit 1mm wide and the resulting diffraction pattern is observed on a screen 2m away. The distance between the first dark fringes on either side of central bright fringe is-

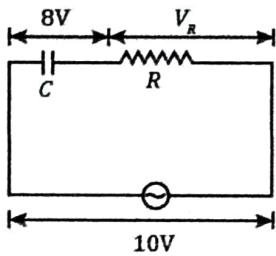
- (1) 1.2 cm
- (2) 1.2 mm
- (3) 2.4 cm
- (4) 2.4 mm

33. A uniform electric field of 100 Vm^{-1} is directed at 30° with the positive X-axis as shown in figure. Find the potential difference V_{BA} , if $OA = 2 \text{ m}$ and $OB = 4 \text{ m}$.



- (1) $-100(2 + \sqrt{3}) \text{ V}$
- (2) $-100(2 - \sqrt{3}) \text{ V}$
- (3) $100(2 + \sqrt{3}) \text{ V}$
- (4) $100(2 - \sqrt{3}) \text{ V}$

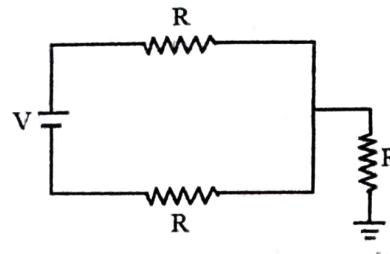
34. In a series R-C circuit shown in figure, the applied voltage is 10 V and the voltage across capacitor is found to be 8V . Then the voltage across R , and the phase difference between current & the applied voltage will respectively be



- (1) $6\text{V}, \tan^{-1}\left(\frac{4}{3}\right)$
- (2) $3\text{V}, \tan^{-1}\left(\frac{3}{4}\right)$
- (3) $6\text{V}, \tan^{-1}\left(\frac{5}{3}\right)$
- (4) none

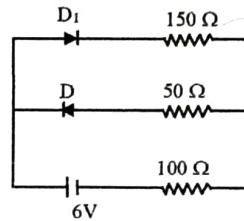
35. When a polaroid sheet is rotated between two crossed polaroids then the transmitted light intensity will be maximum for a rotation of :
- (1) 60°
 - (2) 30°
 - (3) 90°
 - (4) 45°

36. The current drawn from the battery shown in the figure is



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

37. The circuit shown in figure contains two diodes each with a forward resistance of 50Ω and with infinite reverse resistance. If the battery voltage is 6V , find the current through the 100Ω resistance.

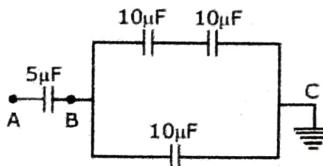


- (1) 0.5 A
- (2) 0.8 A
- (3) 0.7 A
- (4) 0.02 A

38. The current flowing in a coil is 3A and the power consumed is 108W . If the a.c. source is of $120 \text{ V}, 50 \text{ Hz}$, the resistance of the circuit is :

- (1) 24Ω
- (2) 10Ω
- (3) 12Ω
- (4) 6Ω

39. In the given circuit if point c is connected to the earth and a potential of $+2000 \text{ V}$ is given to the point A, the potential at B is -



- (1) 1500 V
- (2) 1000 V
- (3) 500 V
- (4) 400 V

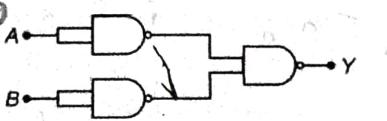
40. The current in an inductor is given by $i = (2 + 3t)$ ampere, where t is in second. The self induced emf in it is 9 mV. The energy stored in the inductor at $t=1\text{s}$ is

- (1) 10 mJ
- (2) 37.5 mJ
- ✓ (3) 75 mJ
- (4) zero

41. During a negative beta decay,

- (1) An atomic electron is ejected
- (2) An electron which is already present within the nucleus is ejected
- (3) A neutron in the nucleus decays emitting an electron
- (4) a proton in the nucleus decays emitting an electron.

42. The truth table for the logic gate shown in the figure is



A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

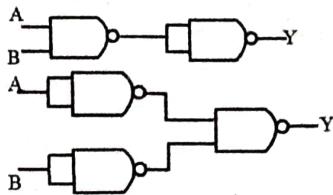
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

43. The displacement current flows in the dielectric of a capacitor when the potential difference between its plates -

- (1) is changing with time
- (2) is changing with distance
- (3) becomes zero
- (4) has assumed a constant value

44. You are given two circuits as shown in following figure. The logic operation carried out by the two circuit are respectively :-



- ✓ (1) AND, OR
- (2) OR, AND
- (3) NAND, OR
- (4) NOR, AND

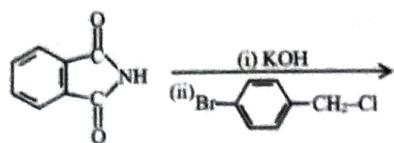
45. Given truth table is related with-

A	B	Y
1	1	0
0	1	1
1	0	1
0	0	1

- (1) NOT gate
- (2) OR gate
- (3) XOR gate
- ✓ (4) NAND gate

CHEMISTRY**[CHEMISTRY]**

6. The major product of the following reaction



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

7. When a salt is heated with dilute H_2SO_4 and KMnO_4 solution, the pink colour of KMnO_4 is discharged, the salt is :

- (1) a sulphite
- (2) a carbonate
- (3) a nitrate
- (4) a bicarbonate

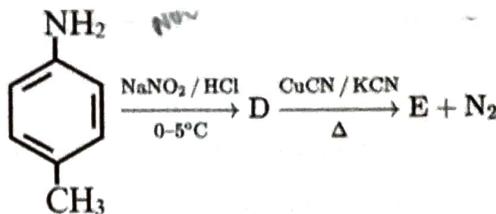
8. The rate constant for a first order reaction involving compound A was found to be 0.082 min^{-1} . When the initial concentration of A is 0.15 mole/L, how long will it take for the concentration of A to drop to 0.03 mole/L :

- (1) 1.96 min
- (2) 1960 min
- (3) 196 min
- (4) 19.6 min

49. Which of the following is a low-spin (spin-paired) complex?

- (1) $[\text{Ni}(\text{NH}_3)_6]^{2+}$
- (2) $[\text{Ti}(\text{H}_2\text{O})_6]^{2+}$
- (3) $[\text{Cr}(\text{NH}_3)_6]^{3+}$
- (4) $[\text{Co}(\text{NH}_3)_6]^{3+}$

- 50.



