1. A seat marked with Reg. No. will be allotted to each student. The student should ensure that he/she occupies the correct seat only. If any student is found to have occupied the seat of another student, both the students shall be removed from the examination and shall have to accept any other penalty imposed upon them.

2. Duration of Test is 3 Hours and Questions Paper Contains 180 Questions. The Max. Marks are 720.

3. Student can not use log tables and calculators or any other material in the examination hall.

4. Student must abide by the instructions issued during the examination, by the invigilators or the centre incharge.

5. Before attempting the question paper ensure that it contains all the pages and that no question is missing.

6. Each correct answer carries 4 marks, while 1 mark will be deducted for every wrong answer. Guessing of answer is harmful.

7. A candidate has to write his / her answers in the OMR sheet by darkening the appropriate bubble with the help of Blue / Black Ball Point Pen only as the correct answer(s) of the question attempted.

8. Use of Pencil is strictly prohibited.

Note: In case of any Correction in the test paper, please mail to dlpcorrections@allen.ac.in within 2 days along with Paper code and Your Form No.

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- Gravitation
- Electrostatics and Capacitors
- Current electricity
- Magnetic effect of current and Magnetism
- Electromagnetic Induction and Alternating current
- Electromagnetic Waves

### OPTICS
- (i) Ray optics & optical Instruments
- (ii) Wave optics: Nature of Light, Interference, Diffraction & Polarization
- Modern Physics (Dual Nature of Matter and Radiation, Atoms and Nuclei)
- Electronic Devices

### CHEMISTRY
- Organic Chemistry: Some Basic Principles and Techniques
- Hydrocarbons
- Haloalkanes and Haloarens
- Alcohols, Phenols and Ethers
- Aldehydes, Ketones and Carboxylic Acids
- Organic Compounds Containing Nitrogen (Amines)
- Redox Reactions
- Electrochemistry
- Chemical Kinetics
- Surface Chemistry
- General Principles and Processes of Isolation of Elements
- Coordination Compounds
- Environmental Chemistry
- Biomolecules
- Polymers
- Chemistry in Everyday Life

### BIOLOGY
- **Genetics and Evolution**: (i) Principles of inheritance and Variation (ii) Evolution
- **Biology in Human Welfare**: (i) Microbes in Human Welfare
- **Biotechnology**: (i) Biotechnology: Principles and Processes (ii) Biotechnology and its Applications
- **Biology in Human Welfare**: (i) Human Health and Disease (ii) Strategies for Enhancement in Food Production (Domestication of Plants & Animals)
- **Ecology**: (i) Organisms and Populations (ii) Ecosystem (iii) Biodiversity and Conservation (iv) Environmental Issues
1. Two concentric spherical shells of radius $R_1$ & $R_2$ have $q_1$ & $q_2$ charge respectively as shown in figure. How much charge will flow through key $k$ when it is closed:

(1) $q_2 \left( \frac{R_1 + R_2}{R_2} \right)$  
(2) $\frac{q_1 R_2 + q_2 R_1}{R_2}$  
(3) $q_2 \left( \frac{R_2 - R_1}{R_2} \right)$  
(4) $\frac{q_1 R_2 - q_2 R_1}{R_2}$

2. A capacitor is charged by using a battery which is then disconnected. A dielectric slab is then slipped between the plates, which results in:

(1) Reduction of charge on the plates and increase of potential difference across the plates.
(2) Increase in the potential difference across the plates, reduction in stored energy, but no change in the charge on the plates.
(3) Decrease in the potential difference across the plates, reduction in stored energy, but no change in the charge on the plates.
(4) None of the above

3. A long solenoid of radius 2 cm has 100 turns/cm and carries a current of 5 A. A coil of radius 1 cm having 100 turns and a total resistance of 20 $\Omega$ is placed inside the solenoid coaxially. The coil is connected to a galvanometer. If the current in the solenoid is reversed in direction, find the charge flown through the galvanometer:

(1) $2 \times 10^{-4}$ C  
(2) $4 \times 10^{-4}$ C  
(3) $6 \times 10^{-4}$ C  
(4) $8 \times 10^{-4}$ C
4. A real image of an object is formed at a distance of 20 cm from lens. On putting another identical lens in contact with it, the image is shifted 10 cm towards the combination, the power of the lens is:-

(A) 2D  (B) 5D  (C) 6D  (D) 10D

5. A common-emitter amplifier is designed with a n-p-n transistor ($\alpha = 0.99$). The input impedance is 1 k$\Omega$ and load is 10 k$\Omega$. The voltage gain will be:-

(A) 9.9  (B) 99  (C) 990  (D) 9900

6. Two concentric spheres A & B are kept very near to each other. A is negatively charged and B is earthed. The true statement is :-

(A) Charge on B is zero  (B) Potential at B is zero  (C) Charge is uniformly distributed on A  (D) Charge is non uniformly distributed on A

(A) A & C  (B) A & D  (C) B & C  (D) B & D

7. The plates of a parallel plate capacitor are charged up to 100 volt. A 2 mm thick plate is inserted between the plates, then to maintain the same potential difference, the distance between the capacitor plates is increased by 1.6 mm. The dielectric constant of the plate is :-

(A) 5  (B) 1.25  (C) 4  (D) 2.5

8. In the following figure what is the final value of current in the 10 ohm resistor when the plug of key K is inserted ?

(1) $\frac{2}{20}$ A  (2) $\frac{2}{30}$ A  (3) $\frac{2}{10}$ A  (4) Zero
9. For the given incident ray as shown in figure, the condition of total internal reflection of this ray the minimum refractive index of prism will be :-

\[ \frac{\sqrt{3} \pm 1}{2} \]

(1) $\frac{\sqrt{3}+1}{2}$  (2) $\frac{\sqrt{2}+1}{2}$

(3) $\frac{3}{2}$  (4) $\frac{7}{\sqrt{6}}$

10. An AND gate :-
   (1) implements logic addition
   (2) is equivalent to a series switching circuit
   (3) is an any or all gate
   (4) is equivalent to a parallel switching circuit

11. Electric flux through surface $s_1$ :-

- (1) is minimum
- (2) is maximum
- (3) equal to $s_2$ but less than $s_4$
- (4) equal for all surfaces

12. A and B are two concentric circular loop carrying current $i_1$ and $i_2$ as shown in figure. If ratio of their radii is 1:2 and ratio of the flux densities at the centre O due to A and B is 1:3 then the value of $\frac{i_1}{i_2}$ will be :-

- (1) $\frac{1}{2}$
- (2) $\frac{1}{3}$
- (3) $\frac{1}{4}$
- (4) $\frac{1}{6}$
13. The time constant of a circuit is 10 sec, when a resistance of 10Ω is connected in series in a previous circuit then time constant becomes 2 second, then the self inductance of the circuit is:-