In the reaction the product E is

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

51. The ions from among the following which are colourless are :

- (1) Ti^{4+}
- (2) Cu^{+2}
- (3) Co^{3+}
- (4) Fe^{2+}

52. In a first order reaction the concentration of reactant decreases from 800 mol/dm^3 to 50 mol/dm^3 in 200 sec.. The rate constant of reaction in s^{-1} is

- (1) $2 \times 10^{-4} \text{ s}^{-1}$
- (2) $1.386 \times 10^{-2} \text{ s}^{-1}$
- (3) $3.45 \times 10^5 \text{ s}^{-1}$
- (4) $2 \times 10^4 \text{ s}^{-1}$

53. A Planar Complex [Mabcd] gives -

- (1) Two Optical isomer
- (2) Two geometrical isomer
- (3) Three optical isomer
- (4) Three geometrical isomers

54. Statement I : Glucose gives a reddish brown precipitate with Fehling's solution. ~~X~~

Statement II : Reaction of glucose with Fehling's solution give CuO and gluconic acid

- (1) Both Statement I and Statement II are false
- (2) Statement I is true but Statement II is false
- (3) Statement I is false but Statement II is true
- (4) Both Statement I and Statement II are true

55. Match the column :

Column-I	Column-II
Chromyl (a) chloride test	(p) H_2S
Rotten egg smell (b)	(q) SO_2
Suffocating smell (c)	(r) $\text{K}_4[\text{Fe}(\text{CN})_6]$
Brown chocolate test of Cu^{2+} (d)	(s) CrO_2Cl_2

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

56. If a is the initial concentration and k is the rate constant of a zero order reaction, the time for the reaction to go to completion will be -

- (1) k/a
- (2) a/k
- (3) $a/2k$
- (4) $k/2a$

57. Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali.

- (1) $\text{CH}_3\text{--CH}_2\text{--NO}_2$
- (2) $\text{CH}_3\text{--CH}_2\text{--NH--CH}_3$
- (3) $\text{CH}_3\text{--CH}_2\text{--NH}_2$
- (4) $\text{CH}_3\text{--CH}_2\text{--N}(\text{CH}_3)\text{--CH}_2\text{--CH}_3$

58. A solution of 1.25 g of a non-electrolyte in 20 g of water freezes at 271.94 K. If $K_f = 1.86 \text{ K molality}^{-1}$ then the molecular wt. of the solute is :

- (1) 207.8 g/mol
- (2) 179.79 g/mol
- (3) 209.6 g/mol
- (4) 109.6 g/mol

59. Which one of the ionic species will impart colour to an aqueous solution?

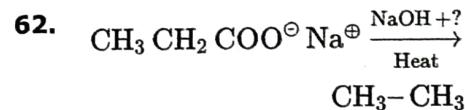
- (1) Ti^{4+}
- (2) Cu^+
- (3) Zn^{2+}
- (4) Cr^{3+}

60. Which of the following aqueous solution has highest boiling point? (Assume all electrolytes are 100% ionisable)

- (1) 0.1 m KCl
- (2) 0.1 m K_2CO_3
- (3) 0.01 m Na_3PO_4
- (4) 0.01 m KCl

61. The equilibrium $\text{Cr}_2\text{O}_7^{2-} \rightleftharpoons 2\text{CrO}_4^{2-}$ is shifted to right in -

- (1) An acidic medium
- (2) A basic medium
- (3) A neutral medium
- (4) It does not exist



Consider the above reaction and identify the missing reagent/chemical ?

- (1) B_2H_6
- (2) Red phosphorus
- (3) CaO
- (4) DIBAL-H

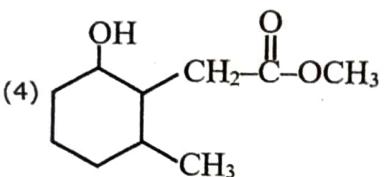
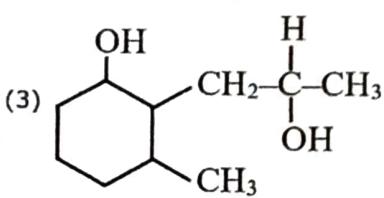
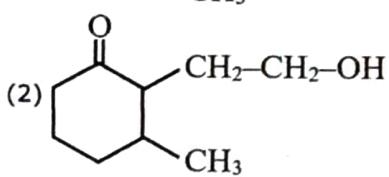
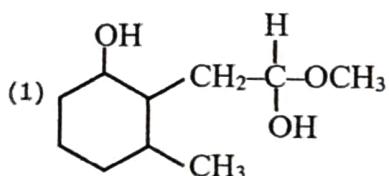
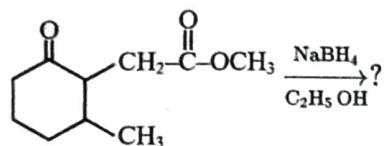
63. 10 gram of non volatile and non electrolyte solute with molecular mass 100 gram mol⁻¹ is dissolved in 100 gram solvent to show 0.3°C elevation in boiling point. The value of molal ebullioscopic constant will be :

- (1) 10
- (2) 3
- (3) 0.3
- (4) unpredictable

64. The outer electronic structure of Lawrencium (atomic number 103) is :

- (1) [Rn] 5f¹³ 7s² 7p²
- (2) [Rn] 5f¹³ 6d¹ 7s¹ 7p²
- (3) [Rn] 5f¹⁴ 7s¹ 7p²
- (4) [Rn] 5f¹⁴ 6d¹ 7s²

65. The product formed in the following chemical reaction is :



66. The standard reduction potential at 298 K for single electrodes are given below :

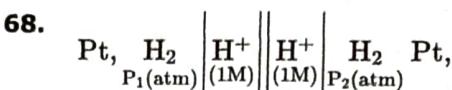
Electrode	Electrode Potential (volt)
Mg ²⁺ /Mg	-2.34
Zn ²⁺ /Zn	-0.76
Fe ⁺² /Fe	-0.44

From this we can infer that-

- (1) Zn can reduce both Mg²⁺ and Fe²⁺
- (2) Fe can reduce both Mg²⁺ and Zn²⁺
- (3) Mg can reduce both Zn²⁺ and Fe²⁺
- (4) Mg can reduce Zn²⁺ but not Fe²⁺

67. The heating of phenyl methyl ether with HI produces :

- (1) Ethyl chloride
- (2) Iodobenzene
- (3) Phenol
- (4) Benzene



The cell reaction will be spontaneous if

- (1) P₁>P₂
- (2) P₁<P₂
- (3) P₁=P₂
- (4) P₁= 1 atm

68. Amongst the following the most stable complex is-

- (1) [Co(NH₃)₃Cl₃]
- (2) [Co(H₂O)₆]Cl₃
- (3) [CoF₆]³⁻
- (4) [Co(en)₃]³⁺

Q. Match list-I with list-II

	List-I (Reactants)	List-II (Products)
(A)	phenol, Zn/ Δ	(I) Salicyl aldehyde
(B)	phenol, CHCl_3 , NaOH , HCl	(II) Salicylic acid
(C)	phenol, CO_2 , NaOH , HCl	(III) Benzene
(D)	phenol, Conc. HNO_3	(IV) picric acid

Choose the correct answer from the options given below

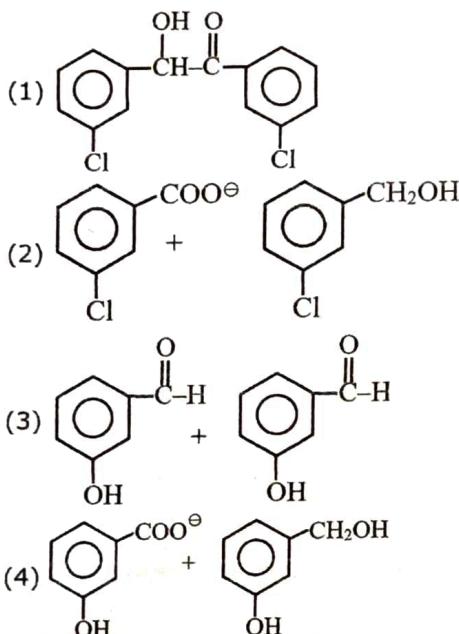
- (1) A-III, B-I, C-II, D-IV
- (2) A-IV, B-I, C-II, D-III
- (3) A-II, B-I, C-IV, D-III
- (4) A-I, B-II, C-IV, D-III

71.

The reduction potential of a hydrogen electrode in a solution with $\text{pOH}=4$ at 25°C is :

- (1) -0.059
- (2) 0.059
- (3) -0.59
- (4) 0.59

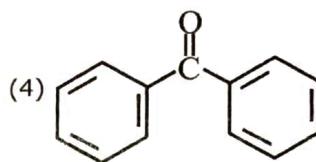
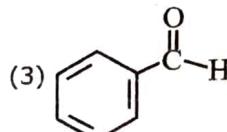
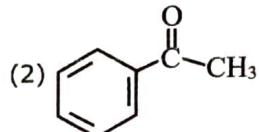
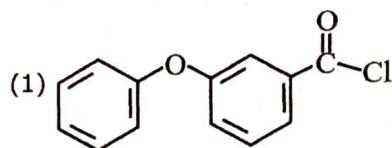
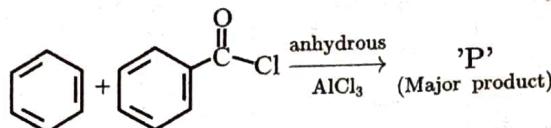
72. m-chlorobenzaldehyde on treatment with 50% KOH solution yields



73. What volume of gases at STP will evolve if 1L of 0.01M solution of H_2SO_4 is electrolysed?

- (1) 33.6 L
- (2) 336 ml
- (3) 3.36 ml
- (4) 3.36 L

74. Identify major product 'P' formed in the following reaction.



75. The standard reduction electrode potentials of four elements are

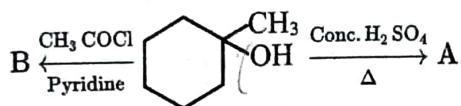
$$\text{A} = -0.250 \text{ V}, \quad \text{B} = -0.136 \text{ V}$$

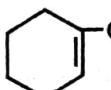
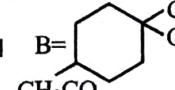
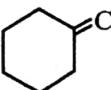
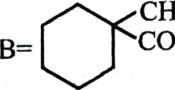
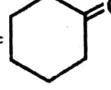
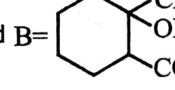
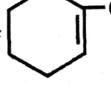
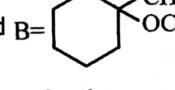
$$\text{C} = -0.126 \text{ V}, \quad \text{D} = -0.402 \text{ V}$$

The metal that displaces A from its aqueous solution is:

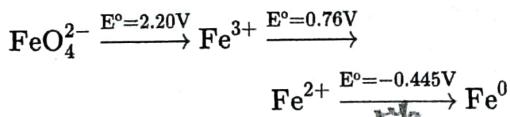
- (1) B
- (2) C
- (3) D
- (4) None of these

76. Identify the major products A and B respectively in the following set of reactions



- (1) A =  and B = 
- (2) A =  and B = 
- (3) A =  and B = 
- (4) A =  and B = 

77. EMF diagram for some ions is given as :-



Determine the value of E° for $\text{FeO}_4^{2-}/\text{Fe}^{+2}$

- (1) 1.84 V
 (2) 1.6 V
 (3) 2.52 V
 (4) 7.36 V

78. Match the column :

Column-I	Column-II
Fe ²⁺ react with K ₃ [Fe(CN) ₆]	(p) Cherry red ppt
Fe ³⁺ react with K ₄ [Fe(CN) ₆]	(q) Turn bull's blue
Ni ²⁺ react with DMG	(r) Prussian blue
Cu ²⁺ react with NH ₃ solution	(s) Blue solution

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

- B 79. Which of the following is the most stable oxidation state of aluminium ?

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

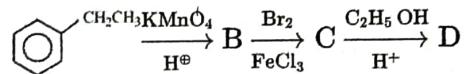
80. Correct order of atomic radii is :

- (1) B < Al < Ga < In
 (2) B > Al > Ga > In
 (3) B < Al > Ga < In
 (4) Al < B < Ga < In

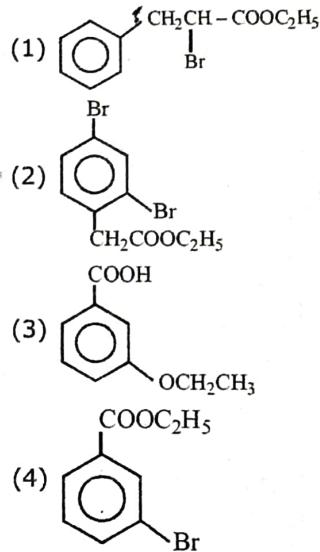
81. Which trihalide ion is unknown ?