(1) 2.5 H (2) 5H (3) 15 H (4) 25 H

14. In Young's double slit experiment, the seventh maximum with wavelength \( \lambda_1 \) is at a distance \( d_1 \) from central maxima and the same maximum with wavelength \( \lambda_2 \) is at a distance \( d_2 \). Then \( \frac{d_1}{d_2} \):

(1) \( \frac{\lambda_1}{\lambda_2} \) (2) \( \frac{\lambda_2}{\lambda_1} \) (3) \( \frac{\lambda_1^2}{\lambda_2} \) (4) \( \frac{\lambda_2^2}{\lambda_1} \)

15. In the given transistor circuit, the base current is 35 µA. The value of \( R_b \) is :-

(1) 100 kΩ (2) 200 kΩ (3) 300 kΩ (4) 400 kΩ

16. Electric field at a place is \( E = E_0 \hat{E} \) V/m. A particle of charge \( +q_0 \) moves from point A to B along a circular path find work done in this motion by electric field :-

(1) \( \sqrt{2}q_0aE_0 \) (2) \( \frac{q_0aE_0}{\sqrt{2}} \) (3) \( q_0aE_0 \) (4) \( 2qE_0a \)
17. P, Q and R long parallel straight wires in air, carrying currents as shown. The direction of resultant force on R is :-

18. In a given series LCR circuit $R = 4\Omega$, $X_L = 5\Omega$ and $X_C = 8\Omega$, the current :-
   (1) Leads the voltage by $\tan^{-1}(3/4)$
   (2) Leads the voltage by $\tan^{-1}(5/8)$
   (3) Lags the voltage by $\tan^{-1}(3/4)$
   (4) Lags the voltage by $\tan^{-1}(5/8)$

19. At what angle should an unpolarised beam be incident on a crystal of $\mu = \sqrt{3}$, so that reflected beam is polarised :-
   (1) $45^o$
   (2) $60^o$
   (3) $90^o$
   (4) $0^o$

20. When light is incident on surface, photo electrons are emitted. For photoelectrons :
   (1) The value of kinetic energy is same for all
   (2) Maximum kinetic energy do not depend on the wave length of incident light
   (3) The value of kinetic energy is equal to or less than a maximum kinetic energy
   (4) None of the above.

21. In the circuit shown, the reading of the Ammeter is doubled after the switch is closed. Each resistor has a resistance $1\Omega$ and the ideal cell has an e.m.f. $10V$. Then, the Ammeter has a coil resistance equal to

   (1) $2\Omega$
   (2) $1\Omega$
   (3) $2.5\Omega$
   (4) None
22. Due to the flow of current in a circular loop of radius \( R \), the magnetic field produced at the centre of the loop is \( B \). The magnetic moment of the loop is:

(1) \( BR^2/\pi \mu_0 \)
(2) \( 2\pi BR^2/\mu_0 \)
(3) \( BR^2/2\pi \mu_0 \)
(4) \( 2\pi BR^2/\mu_0 \)

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

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

24. How will the diffraction pattern change when yellow light is replaced by blue light? The fringe will be:

(1) Wider
(2) Narrower
(3) Brighter
(4) Fainter

25. An electron of stationary hydrogen atom passes from the fifth energy level to the ground level. The velocity that the atom acquired as a result of photon emission will be:

(1) \( \frac{25m}{24hR} \)
(2) \( \frac{24m}{25hR} \)
(3) \( \frac{24hR}{25m} \)
(4) \( \frac{25hR}{24m} \)

(m is the mass of the atom, \( R \) is Rydberg constant and \( h \) is Planck's constant)
26. When a current of 2 A flows in a battery from negative to positive terminal, the potential difference across it is 12 V. If a current of 3 A flows in the opposite direction potential difference across the terminals of the battery is 15 V, the emf of the battery is

(1) 12.6 V  (2) 13.2 V  
(3) 13.5 V  (4) 14.0 V

27. A positively charged (+q) particle of mass m has kinetic energy \( K \) enters vertically downward in a horizontal field of magnetic induction \( B \). The acceleration of the particle is :-

(1) \( \frac{2K}{qB} \)  
(2) \( \frac{qB\sqrt{2K}}{m} \)  
(3) \( \frac{2\sqrt{2K}}{m} \)  
(4) \( \frac{2qB\sqrt{2K}}{m} \)

28. The nature of electromagnetic wave is :-

(1) longitudinal  
(2) longitudinal stationary  
(3) transverse  
(4) transverse stationary

29. The half life of a radioactive isotope 'X' is 50 years. It decays to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio of 1 : 15 in a sample of a given rock. The age of the rock was estimated to be :-

(1) 150 years  (2) 200 years  
(3) 250 years  (4) 100 years

30. What is the current through an ideal P-N junction diode shown in figure below :-

(1) Zero  (2) 10 mA  
(3) 20 mA  (4) 50 mA
31. A given piece of wire of length $l$ and radius $r$ and resistance $R$ is stretched uniformly to wire of radius $\frac{r}{2}$. Its new resistance is:

(1) $4R$  
(2) $8R$  
(3) $16R$  
(4) $32R$

32. Two identical conducting wires A and B of same dimensions and same material are bent in the form of circular coil. Wire A consists of single turn whereas wire B consists of 2 turns. Both these wires are then suspended in a uniform magnetic field with their planes parallel to the one another and same current is passed through them. Which statement is correct?

(1) Couple on loop A is more than on loop B  
(2) Couple on loop B is more than on loop A  
(3) Couples on both the loop are equal  
(4) Couple on loop B is twice that on loop A

33. An object approaches a convergent lens from the left of lens with a uniform speed 5 m/s and stops at the focus. The image:

(1) Moves away from lens with an uniform speed 5 m/s  
(2) Moves away from lens with uniform acceleration.  
(3) Moves away from lens with non-uniform acceleration.  
(4) Moves towards the lens with non-uniform acceleration.

34. When the electron jumps from a level $n=4$ to $n=1$, the momentum of the recoiled hydrogen atom will be:

(1) $6.5 \times 10^{-27}$ kg ms$^{-1}$  
(2) $12.75 \times 10^{-19}$ kg ms$^{-1}$  
(3) $13.6 \times 10^{-19}$ kg ms$^{-1}$  
(4) zero

35. In a CE transistor amplifier, the audio signal voltage across the collector resistance of 2 kΩ is 2V. If the base resistance is 1 KΩ and the current amplification of the transistor is 100, the input signal voltage is:

(1) 0.1 V  
(2) 1 V  
(3) 1 mV  
(4) 10 mV
36. Each element in the finite chain of resistors shown in the figure is 1Ω. A current of 1 A flows through the final element. Then what is the potential difference V across input terminals of the chain.

\[ V=? \]

(1) 12 volt  (2) 34 volt  
(3) 1 volt  (4) 16 volt

37. Which is correct for phenomenon of periodic electromagnetic induction

(1) Phase difference between induced emf and induced current is \( \pi \)
(2) Phase difference between induced emf and linked flux is zero
(3) Phase difference between induced emf and linked flux is \( \frac{\pi}{2} \)
(4) Frequency of all induced parameters is double the rotational frequency of the coil

38. The far point of a near sighted person is 6.0 m from his eyes and she wears contacts that enable her to see distant objects clearly. A tree is 18.0 m away and 2.0 m high. How high is the image formed by the contacts ?