- (1) F₃⁻
 (2) Br₃⁻
 (3) I₃⁻
 (4) Cl₃⁻

82. In a set of reactions, ethyl benzene yielded a product D.



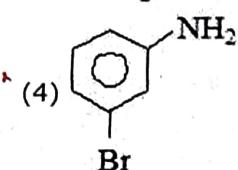
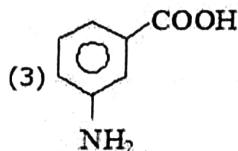
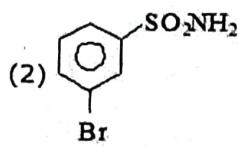
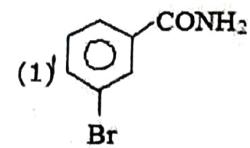
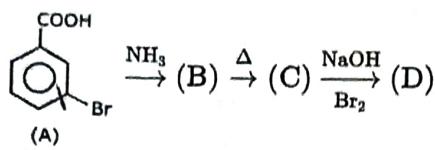
D would be:



83. In arrhenius equation $k = Ae^{-\frac{E_a}{RT}}$, A may not be termed as rate constant

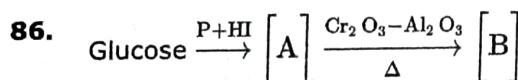
- (1) When 100% reactant will convert into the product
 (2) When the temperature becomes infinite
 (3) When the fraction of molecule crossing over the energy barrier becomes unity
 (4) At very low temperature

84. In a set of reactions m-bromobenzoic acid gave a product (D). Identify the product (D).

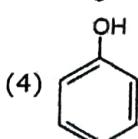
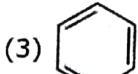
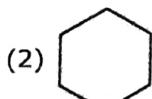
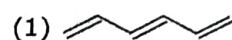


85. 1 mole of electrons passes through each of the solution of AgNO_3 , CuSO_4 and AlCl_3 , where Ag Cu and Al are deposited. Their molar ratio of deposition of Ag, Cu and Al respectively is,

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



Major product [B] of the above reaction is :

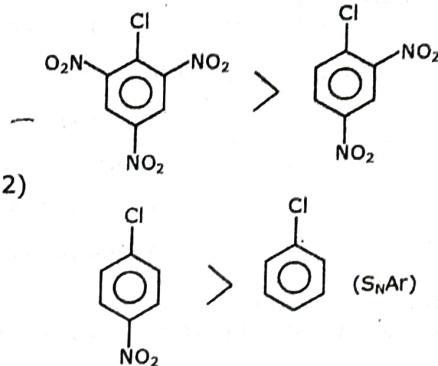


87. The equivalent conductivity of 0.1M weak acid is 100 times lesser than that at infinite dilution. The degree of dissociation of weak electrolyte at 0.1M is -

- (1) 100
 (2) 10
 (3) 0.01
 (4) 0.001

88. Which of the following is correct order for reactivity towards

- (1) $\text{R-I} > \text{R-Br} > \text{R-Cl} > \text{R-F}$ (S_{N}^1)



- (3) $\text{CH}_3\text{-CO Cl} > (\text{CH}_3\text{CO})_2\text{O} > \text{CH}_3\text{COOC}_2\text{H}_5 > \text{CH}_3\text{CONH}_2$ ($\text{S}_{\text{N}}\text{AE}$)

- (4) All

89. At 298 K, the conductivity of a saturated solution of AgCl in water is $2.6 \times 10^{-6} \text{ ohm}^{-1} \text{ cm}^{-1}$. Given, $\lambda_m^\infty(\text{Ag}^+) = 63 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ & $\lambda_m^\infty(\text{Cl}^-) = 67 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ Therefore solubility product of AgCl is

- (1) 2×10^{-5}
 (2) 4×10^{-10}
 (3) 4×10^{-16}
 (4) 2×10^{-8}

90. Match the column :

	Column-I (Reaction)	Column-II (Reagent)
(A)	$\text{CH}_3\text{CH}_2\text{OH} \rightarrow \text{CH}_3\text{CH}_2\text{Br}$	(p) KOH + $\text{C}_2\text{H}_5\text{OH}$
(B)	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{Br})\text{CH}_3 \rightarrow 2\text{-Pentene}$	(q) NaNO_2
(C)	$\text{CH}_3\text{CH}_2\text{Cl} \rightarrow \text{CH}_3\text{CH}_2\text{ON=O}$	(r) $\text{NaBr} + \text{Conc. H}_2\text{SO}_4$
(D)	$\text{CH}_3\text{CH}_2\text{Cl} \rightarrow \text{CH}_3\text{CH}_2\text{NO}_2$	(s) AgNO_2

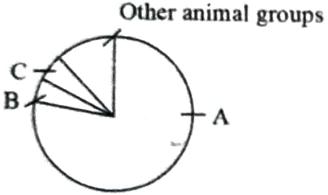
(1) A-(r), B-(s), C-(q), D-(p)

(2) A-(r), B-(p), C-(s), D-(q)

(3) A-(r), B-(p), C-(q), D-(s)

(4) A-(s), B-(q), C-(p), D-(r)

BIOLOGY**[BIOLOGY]**

- 91.** Pollen grain represents
 (1) Female gametophyte
 (2) Male gametophyte
 (3) Sporophyte
 (4) Anther
- 92.** Which of the following statements is true?
 (1) A dominant allele determines the phenotype when paired with a recessive allele
 (2) A recessive allele is always non functional
 (3) A functional allele is always dominant
 (4) A dominant allele is always unmodified allele.
- 93.** Species area relationship was given by
 (1) Robert May
 (2) Edward Wilson
 (3) Alexander von Humboldt
 (4) Paul Ehrlich
- 94.** A pie chart with proportionate number of species of major taxa of invertebrates is given below.
- 
- Other animal groups
- Select the option which correctly identifies the labels A, B and C.
 (1) A -Molluscs, B-Insects, C- Crustaceans
 (2) A -Insects, B-Molluscs, C- Crustaceans
 (3) A -Insects, B-Crustaceans, C- Molluscs
 (4) A -Crustaceans, B-Molluscs, C- Insects
- 95.** Yellow sticky pollenkitt is found on pollen grains of entomophilous flowers that are formed by-
 (1) Pollen mother cell
 (2) Tapetum
 (3) Endothecium
 (4) Intine of pollen grain
- 96.** In pea plants, yellow seeds are dominant to green. If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in F_1 generation ?
 (1) 50 : 50
 (2) 9 : 1
 (3) 1 : 3
 (4) 3 : 1
- 97.** Largest cell of egg apparatus is
 (1) Synergids
 (2) Egg cell
 (3) Central cell
 (4) Antipodal
- 98.** The total types of gametes produced by an individual with $AaBbCc$ genotype will be-
 (1) 2
 (2) 4
 (3) 6
 (4) 8
- 99.** Match the columns and select the correct option.
- | Column A
(Extinct species) | Column B
(Native area) |
|-------------------------------|---------------------------|
| a. Dodo | (i) Russia |
| b. Quagga | (ii) Mauritius |
| c. Thylacine | (iii) Africa |
| d. Steller's sea cow | (iv) Australia |
- (1) a(ii), b(iv), c(iii), d(i)
 (2) a(i), b(ii), c(iii), d(iv)
 (3) a(ii), b(iii), c(iv), d(i)
 (4) a(iv), b(iii), c(ii), d(i)
- 100.** Egg apparatus is present towards :
 (1) Chalazal end
 (2) Micropyle end
 (3) Funiculum
 (4) (1) & (2) both



- 101.** The phenotype of F_1 hybrid resembles both of the two parents in
 (1) Dominance ✓
 (2) Incomplete dominance
 (3) Co-dominance
 (4) Intermediate inheritance +
- 102.** Which of the following is not an example of exotic species?
 (1) Cichlid fish for Lake Victoria of East Africa
 (2) Parthenium for India
 (3) Water hyacinth for India
 (4) Nile perch for Lake Victoria of East Africa
- 103.** A polygenic trait is controlled by 3 genes A, B and C. In a cross $AaBbCc \times AaBbCc$, the phenotypic ratio of the offsprings was observed as : 1 : 6 : x : 20 : x : 6 : 1 what is the possible value of x?
 (1) 3
 (2) 9
 (3) 15
 (4) 25
- 104.** Highest number of species are existing in which of the following taxa of vertebrates?
 (1) Fishes
 (2) Birds
 (3) Amphibians
 (4) Reptiles
- 105.** Select the incorrect statement-
 (1) In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.
 (2) Human males have one of their sex-chromosome much shorter than the other.
 (3) Male fruit fly is heterogametic.
 (4) In male grasshoppers, 50% of sperms have no sex-chromosome.
- 106.** Identify true (T) or false (F) statements and select the correct option.
 a. Tropical rainforest and sugarcane field are the most productive ecosystems.
 b. Secondary productivity is the rate of formation of new organic matter by consumers.
 c. Humus is colourless and partly decomposed organic matter.
 (1) a-T, b-T, c-F
 (2) a-T, b-T, c-T
 (3) a-F, b-T, c-F
 (4) a-T, b-F, c-F
- 107.** Select the odd one out w.r.t. chromosomal theory of inheritance-
 (1) It was proposed by Sutton and Boveri ✓
 (2) Assortment behaviour of chromosomes is parallel to assortment behaviour of genes
 (3) Chromosomes and genes occur in pairs in diploid and haploid cells respectively
 (4) The paired condition of both chromosomes as well as Mendelian factors is restored during fertilization
- 108.** State true (T) or false (F) for the following statements and choose the correct option.
 a. Detritus is the raw material for decomposition.
 b. Pyramid of biomass of an aquatic ecosystem may be inverted.
 c. Least productive ecosystem is desert and deep sea.
 (1) a-F, b-F, c-F
 (2) a-F, b-T, c-T
 (3) a-T, b-T, c-T
 (4) a-T, b-F, c-T
- 109.** A man who carries an X-linked allele will pass it on to-
 (1) All his daughters
 (2) Half of his daughter
 (3) All his sons
 (4) All his children
- 110.** In aquatic ecosystem, major channel for energy flow is:-
 (1) Grazing food chain
 (2) Detritus food chain
 (3) Auxillary food chain
 (4) Parasitic food chain
- 111.** Back bone in structure of DNA molecule is made up of -
 (1) Pentose Sugar and phosphate
 (2) Hexose sugar and phosphate
 (3) Purine and pyrimidine
 (4) Sugar and phosphate

112. Read the statements given below and choose the correct option.

Statement-I : Decomposition is purely an anaerobic process.

Statement-II : The rate of decomposition is controlled by chemical composition of detritus and climatic factors.

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

113. Which of the following is called polynucleotide joining enzyme :-

- (1) DNA polymerase - I
- (2) DNA polymerase - II
- (3) DNA ligase
- (4) Ribonuclease

114. In most ecosystems, all the pyramids of number, energy and biomass are upright. It indicates that:-

- (a) Producers are more in number and biomass than the herbivores.
- (b) Herbivores are less in number and biomass than the carnivores.
- (c) Energy at a lower trophic level is always more than at a higher level.

Choose the correct option.

- (1) Only (a) is correct
- (2) Only (b) is correct
- (3) Both (a) and (c) are correct
- (4) Both (b) and (c) are correct

115. Small animals lose their body heat very fast as compared to large animals because

- (1) The intake of energy by small animals in the form of food is very less
- (2) The surface area of small animals is less than the big animals
- (3) The metabolic rate of small animals is very low as compared to big animals
- (4) The surface area of small animals is larger relative to their volume

116. In E. coli, the lac operon gets switched on when

- (1) Lactose is present and it binds to the repressor
- (2) Repressor binds to operator
- (3) RNA polymerase binds to the operator
- (4) Lactose is present and it binds to RNA polymerase

117. The equation which describes Verhulst Pearl Logistic Growth of a population is
[Here, N = Population density at time t, r = Intrinsic rate of natural increase, K = Carrying capacity]

- (1) $dN/dt = rN \left[\frac{K-N}{K} \right]$
- (2) $\frac{dt}{dN} = rN \left[\frac{K}{K-N} \right]$
- (3) $dt/dN = rN \left[\frac{K-N}{K} \right]$
- (4) $dN/dt = rN \left[\frac{K}{K-N} \right]$

118. Alec Jeffreys developed the DNA fingerprinting technique. The probe he used was -

- (1) Ribozyome
- (2) Sex chromosomes
- (3) SNP
- (4) VNTR

119. Read the following statements and select the correct option.

Statement 1 : According to Gause's 'Competitive Exclusion Principle', two closely related species competing for the same resources can co-exist indefinitely.