(1) 1.0 m  (2) 1.5 m  
(3) 0.75 m  (4) 0.50 m

39. If E and P are the energy and the momentum of a photon respectively then on reducing the wavelength of photon -

(1) P and E both will decrease  
(2) P and E both will increase  
(3) P will increase and E will decrease  
(4) P will decrease and E will increase

40. The satellite of mass m revolving in a circular orbit of radius r around the earth has kinetic energy E. Then its angular momentum will be:-

\[ (1) \frac{\sqrt{E}}{mr} \quad (2) \frac{E}{2mr} \]

\[ (3) \sqrt{2Emr^2} \quad (4) \sqrt{2Emr} \]

Use stop, look and go method in reading the question
41. In potentiometer experiment when \( K_1 \) is closed balance length is 100 cm. Then what will be balancing length when \( K_2 \) is closed?

- (1) 100 cm
- (2) 50 cm
- (3) 25 cm
- (4) 200 cm

42. If the magnetic dipole moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are denoted by \( \mu_d, \mu_p \) and \( \mu_f \) respectively, then:

- (1) \( \mu_p = 0 \) and \( \mu_f \neq 0 \)
- (2) \( \mu_d \neq 0 \) and \( \mu_p = 0 \)
- (3) \( \mu_d \neq 0 \) and \( \mu_f \neq 0 \)
- (4) \( \mu_d = 0 \) and \( \mu_p \neq 0 \)

43. A ray of light passes through equilateral Prism \( (\mu = 1.5) \) such that angle of incidence is equal to angle of emergence and the later is equal to 3/4th of Prism angle. The angle of deviation is:

- (1) 60°
- (2) 30°
- (3) 45°
- (4) 120°

44. In the nuclear reaction \( ^{235}_{92}U \) decay to \( ^{231}_{91}Pa \), what are the particles emitted?

- (1) One \( \alpha \)-particle and one proton
- (2) One \( \alpha \)-particle and one electron
- (3) One deuteron and one positron
- (4) One electron and one proton

45. A geostationary satellite is revolving around the earth. To make it escape from gravitational field of earth, its velocity must be increased:

- (1) 100%
- (2) 41.4%
- (3) 50%
- (4) 59.6%
46. In electrolysis of Al₂O₃ by Hall-Heroult process:
   (1) Cryolite (Na₃AlF₆) lowers the melting point of Al₂O₃ and increases its electrical conductivity
   (2) Al is obtained at cathode & O₂ at anode
   (3) Graphite anode is converted into CO₂
   (4) All of these

47. For a chemical reaction temperature increased from 25°C to 55°C then rate of reaction will be changed by a factor of (Assume µ = 3):
   (1) 27 (2) 9 (3) 3 (4) 2

48. An alkylbromide (A) forms a Grignard reagent which on treatment with water yield n-hexane. When A is treated with sodium in dry ether, 4, 5-diethyloctane is formed. The structure of A is:
   (1) CH₃CH₂CH₂CH₂CH₂CH₂Br
   (2) CH₃CH₂CH₂CH₂CHCH₃
   (3) CH₃CH₂CH₂CHCH₂CH₂
   (4) CH₃CHCHCH₂CH₂

49. When CH₃CH₂CH₂CHCl₂ is treated with 2 gram equivalent NaNH₂, the product formed is:
   (1) CH₃CH₂C≡CH
   (2) CH₃CH₂C≡CH₂
   (3) CH₃CH₂C≡CH₂ NH₂
   (4) CH₃CH₂C≡CH₂ Cl

---

46. हां लें है ये टालुका की सिंहासन अंततः आफ्नो तन-में
   (1) ब्रूवे हस्त इन्जेक्टर (Na₃AlF₆) घ्र यो क्लोरोइट या अंततः कम हो करते हैं तथा इससे विग्रहीत यो तत्त्व लक्ष्य बनें जाते हैं
   (2) अल्यूमिनियम ब्रूवे दे, (चोटिये) दे, प्रमाण्य आते हैं
   (3) ज्यो फाइट एक्स्की पे स्वतंत्र हो जाते हैं
   (4) इनमें से साती

47. ब्रूवे क्लियर में लैणिक औशी क्लियर का त फ़ूज्स दे बढ़ा 1 क्लियर कर्डिय जाते हैं तथा अभी फ़ूज दरकार तो की से बढ़ा जाये। वसूल यू = 3 मा न लो फ़ूज़:-
   (1) 27 (2) 9 (3) 3 (4) 2

48. एक लैणिक क्लियर में हल्द चिव ना दे औशी करे काचना त है एक के बढ़ा फ़ूज फ़ूज दे ब्रांड हाना त है। लेकिन रू, एक इंटेर में से चिव के सा फ़ूज फ़ूज दरकार जाते हैं
   (1) CH₃CH₂CH₂CH₂CH₂Br
   (2) CH₃CH₂CH₂CH₂CHCH₃
   (3) CH₃CH₂CH₂CHCH₂CH₂
   (4) CH₃CHCHCH₂CH₂

49. ज्या CH₃CH₂CH₂CHCl₂ के 2 ग्राम मुंह हल्द नायक दे सा फ़ूज फ़ूज़ के फ़ूज दरकार फ़ूज दरकार है ता सा फ़ूज़ दरकार फ़ूज़ है
   (1) CH₃CH₂C≡CH
   (2) CH₃CH₂C≡CH₂
   (3) CH₃CH₂C≡CH₂ NH₂
   (4) CH₃CH₂C≡CH₂ Cl

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Take it Easy and Make it Easy
50. Identify the strongest base from the given compounds:

1. \( \text{H}_2\text{N} \)
2. \( \text{C}_3\text{H}_4 \)
3. \( \text{O} \)
4. All have same basic strength

51. The zone refining of metal is based on the principle of:

1. Greater mobility of pure metal than that of impurity
2. Higher melting point of the impurity than that of the pure metal.
3. Greater noble character of the solid metal than that of the impurity
4. Greater solubility of the impurity in the molten state than in the solid

52. \( 2\text{Ag}^{+}(\text{aq}) + \text{Cu}(s) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Ag}(s) \)

The standard potential for this reaction is 0.46 V, which change will increase the potential the most?