Statement 2 : Majority of parasites reduce the survival, growth and reproduction of the host and reduce its population density.

- (1) Only statement 1 is correct
- (2) Only statement 2 is correct
- (3) Both the statements are correct
- (4) Both the statements are incorrect

120. Which of the following are correct statements?

- (1) N-bases (A,G,C,T,U) have heterocyclic rings
- (2) In all cellular organisms DNA is genetic material
- (3) Adenylic acid is nucleoside
- (4) Cytidine is a nucleoside

- (1) Only 3
- (2) 1, 2 & 4
- (3) 2 & 3
- (4) 1 & 4

121. Mark the mismatched pair.

- (1) Diapause - Zooplanktons
- (2) Regulators - Birds
- (3) Aestivation - Fishes
- (4) Hibernation - Snails



122. RNA polymerase stops its activity by

- (1) Rho (ρ) factor
- (2) sigma (σ) factor
- (3) UAG
- (4) AUG

123. Select the correct equation for population density at time $t + 1$.

- (1) $N_t = N_0 \times [(B + I) - (D + E)]$
- (2) $N_t = N_0 \times [(B + E) - (D + I)]$
- (3) $N_t = N_0 \times [(B + I) + (D + E)]$
- (4) $N_{t+1} = N_t + (B + I) - (D + E)$

124. How many different proteins does the ribosome consist of?

- (1) 60
- (2) 40
- (3) 20
- (4) 80

125. The filiform apparatus of synergids :

- (1) Play an important role in guiding the pollen tube into the synergid
- (2) Help in the opening of pollen tube
- (3) Prevents pollen tube from bursting
- (4) Is diploid

126. Transfer of pollen from anther to stigma of same flower is called:-

- (1) Autogamy
- (2) Geitonogamy
- (3) Xenogamy
- (4) None of these

127. Species biodiversity share of India in global biodiversity is-

- (1) 2.1%
- (2) 8.1%
- (3) 5.4%
- (4) 12%

128. Sex linked recessive disorders are more common in :-

- (1) Male
- (2) Female
- (3) Equal in male and female
- (4) Uncertain

129. Term biodiversity was proposed by:

- (1) David Tillman
- (2) Poul Ehrlich
- (3) Edward Wilson
- (4) Alexander Von Humboldt

130. There are three genes a, b and c. The percentage of crossing over between a and b is 20%, b and c is 28% and a and c is 8%. What is the sequence of genes on chromosome?

- (1) b, a, c
- (2) a, b, c
- (3) a, c, b
- (4) None



131. Pick out the correct statements:

- (a) Haemophilia is a sex-linked recessive disease
 - (b) Down's syndrome is due to aneuploidy.
 - (c) Phenylketonuria is an autosomal recessive gene disorder
 - (d) Sickle cell anaemia is an X-linked recessive gene disorder.
- (1) (a) and (d) are correct
 - (2) (b) and (d) are correct
 - (3) (a), (c) and (d) are correct
 - (4) (a), (b) and (c) are correct

132. What is percentage of photosynthetically active radiation (PAR), if incident solar radiation is considered 100%?

- (1) 100%
- (2) 50%
- (3) 1-5%
- (4) 2-10%

133. Assertion :- The repetitive DNA are separated from bulk genomic DNA as different peaks during density gradient centrifugation.

Reason :- The bulk DNA forms a minor peak & other major peaks are referred to as satellite DNA.

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

134. The ultimate source of energy for all ecosystems on earth is -

- (1) Photosynthesis
- (2) Sun
- (3) ATP
- (4) Organic compounds

135. Regulation of gene expression in eukaryotes could be exerted at :-

- a. Transcriptional level (formation of primary transcript)
 - b. Processing level (regulation of splicing)
 - c. Transport of mRNA from nucleus to the cytoplasm
 - d. Translational level
- (1) a, b and c
 - (2) b, c and d
 - (3) a, c and d
 - (4) a, b, c and d

136. The large holes in Swiss cheese are due to production of a large amount of ...A... by a bacterium ...B.... Here A and B refers to-

- (1) A - CO_2 ; B - *Penicillium roqueforti*
- (2) A - CO_2 ; B - *Propionibacterium shermanii*
- (3) A - CO_2 ; B - *Penicillium notatum*
- (4) A - CO_2 ; B - *Saccharomyces cerevisiae*

137. Which of the following statement regarding female reproductive system is (are) **correct**?

- (i) Myometrium undergoes strong contraction at the time of delivery of baby.
 - (ii) Ovary is primary female sex organ which produces the female gamete and steroid hormones.
 - (iii) Ovarian stroma is divided into two zones, inner cortex and outer medulla.
 - (iv) Infundibulum possess finger like projections which help in collection of ovum after the ovulation.
 - (v) A functional mammary gland is the characteristics of all the mammals.
- (1) (i) and (iv)
 - (2) (ii), (iv) and (v)
 - (3) (i), (ii) and (iv)
 - (4) (i), (ii), (iv) and (v)

138. Match the following list of microbes and their importance :

(A)	<i>Saccharomyces cerevisiae</i>	(I)	Production of immunosuppressive agents
(B)	<i>Monascus purpureus</i>	(ii)	Ripening of Swiss cheese
(C)	<i>Trichoderma polysporum</i>	(iii)	Commercial production of ethanol
(D)	<i>Propionibacterium shermanii</i>	(iv)	Production of blood-cholesterol lowering agents

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

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

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

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

139. **Statement -I:** The spermatogonia present on the inside wall of seminiferous tubules, multiply by mitotic division and increase in number.

Statement -II: At puberty only 60,000-80,000 primary follicles are left in both ovaries.

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

140. Human male ejaculates about A million sperms during a coitus, of which for normal fertility, at least B% sperms must have normal shape and size and at least C% of them must show vigorous motility.

Choose the correct values for A, B and C from the given options :

- (1) A - 400 - 500; B - 60; C - 40
- (2) A - 200 - 300; B - 60; C - 40
- (3) A - 200 - 300; B - 40; C - 60
- (4) A - 80 - 100; B - 40; C - 60

141. **Assertion (A):** The menstrual flow results due to breakdown of endometrial lining of the uterus and its blood vessels.

Reason (R): Rapid fall in the level of progesterone takes place due to degeneration of corpus luteum.

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

142. Given below are two statements :

Statement I : The release of sperms into the seminiferous tubules is called spermiation.

Statement II : Spermiogenesis is the process of formation of sperm from spermatogonia.

In the light of the above statements, choose the most appropriate 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.

143. Match the column I & Column II -

	Column I	Column II
(a)	Parturition	(i) Attachment of embryo to endometrium
(b)	Gestation	(ii) Release of egg from Graafian follicle
(c)	Ovulation	(iii) Delivery of baby from uterus
(d)	Implantation	(iv) Duration between pregnancy and birth
(e)	Fertilisation	(v) Formation of zygote by fusion of egg and sperm

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

144. **Statement-I :** Disease or infections which are transmitted through sexual intercourse are collectively called sexually transmitted infections.

Statement-II : STD's if not properly treated may lead to pelvic inflammatory diseases, abortion, still birth, Ectopic pregnancies, infertility or even cancer of reproductive tract.

- (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

145. **Assertion :** India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as "social goal"

Reason : These programmes called family planning were initiated in 1951

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

146. Match the following

	Columns-I	Columns-II
(a)	ZIFT	(i) Sperm is directly injected into the ovum
(b)	GIFT	(ii) Zygote is transferred into the fallopian tube
(c)	IUT	(iii) Embryo with more than eight blastomeres is transferred into uterus
(d)	ICSI	(iv) Transfer of ovum into the fallopian tube

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

147. Physiological barriers of innate immunity include:

- (a) Macrophages
- (b) NK cells
- (c) Mucus coating of the epithelium lining the respiratory tract
- (d) Saliva in mouth
- (e) Acid in stomach

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

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

148. Which of the following statements are **correct**?

- (a) Appearance of dry, scaly lesions on various parts of the body such as skin, nails and scalp are the main symptoms of the disease caused by Microsporum.
 - (b) Fertilization and development of malarial parasite plasmodium takes place in the mosquito's gut.
 - (c) Disease such as Malaria, Pneumonia and Filariasis are transmitted through the insect vectors.
 - (d) Viral diseases such as Typhoid and Pneumonia are the types of air-borne diseases.
- (1) (a), (b) and (d) only ✓
 (2) (c) and (d) only ✗
 (3) (a) and (b) only
 (4) All are correct ✓

149. Which of the statements are **incorrect**:

- (1) Computed Tomography uses strong magnetic fields and non-ionising radiations to detect physiological changes in living tissue.
- (2) Rheumatoid arthritis is an autoimmune disease.
- (3) The vaccine also generates memory -B and T-cells that recognize the pathogen quickly on subsequent exposure.
- (4) Allergy is due to the release of chemicals like histamine and serotonin from the mast cells.

150. Match the Column I with Column II -

Column I	Column II
(a) AIDS	(i) α -Interferon
(b) Cancer	(ii) Macrophages
(c) Biological Response modifier	(iii) Don't die of ignorance
(d) HIV factory	(iv) Metastasis

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

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

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

(4) a-iii, b-iv, c-i, d-ii ✓

151. Assertion (A) : Nicotine stimulates adrenal gland to release adrenaline into blood circulation.

Reason (R) : Tobacco lower blood pressure and increase heart rate.

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

152. Find out the **incorrect** statements -

- (a) The flower tops, leaves of the plant papaver somniferum are used to produce marijuana and hashish.
 - (b) Excessive dosage of cocaine causes hallucinations ✓
 - (c) Cannabinoids generally taken by inhalation and oral ingestion.
 - (d) Heroin interferes with the transport of the neuro-transmitter dopamine.
- (1) a, d
 (2) b, c
 (3) a, c
 (4) c, d ✓

153. The flippers of the Penguins and Dolphins are the example of the -

- (1) Convergent evolution
- (2) Divergent evolution
- (3) Adaptive radiation
- (4) Natural selection

154. Match List - I with List - II with respect to convergent evolution :-

List - I	List - II
A. Lemur	I. Flying phalanger
B. Bobcat	II. Numbat
C. Ant eater	III. Spotted cuscus
D. Flying squirrels	IV. Tasmanian tiger cat

Choose the correct answer from the options given below:

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

155. Match List - I with List - II :

List - I	List - II
A. Gene pool	I. Stable within a generation
B. Genetic drift	II. Change in gene frequency by chance
C. Gene flow	III. Transfer of genes into or out of population
D. Gene frequency	IV. Total number of genes and their alleles

Choose the correct answer from the options given below:

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

156. Given below are some stages of human evolution. Arrange them in correct sequence. (Past to Recent)

- A. Homo habilis
- B. Homo sapiens
- C. Homo neanderthalensis
- D. homo erectus

Choose the correct sequence of human evolution from the options given below:-

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

157. Natural genetic engineers of plant is :

- (1) Yeast
- (2) Agrobacterium tumefaciens
- (3) E. Coli
- (4) Mycoplasma

158. The enzymes commonly used in genetic engineering are-

- (1) Restriction endonuclease and polymerase
- (2) Restriction endonuclease and Ligase
- (3) Endonuclease and Ligase
- (4) Ligase and Polymerase

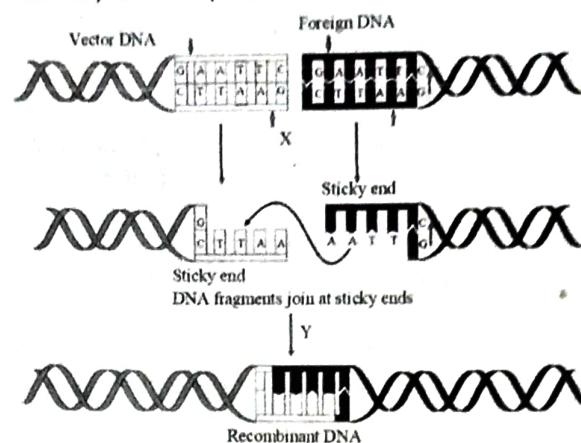
159. Stirred-tank bioreactors have been designed for-

- (1) Ensuring anaerobic conditions in the culture vessel
- (2) Availability of oxygen throughout the process
- (3) Addition of preservatives to the product
- (4) Purification of the product

160. If a recombinant DNA bearing gene for ampicillin resistance is transferred into E.coli cells and the host cells are spread on agar plates containing ampicillin then :

- (1) Both transformed and untransformed recipient cells will die
- (2) Both transformed and untransformed cells will grow.
- (3) Transformed recipient cell will grow and untransformed recipient cell will die.
- (4) Transformed recipient cell will die and untransformed recipient cell will grow.