1. Doubling the \([\text{Ag}^+]\)
2. Halving the \([\text{Cu}^{2+}]\)
3. Doubling the size of the \(\text{Cu}(s)\) electrode
4. Decreasing the size of the \(\text{Ag}\) electrode of one half

53. The product (A) formed in the following reaction

\( \text{C}_6\text{H}_5\text{CH}_3 + \text{Cl}_2 \underset{\text{High Temp. UV}}{\rightarrow} (A) \)

1. \( \text{C}_6\text{H}_5\text{CH}_3\text{Cl} \)
2. \( \text{C}_6\text{H}_5\text{Cl} \)
3. \( \text{CCl}_3 \)
4. \( \text{CCl}_3\text{CCl}_3 \)

---

50. दिए गए चौ पिकल में प्रकाश त्रांश राखच निर्देश

1. \( \text{H}_2\text{N} \)
2. \( \text{C}_3\text{H}_4 \)
3. \( \text{O} \)
4. सभी की समान शारीरिक महत्ता है।

51. धातु आप का मण्डल परिचय किस दिशा-या पर आया रहा है?

1. \( \text{Cu}^{2+} \) धातु की गलियों लल क्षे डिये गलियों लल से अधिक करने तत्त्व है।
2. \( \text{Ag}^{+} \) इंडिए का गलना का धातु धातु के गलना केसा उसे उत्तर तत्त्व है।
3. \( \text{Cu}(s) \) से सब निर्माण के उत्तर क्रम क्षे अभु इंडिया के उत्तर क्रम से अधिक करने तत्त्व है।
4. \( \text{Ag} \) से सबका शारीरिक में आप \( \text{Ag}^{+} \) की ठिकाना अधिक करने तत्त्व है।

52. \( 2\text{Ag}^{+}(\text{aq}) + \text{Cu}(s) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Ag}(s) \)

इस अभिक्रिया के लिए नक्षित्रिक 0.46 V है। वै नस परिक्षण न नक्षित्रिक में समान ठिकाने न करना है?

1. \( [\text{Ag}^+] \) करने पर फालू है?
2. \( [\text{Cu}^{2+}] \) अधिक करने पर फालू है?
3. \( \text{Cu}(s) \) इंडिए अल्टर का अंतर करने पर फालू है?
4. \( \text{Ag} \) इंडिए अल्टर के अंतर के धातु कार अधिक करने पर फालू है?

53. निम्न अभिक्रिया में प्रारंभिक है पद
54. 

\[
\begin{align*}
\text{HNO}_3 + H_2SO_4 & \rightarrow (A) \rightarrow \text{Cl}_2 \rightarrow (B)
\end{align*}
\]

The major product (B) is :-

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

55. Number of optical isomers in the open chain structure of glucose is :

(1) 16 (2) 8 (3) 32 (4) 4

56. What is not correct about \([\text{Fe}(\text{H}_2\text{O})_6\text{NO}]^{2+}\) ?
(1) Oxidation number of metal is +1
(2) Coordination number of metal is 6
(3) It is a tetrahedral complex.
(4) Ligand NO carries unit positive charge

57. Electricity required for liberating 710 g of Cl_2(g) by electrolyzing a concentrated solution of NaCl will be :-

(1) \(1.93 \times 10^5\) C
(2) \(1.93 \times 10^6\) C
(3) \(9.65 \times 10^5\) C
(4) \(9.65 \times 10^6\) C

58. Alkyl iodides can be best prepared by :-

(1) Swart reaction
(2) Finkelestin reaction
(3) Sand meyer’s reaction
(4) 1 & 3 both

59. An organic compound 'A' on reaction with PCC (Phyridiniumchlorochromate) gives a compound 'B'. Which on further reaction with I_2 and NaOH forms tri-iodomethane Identify the compound 'A'.

(1) HCOOH
(2) CH_3–CH_2–C–CH_3
(3) CH_3CHO
(4) C_2H_5OH

60. Polysaccharides have .............. linkage ?

(1) Glycosidic
(2) Peptide
(3) Anomeric
(4) Polymorphic

\[\text{Phase/ENTHUSIAST, MLK,M,N,PQ,MLSP, MAZD,E,F,G,H & MAZI/15-04-2016}\]
61. In the synergic bond of metal carbonyls :-
   (1) π* molecular orbital of ligand is used
   (2) π* molecular orbital of metal is used
   (3) σ molecular orbital of ligand as well as metals are used
   (4) σ* molecular orbital of metal is used

62. Which of the following statement about physical adsorption is not correct :-
   (1) It is usually mono-molecular layered
   (2) It is reversible in nature
   (3) It involves vander walls interaction between adsorbent and adsorbate
   (4) It involves small value of heat of adsorption

63. Which of the following is most reactive for electrophilic addition reaction?
   (1) CH₃–C≡CH (2) CH₃–CH=CH₂
   (3) CH=CH (4) CH≡CH

64. Which of the reactants given below is/are suitable for the preparation of Methoxybenzene?
   (x) –Br+CH₂ONa
   (y) –ONa + CHBr₃
   (1) Only x (2) Only y
   (3) Both x and y (4) Neither ‘x’ nor ‘y’

65. The monomer of teflon is :-
   (1) CF₂ = CF₂ (2) CFCI = CF₂
   (3) CCl₂ = CCl₂ (4) CFCl = CFCI

66. Which of the following outer orbital complex has maximum number of unpaired electron :-
   (1) d⁴ (octahedral) (2) d⁹ (octahedral)
   (3) d⁷ (octahedral) (4) d⁵ (octahedral)

67. On adding few drops of dil HCl or FeCl₃ to freshly precipitated ferric hydroxide a red coloured colloidal solution is obtained. This phenomenon is called :-
   (1) Peptization (2) Dialysis
   (3) Protection (4) Dissolution

68. Which type of the overlap of orbitals involves in hyperconjugation ?
   (1) π–π (2) σ–π (3) σ–σ (4) p–p
69. When acetaldehyde is heated with Fehling’s solution, it gives a red ppt. of :-
(1) CuSO₄  (2) CuO
(3) Cu₂Cl₂  (4) Cu₂O

69. Identify the nonionisable octahedral complex among following :
(1) Pt(NH₃)₂Cl₂  (2) Pt(NH₃)₃Cl₄
(3) Pt(NH₃)₃Cl₂  (4) Pt(NH₃)₃Cl₃

70. Which of the following is most reactive for nucleophilic substitution reaction ?
(1) CH₃CONH₂  (2) CH₂COOC₂H₅
(3) CH₃-C-O-C-CH₃  (4) CH₃-C-Cl

71. Identify the nonionisable octahedral complex among following :
(1) Pt(NH₃)₂Cl₂  (2) Pt(NH₃)₃Cl₄
(3) Pt(NH₃)₃Cl₂  (4) Pt(NH₃)₃Cl₃

72. How many structural isomers of alcohols with the formula C₄H₉OH are possible if all the carbon are in straight chain ?
(1) 4  (2) 5  (3) 2  (4) 3

73. Which of the following is water soluble :-
(1) Insulin  (2) albumins
(3) Pyridoxine  (4) All of above

74. Addition of hydrogen cyanide to carbonyl compounds is :-
(1) Accelerated by addition of base
(2) Accelerated by addition of acids
(3) Addition of either acid or base do not affect the rate
(4) Retarded by addition of base

75. Dettol is an example of :-
(1) Antiseptic  (2) Antimalarial
(3) Disinfectant  (4) Antifertility drug

76. How many moles of H₂SO₃ is required to reduce one mol of KMnO₄ in acidic medium :
(1) 1.5 mol  (2) 3 mol  (3) 2.5 mol  (4) 1 mol

77. IUPAC name of the following compound is
\[
\text{CH}_3-\text{CH-CH}_3
\]
(1) 3-cyanopentane-1,5-dinitrile
(2) Propane-1,2,3-tricarbonitrile
(3) Propane-1,2,3-trinitril
(4) Propane-tricyanide
78. The correct stability order for the following carbocation is:-(I) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(II) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(III) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(IV) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(1) IV > I > III > II (2) IV > III > II > I (3) I > IV > III > II (4) I > III > IV > II

79. The correct order of acidic strength is:-(1) Chloroacetic acid > Fluoroacetic acid > Phenol > Ethanol (2) Ethanol > Phenol > Chloroacetic acid > Fluoroacetic acid (3) Fluoroacetic acid > Chloroacetic acid > phenol > Ethanol (4) Fluoroacetic acid > Chloroacetic acid > Ethanol > Phenol

80. Penicillin G is a:-(1) Narrow spectrum antibiotic (2) Broad spectrum analgesic (3) Broad spectrum antibiotic (4) Broad spectrum antiseptic

81. In which of the following reaction element sulphur get reduced:-(1) \( \text{SO}_3^2^- + \text{Cr}_2\text{O}_7^{2^-} \rightarrow \text{SO}_4^{2-} + \text{Cr}^{3+} \) (2) \( \text{H}_2\text{S} + \text{MnO}_4^- \rightarrow \text{Mn}^{2+} + \text{S} \) (3) \( \text{H}_2\text{SO}_4 + \Gamma \rightarrow \text{I}_2 + \text{SO}_2 \) (4) \( \text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O} \)

82. The total number of geometrical isomers for the compound hexa-1, 3, 5-triene is:-(1) 2 (2) 3 (3) 4 (4) 5

83. During detection of phosphorus in an organic compound, yellow precipitate is formed due to the formation of:-(1) \( \text{NH}_4\text{H}_2\text{PO}_4 \) (2) \( \text{Mg}_2\text{P}_2\text{O}_7 \) (3) \( \text{NH}_4\text{H}_2\text{PO}_4.12\text{MoO}_3 \) (4) \( \text{NH}_4\text{H}_2\text{MoO}_4 \)

84. The electrophile involved in Reimer-Tiemann reaction is:-(1) CHCl\(_3\) (2) CCl\(_2\) (3) CCl\(_3\) (4) CHO

85. निम्न के बारे में नाम के लिए 611 विच व अन्य क्रम हैं:
(I) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(II) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(III) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(IV) \( \begin{array}{c}
\text{O} \\
\end{array} \)
(1) IV > I > III > II (2) IV > III > II > I (3) I > IV > III > II (4) I > III > IV > II

86. आकार गतिविधि के लिए 611 विच व अन्य क्रम हैं:
(1) वाले गोरे एस्टन के अम्ल के आकार की ग्रुपी लंबे नाम है। (2) एस्टन के आकार के अम्ल में वाले गोरे एस्टन के आकार है। (3) फल्दे गोरे एस्टन के आकार की ग्रुपी लंबे नाम है। (4) फल्दे गोरे एस्टन के आकार की ग्रुपी लंबे नाम है।

87. The total number of geometrical isomers for the compound hexa-1, 3, 5-triene is:-(1) 2 (2) 3 (3) 4 (4) 5

88. During detection of phosphorus in an organic compound, yellow precipitate is formed due to the formation of:-(1) \( \text{NH}_4\text{H}_2\text{PO}_4 \) (2) \( \text{Mg}_2\text{P}_2\text{O}_7 \) (3) \( \text{NH}_4\text{H}_2\text{PO}_4.12\text{MoO}_3 \) (4) \( \text{NH}_4\text{H}_2\text{MoO}_4 \)

89. The electrophile involved in Reimer-Tiemann reaction is:-(1) CHCl\(_3\) (2) CCl\(_2\) (3) CCl\(_3\) (4) CHO
85. The relative reactivity of
(I) Benzyl chloride
(II) p-methoxy benzyl chloride
(III) p-Nitrobenzyl chloride
Towards S_N1 reaction follows the order :
(1) I > II > III
(2) II > I > III
(3) III > II > I
(4) I > III > II

86. If order of a reaction is x then unit of its rate constant is :
(1) mol^{1-x} L^x sec^{-1}
(2) mol^{1-x} L^x sec^{-1}
(3) mol^{1-x} L^x sec
(4) mol^{1-x} L^x sec^{-1}

87. Identify the product (C) in the following series of reaction

88. Over 10 ppm fluoride causes :
(1) Harm full effects to bones and teeth
(2) Harmfull effects to skin
(3) Harmfull effect to eyes
(4) It is optimum concentration

89. An aromatic compound 'A' on treatement with aqueous ammonia and heating forms compound 'B' which on heating with Br_2 and KOH form a compound C of molecular formula C_6H_7N. The structures of compound A, B and C are respectively :
(1) C_6H_5CH_3, C_6H_5CONH_2, C_6H_5CH_2NH_2
(2) C_6H_5CHO, C_6H_5CONHCH_3, C_6H_5CH_2–NH_2
(3) C_6H_5COOH, C_6H_5CONH_2, C_6H_5NH_2
(4) C_6H_5COOH, C_6H_5NH–C_2H_5, C_6H_5NH_2

90. In bakelite, the rings are joined to each other through :
(1) –CH_2–
(2) –O–
(3) –C–
(4) –C–O–
91. Consider the following four statements (a-d) and select the option which includes all the correct ones only.
(a) Cross-breeding allows the desirable qualities of two different species to be combined.
(b) Wax is used in the preparation of cosmetics and polishes of various kinds.
(c) Pisciculture is catching, processing and selling of fishes.
(d) Inbreeding helps in accumulation of superior genes.

Options:
(1) Statement (b), (c) and (d)
(2) Statement (a) and (d)
(3) Statement (a) and (c)
(4) Statement (a), (c) and (d)

92. Which of the following is correct match for the above diagram?
(1) (a)– Meiosis II completed
(2) (b)– Diploid stage
(3) (c) and (d)– 2 and 4 cells embryo
(4) (e)– Blastula stage

93. (i) Neutrophil (ii) Monocytes (iv) T-lymphocyte (v) Natural killer cells
(vi) Antibody
How many of the above given statements are not the part innate immunity
(1) Three (2) Two (3) Four (4) Five

94. If the modified allele produce normal enzyme then which statement is not true -
(1) It will produce phenotype similar to unmodified allele
(2) It will responsible for transformation of substrate into product
(3) Modified allele is not equivalent to unmodified allele
(4) Modified allele is equivalent to unmodified allele

95. Which is not an example of cytoplasmic inheritance :-
(1) eye colour in drosophila
(2) Iojap character in maize
(3) Albinism in plant
(4) Plastid inheritance
96. Which of the following tools of recombinant DNA technology is incorrectly paired with its use?