161. Identify the enzyme X and Y ?



(1) X = Sma I, Y = DNA ligase

(2) X = Bam HI, Y = RNA ligase

(3) X = Eco RI, Y = DNA ligase

(4) X = Hind III, Y = RNA ligase

162. Given below are two statements:

Statement-I : Agrobacterium tumefaciens a pathogen of several monocot plants.

Statement-II : Retroviruses in animals have the ability to transform cancerous cells into normal cells.

In the light of the above statements, choose the most appropriate 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.

163. Assertion :- Insertional inactivation method helps to differentiate recombinant from non-recombinant.

Reason :- Inactivation of any marker gene of vector due to insertion of desired gene is called insertional inactivation.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

164. Golden rice is a promising transgenic crop. When released for cultivation, it will help in

- (1) Alleviation of vitamin A deficiency
- (2) Pest resistance
- (3) Herbicide tolerance
- (4) Producing a petrol-like fuel from rice

165. C-peptide of human insulin is:-

- (1) A part of mature insulin molecule
- (2) Responsible for the formation of disulphide bridges
- (3) Removed during the maturation of proinsulin to insulin
- (4) Responsible for its biological activity

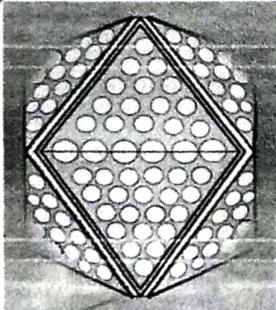
166. What is **not true** amongst the following w.r.t. first transgenic cow?

- (1) The milk had a protein called human α -lactalbumin
- (2) The 1st transgenic cow was called Rosie
- (3) The milk produced was more balanced for humans than ordinary cow's milk
- (4) The human protein content was 30-40 gm/litre of the milk

167. The first clinical gene therapy was given in 1990 to a 4-year old girl with which of the following enzyme deficiency?

- (1) Adenosine deaminase
- (2) Tyrosine oxidase
- (3) Monamine oxidase
- (4) Glutamate dehydrogenase

168. Which is the name of virus given in figure



- (1) TMV
- (2) bacteriophage
- (3) Polio virus
- (4) Adeno virus

169. Read the following statements and find out the **True (T)** or **False (F)** statements :

- (A) Parturition is induced by a complex neuro-endocrine mechanism.
- (B) By the end of the 2nd month of pregnancy, the foetus develops limbs and digits.
- (C) During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovary.
- (D) The increased secretions of LH and FSH stimulates follicular development as well as secretion of estrogens by the growing follicles.

- (1) A - T, B - F, C - F, D - T
- (2) A - T, B - F, C - T, D - F
- (3) A - F, B - T, C - F, D - F
- (4) A - T, B - T, C - F, D - T

170. **Assertion (A):** All copulations do not lead to the fertilization and pregnancy.

Reason (R): Fertilization can occur only if the ovum and sperms are transported simultaneously to the ampullary region.

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

171. Match column I with column II and choose the **correct** option.

	Column I	Column II
(a)	After 1st month of pregnancy	(i) Appearance of hair on the head of foetus
(b)	By the end of 2nd month of pregnancy	(ii) Embryo's heart is formed
(c)	During the 5th month of pregnancy	(iii) Limbs and digits develop in foetus

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

172. Match List-I with List-II

List-I		List-II	
A.	Non-Medicated IUD	I.	Multiload 375
B.	Copper releasing IUD	II.	Progesterogens
C.	Hormone releasing IUD	III.	Lippes loop
D.	Implants	IV.	LNG-20

Choose the correct answer from the options given below :

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

173. Statement-I : An ideal contraceptive should be user-friendly, easily available, effective and reversible with no or least side effect.

Statement-II : Coitus interruptus is another method in which the male partner withdraws his penis from the vagina just before ejaculation so as to avoid insemination.

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

174. Read the following statements and find out the option contains all the incorrect statements :
 (a) straight alpha-interferon are the biological response modifiers which activates the immune system of the patients and helps in destroying the tumor

- (b) Normal cells show a property called contact inhibition by virtue of which contact with other cells inhibits their uncontrolled growth.
- (c) Ionising radiations like X-rays and gamma rays and non-ionizing radiations like UV cause DNA damage leading to neoplastic transformation.
- (d) Malignant tumors normally remain confined to their original location.
- (e) Metastasis is the most feared property of malignant tumors.

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

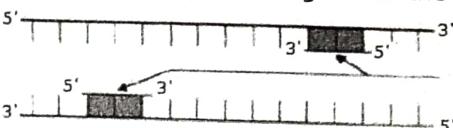
175. Ina...., a fish caught inb..., happened to be a...c..., which was thought to be extinct. These animals are calledd... evolved into first ...e....

- (1) A-1891, b-South America, c-Ichthyosaurs, d-lobefins, e-amphibians
- (2) a-1938, b-South America, c-Ictyophis, d-coelocanth, e-reptiles
- (3) a-1891, b-North America, c-coelocanth, d-lobefins, e-amphibians
- (4) a-1938, b-South Africa, c-coelocanth, d-lobefins, e-amphibians

176. Significance of 'heat shock' method in bacterial transformation is to facilitate ;-

- (1) Binding of DNA to the cell wall
- (2) Uptake of DNA through membrane transport proteins
- (3) Uptake of DNA through transient pores in the bacterial cell wall
- (4) Expression of antibiotic resistance gene

177. Identify the step of PCR given in the diagram-



- (1) Extension of primer
- (2) Denaturation of DNA
- (3) Annealing of primer
- (4) Exposure to high temperature

178. If you ligate a foreign DNA at the PstI site of antibiotic resistance gene in the vector pBR322, the recombinant DNA will-

- (1) Lose tetracycline resistance
- (2) Lose ampicillin resistance
- (3) Lose both tetracycline and ampicillin resistance
- (4) Maintain both tetracycline and ampicillin resistance

179. Which of the following genes were introduced in cotton to protect it from cotton bollworms?

- (1) cryIIAc and cryIAb
- (2) btAc and BtAc and BtAb
- (3) cryIAC and cryIIAB
- (4) nif genes

180. Match Column-I and Column-II and select the correct answer from the codes given below:

	Column-I	Column-II
A	Biopiracy	(i) Transferring a functional gene
B	Biopatent	(ii) Gene silencing
C	Gene therapy	(iii) Illegal use of biological organism
D	RNAi	(iv) Right granted for biological entities

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