(1) Restriction endonuclease - Production of DNA Fragment for gene cloning
(2) DNA ligase - enzyme that acts on DNA, creating sticky end
(3) DNA polymerase - copies DNA sequence in the polymerase chain reaction
(4) Reverse transcriptase - production of cDNA from mRNA

97. Meiosis take place in Angiosperm during :-

(1) Gametes formation
(2) Formation of flowers
(3) Formation of spores
(4) Formation of seeds

98. A country with a high rate of population growth took measures to reduce it. The figure below shows age-sex pyramids of populations A and B twenty years apart. Select the correct interpretation about them:

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **A** is the earlier pyramid and no change has occurred in the growth rate
- **A** is more recent and shows slight reduction in the growth rate
- **B** is the earlier pyramid and shows stabilised growth rate
- **B** is more recent showing that population is very young
99. We have a moral duty to care for Biodiversity, well being and pass on our biological legacy in good order to future generation, this Biodiversity conservation argument is considered in:-
(1) Narrowly utilitarian  (2) Ethical argument  
(3) Broadly utilitarian  (4) All of the above

100. Find the incorrect statement :-
(1) Whole plant can be regenerated from explant  
(2) Micropropagation is possible due to cellular totipotency  
(3) Genetically different plants produced by same explant are called somaclones  
(4) Healthy plants can be obtained from culturing apical meristem of virus infected plants

101. Which one of the following gives correct categorization of animals according to their products:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Chiru</td>
<td>Shahtoosh wool</td>
</tr>
<tr>
<td>(2) Sheep</td>
<td>Angora wool</td>
</tr>
<tr>
<td>(3) Goat</td>
<td>Beef</td>
</tr>
<tr>
<td>(4) Pig</td>
<td>Broiler</td>
</tr>
</tbody>
</table>

102. Amniocentesis is most often used to–
(1) Facilitate artificial insemination  
(2) Measure immune response capability in transplant recipient  
(3) Determine the presence of certain disorder in the foetus  
(4) Estimate the mother's potential for maintaining a pregnancy.

103. Which of the following immunoglobulin is responsible for passive immunity of infants ?
(1) Ig-E, because it can cross the placenta  
(2) Ig-M, because it is heaviest immunoglobulin present in colostrum  
(3) Ig-A, because it present an abundant quantity in colostrum  
(4) Ig-A, because it can cross the placenta and reaches in foetus.

99. हमारे द्वारा जीवित्व तथा अनुभव का समर्पण करना तथा उसका विपरीत का आशीर्वाद तथा उनके साथ आनन्द का समर्पण हमारे साथ हमारी मानवीय जीवित्व के लिए आवश्यक है। इसीलिए हमारे भविष्य के लिए जीवित्व के समर्पण करना आवश्यक है।
(1) निर्धारी (2) आदर्श (3) चर्चा (4) सभी ऊपर वाली भावनाओं के साथ

100. गलत का न कर चाह की ज्ञाति:
(1) स्तंभ (खाना तक) धारा समूह पंि यथार्थ दिवों परिचय नहीं है।
(2) के खिलाफ़ यू पर व्यक्तिकों के लिए सूची बनाने के लिए श्रेष्ठ सम्बन्ध से नहीं है।
(3) स्तंभ (धारा और यथार्थ) पद दित अनुमान तथा शिक्षा नहीं।
(4) वा इसलिए स्तंभ में विस्तारित करने वाले।

101. निम्नलिखित से कौन नहीं, आंकते?
(1) खनन पूर्व और (2) उप्रवेश स्थान नहीं।

102. पर्यावरण रेखां द्वारा क्षितिज के लिए रेखां व्यक्त रहे ही हैं।
(1) कृत्रिम मिनार्ड धान की सुविधा के लिए
(2) प्रयोग विधानों द्वारा खिचकों अनुसार शास्त्रीय मात्र मानी गई है।
(3) पूर्वांचल में कुछ विचारों की उपर्युक्त तिथि में।
(4) गहराई वर्तमान एंड रेक ने के लिए तथ्यक्षण मात्र की अनुसूची में।

103. निम्नलिखित तद्युक्त नहीं लो चुनिम रहे चुनिम में से वह नया विषय अतिशय महत्त्वपूर्ण के लिए जानकारी में दायर है।
(1) Ig-E, तथा फिर अंक देने पर रहे रहे हैं।
(2) Ig-M का लों स्टेट में अंतर्गत इसुतुन न लों बन रहे हैं।
(3) Ig-A तथा फिर लों स्टेट में एक चुनिम रहे नहीं है।
(4) Ig-A तथा अंक देने पर कर्म अंतर्गत में फूं का सकता है।
104. Flower colour is purple in sweet pea due to non-allelic interaction between two dominant genes C & P. Plant with CCpp genotype will have which of the following correct explanation?

a - Flower colour is white
b - No synthesis of chromagen
c - Raw materials are metabolised into chromagen.
d - Chromagen metabolism will be further stopped.
e - Crossing with heterozygous purple flowered plant will yield equal percentage of purple and white flowered plants.

(1) a, c, b and e
(2) All are correct except ‘b’
(3) a, b and e
(4) b, c, d & e

105. In a dihybrid test cross, following offsprings are obtained in the given ratio:

Red flower with round fruits – 44%
Red flower with long fruits – 6%
White flower with round fruits – 7%
White flower with long fruits – 43%

If red colour of flower and round fruits are dominant, then which of the following statement is correct?

(1) Both the genes are located on different chromosomes.
(2) Both genes are present on same chromosome and are 13 map unit apart.
(3) Genes are present on same Chromosome and have cis arrangement
(4) Both (2) and (3)

106. Eli Lilly, an American company prepared two DNA sequences corresponding to A & B chains of human insulin and introduced them in plasmid of *E.coli* to produce insulin chains. Chains A & B were prepared separately, extracted and combined to form human insulin by creating:

(1) Peptide bond (2) Ionic bond
(3) H-bonds (4) Disulphide bonds
107. Match the column correctly:

(a) Homogamy          (i) Primrose
(b) Herkogamy         (ii) Mirabilis
(c) Heterostyly       (iii) Petunia
(d) Self incompatibility (iv) Calotropis

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

108. How many statements are incorrect:-

(a) Removal of 80% tigers from an area results in increased growth of vegetation
(b) The length of food chain is generally limited to 3-4 trophic level due to energy loss.
(c) Carbon constitutes 49% of dry weight of organisms
(d) $4 \times 10^3$ kg of carbon is fixed in biosphere through photosynthesis annually

(1) Two   (2) Three   (3) None   (4) All

109. Chipko movement is related to:-

(1) Wetland conservation
(2) Animal conservation
(3) Mineral conservation
(4) Forest conservation

110. Aim of plant breeding are to produce:-

(1) Disease free varieties
(2) High yielding varieties
(3) Improved food quality
(4) All the above

111. Forelimbs of cat, lizard used in walking; forelimbs of whale used in swimming and forelimbs of bats used in flying are an example of:-

(1) Analogous organs
(2) Adaptive radiation
(3) Homologous organs
(4) Convergent evolution
112. It is a diagrammatic sectional view of male reproductive system. Identify the structure formed by fusion of duct of seminal vesicle and vas deferens?

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

113. Match column-I with column-II and find out the correctly matched option.

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Opioids</td>
<td>i Interferes with the transport of dopamine</td>
</tr>
<tr>
<td>b Cannabinoids</td>
<td>ii Sedative and pain killer</td>
</tr>
<tr>
<td>c Cocaine</td>
<td>iii Used by sport persons for enhance performance</td>
</tr>
<tr>
<td>d LSD</td>
<td>iv Hallucinogen</td>
</tr>
</tbody>
</table>

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

114. If a mulatto man marries with a mulatto woman, then :-

(1) Seven types of genotype will be obtained  
(2) Only mulatto will be produced  
(3) Offsprings with three dominant alleles will be maximum  
(4) 1:4:6:4:1 phenotypic ratio will be obtained
115. Given are the statements regarding linkage of genes:

(i) The strength of the linkage is determined by the distance between the two genes.
(ii) The strength of the linkage is directly proportional to the distance between the two genes.
(iii) The two genes are said to be linked when they fail to show independent assortment.

Out of these statements,
(1) All are correct
(2) (i) & (ii) are correct
(3) (i) & (iii) are correct
(4) (ii) & (iii) are correct

116. What is true?

(1) Flavr savr tomato has more ethylene for improving taste.
(2) Bt in Bt cotton signifies biotechnology.
(3) Anticoagulant hirudin is produced by transgenic Brassica napus seeds.
(4) Somatic hybridization involves fusion of two complete germ cells with desired genes.

117. Limnetic zone is:

(1) The shallow water zone around the edge of lake which supports rooted vegetation
(2) The open water zone beyond the littoral zone
(3) The zone where light does not reach
(4) Both (1) and (2)

118. In above diagram B is:

(1) Primary consumer
(2) Decomposer
(3) Top consumer
(4) Producer

115. नीचे जन नक्सल नक्सल के संबंध में कथन दिए गए हैं:

(i) खालक नक्सल का खयंग देख के जन के मध्य की दूरी द्वारा निकाल रिता हो तो है।
(ii) खालक नक्सल का खयंग देख के जन के मध्य की दूरी से के समान पति हो तो है।
(iii) दहों जन कहते न कोई भी में जन रा राथर अन्य या देखकर नहीं कर पते हैं।

इन संयोग के ने साइंटिसट नक्सल का संबंध है:

(1) All are correct
(2) (i) & (ii) are correct
(3) (i) & (iii) are correct
(4) (ii) & (iii) are correct

116. निम्न में से कौन सा कथन सही है?

(1) Flavr savr टमाटर में स्वाद बढ़ के लिए आधिक गैसें खुलते हैं।
(2) Bt इन Bt जन में Bt का अभ्यंबोगीतक होता है।
(3) Transgenic Brassica napus जन के भी जर्नों द्वारा रान्सिज्डियूडिन का उत्पत्ति किया जाता है।
(4) यह फिक्स करने में बांट में छूट जन युक्त में दो पुष्पों में कोई फाइंड का अन्य उन संबंध किया जाता है।

117. संलग्न अंकन से टक का श्रेणी है?

(1) शीतले किमानें पूंजी ला विकल्प शृंखला जन जन तक, वर्तमान श्रेणी की आपके चाहे।
(2) लित्तरूल (littoral) शृंखला के अंतरमें चाहे जलकक्ष 11 गायक।
(3) शृंखला जन बी अन्य नहीं पुष्प चाहे।
(4) (1) तथा (2) दोनों है"।

118. उ प्रमाणों के तौर पर में नहीं?

(1) प्राणिक उपाधि की (2) अफ्ताबक
(3) उच्च उपाधि की (4) उच्च पदक
119. Identify the likely organisms a, b, c, d in the food web shown below.

**Diagram:**
- Plants
- Deer
- Foxy wolf
- Goat
- Insects
- Eagle
- Snake
- Lion

**Options:**

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peacock</td>
<td>Rats</td>
<td>Frog</td>
<td>Rabbit</td>
</tr>
<tr>
<td>2</td>
<td>Rabbit</td>
<td>Rats</td>
<td>Frog</td>
<td>Peacock</td>
</tr>
<tr>
<td>3</td>
<td>Rabbit</td>
<td>Frog</td>
<td>Rats</td>
<td>Peacock</td>
</tr>
<tr>
<td>4</td>
<td>Frog</td>
<td>Rats</td>
<td>Rabbit</td>
<td>Peacock</td>
</tr>
</tbody>
</table>

120. Conservation and sustainable use of biological diversity and fair and equitable sharing of benefits arising out of the utilisation of genetic resources are the key objectives of :-

(1) Kyoto protocol in Japan (1997)
(2) Earth Summit held in Rio (1992)
(3) Montreal protocol (1987)
(4) Earth Summit in (Johnsberg 2002)

121. Which one of the following options gives one correct example each of convergent evolution and divergent evolution :-

<table>
<thead>
<tr>
<th></th>
<th>Divergent evolution</th>
<th>Convergent evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bones of forelimbs of whale and cheetah</td>
<td>Eyes of octopus and mammals</td>
</tr>
<tr>
<td>2</td>
<td>Wings of butterfly and sparrow</td>
<td>Brain and heart of vertebrates</td>
</tr>
<tr>
<td>3</td>
<td>Potato and sweet potato</td>
<td>Thorn of bougainvillea and tendrils of cucurbita</td>
</tr>
<tr>
<td>4</td>
<td>Flippers of penguins and Dolphins</td>
<td>Wings of butterfly and birds</td>
</tr>
</tbody>
</table>
122. Incorrect statement is–
(1) Prostate is a paired gland present in male reproductive system
(2) In male, testes are situated out side the abdominal cavity
(3) In male, sperm formation continues even in old age
(4) Male reproductive system includes a pair of testes along with accessory ducts, glands and the external genitalia

123.
Diagram is showing, skeletal structure of:–
(1) Morphine molecule
(2) Cannabinoid molecule
(3) Opioids molecule
(4) Coca alkaloid

124. Which of the following gene does not show pleiotropy?
(1) Lethal genes
(2) Gene for sickle cell anaemia
(3) Self incompatibility gene in plants
(4) Gene for size of starch grain in pea

125. I

II

What mistake is present in above pedigree:–
(1) Sex linked character is never transferred from mother to son.
(2) In II\textsuperscript{nd} generation male offspring is affected
(3) Male offspring is never carrier of x-linked disorder
(4) In parental generation wrong symbol is used.

126. Statin used for lowering blood cholesterol level are extracted from:–
(1) Trichoderma polysporum
(2) Monascus purpureus
(3) Streptococcus
(4) Aspergillus
127. What type of ecological succession would operate after a volcanic eruption and forest fire–
   (1) Primary
   (2) Secondary
   (3) Primary & secondary respectively
   (4) Secondary and primary respectively

128. How many statement are correct ?
   (a) Predator also help in maintaining species diversity in community.
   (b) Decomposition is largely an oxygen requiring process
   (c) Number of trophic levels in GFC is never restricted
   (d) Some organisms of DFC are prey to GFC animals.
   (1) a, b, c, d (2) a, b, c
   (3) a, b, d (4) b, c, d

129. Which of the following is fresh water indicator :-
   (1) E. coli (2) Daphnia
   (3) Sluge worm (4) Blood worm

130. A man and a woman who both appear normal have phenyl ketonuria affected child, and phenyl ketonuria is an autosomal recessive trait. The woman becomes pregnant again and is told that she is carrying fraternal twins. What is the probability of phenyl ketonuria in twins ?
   (1) $\frac{1}{16}$ (2) $\frac{1}{4}$ (3) $\frac{1}{2}$ (4) $\frac{9}{16}$

131. The atmosphere of earth at the time of origin of life was :-
   (1) Oxidizing
   (2) Reducing
   (3) Neither oxidizing nor reducing
   (4) Without oxygen atoms

132. Read the following
   (A) It is a thick layer of smooth muscles
   (B) It is a highly glandular layer
   (C) It exhibits strong contraction during delivery of baby
   (D) Progesteron causes hypertrophy in myometrium
   Which of the above statements are correct with respect to myometrium?
   (1) A and B (2) B, C and D
   (3) A and C (4) A, B and C
133. Withdrawal syndrome is characterised by:-
   (a) Anxiety (b) Shakiness
   (c) Nausea (d) Sweating
   (1) a, c (2) b, c
   (3) a, c, d (4) a, b, c, d

134. Find out the phenotypic ratio obtained when we make the selfing of golden leaf plant of snapdragon
   (1) 3:1 (2) 1:1 (3) 2:1 (4) 1:2:1

135. Which statement is true :-
   (1) Non disjunction is the exception of dominance
   (2) Genetic drift is operates in large population
   (3) Secondary sexual characters are the example of sex limited characters
   (4) In virus carbohydrate act as genetic material

136. In which process development of embryo starts outside the embryosac ?
   (1) Diplospory (2) Diploid apogamy
   (3) Adventive embryony (4) Apospory

137. In the above graph shows relation between species richness and area for a wide variety of taxa turns out to be a rectangular hyperbola on a logarithmic scale, the relationship shown by straight line.
   In Which area slope of line to be much steeper ?
   (1) Grass land (2) Temperate region
   (3) Tropical rain forest (4) Tundra

138. The role of an organism in the ecological system is known as
   (1) Habitat (2) Herbivory
   (3) Niche (4) Interaction

133. विचित्र व्रत्त लक्षण के अधीन लक्षण हैं
   (a) चिंता / बैठे चेहरा नी (b) के फात
   (c) मिलनी (d) पी भूत आ ना
   (1) a, c (2) b, c
   (3) a, c, d (4) a, b, c, d

134. ज्यादातर पत्ते गर्भवी गाय हर फलों छाये ध्याये में 
   (1) 3:1 (2) 1:1 (3) 2:1 (4) 1:2:1

135. किसने किसका न सिस्त है?
   (1) आवेदे ज्य प्रभाव विलिंग का असाद है
   (2) अ जानी वाली विकल्प बाज़ जाखंड खेत में होता है
   (3) टिंटिंग का गांव ले गिरकर लक्षण पिघल गिरे 
   (4) वाँ इसमें का जो हाइड्रो अ बन वाली विकल्प हां 

136. किस नुस का विविधता 1 पक्ष के धातु के बने 
   (1) दिव्य प न बी जी । (2) दिव्य प न अस्कर ये मन
   (3) के स्त्री पक्ष के पक्ष के काल होते है।

137. प त्रिकोण के त्रिभुजों में विविध तरंग दृश्य उस के चार विलिंग गया है, जो विकल्प बाज़ अतिक्रमण होता है, वाला गया देता में या ने पक्ष संबंध में वाला रे खाली दांत है।
   निम्न में से किसके में रे खाली दांत न अथवा कटहट रहे होंगे?
   (1) दाते सभी धातु (2) सभी ते पक्ष स्त्री 
   (3) उ पक्ष काट व वी यवताया) टिंटिंग

138. परिस्थिति तिथि त्वरित में जैव की पूर्वी गतिका के बने 
   (1) अ वास (2) बाकर भी तिथि
   (3) निकेत न(वी) पार पर परिक्ष परिक्ष अर्थ
139. Read the following curve.

![Population Curve](image)

What indicates 'b'.
1. Carrying capacity
2. Exponential growth, \( N_t = N_0 e^{rt} \)
3. Logistic growth, \( N_t = \frac{N_0}{1 + e^{k - rt}} \)
4. Logistic growth, \( \frac{dN}{dt} = rN \left( \frac{k - N}{k} \right) \)

140. In XX-XO type of sex determination :-
1. Males have a pair of X-chromosome beside the autosome
2. Males have only one X-chromosome besides the autosome
3. Female have only one X-chromosome beside the autosome
4. Female have no X-chromosome

141. Which of the following statement is correct?
1. *Homo erectus* is the direct ancestor of *Homo sapiens*
2. Cro-magnon man's fossils has been found in Ethiopia
3. *Australopithecus* hunted with stone weapons and ate meat
4. Neanderthal man is the direct ancestor of *Homo erectus*

142. How many minimum primary spermatocytes are required for the formation of 100 sperms?
1. 25
2. 50
3. 100
4. 40

143. Which of the following is false for smoking:-
1. Causes oxygen deficiency in body.
2. It raises blood pressure but reduces heart rate.
4. Smoking paves the way for hard drugs.
144. Find out the genotype of I-2 and II-1 in following pedigree?

I-1   I-2   II-1   II-2
  1     2     1     2
  3     4

(1) AA and AA
(2) Aa and aa
(3) Aa and Aa
(4) aa and AA

145. In a random mating population frequency of recessive gene is 0.5. What is the frequency of dominant phenotypes in population?-
(1) 0.25  (2) 0.50  (3) 0.75  (4) 0.20

146. Sequence of development during the formation of embryosac is:
(1) Archesporium → megaspore → megaspore mother cell
(2) Megasporocyte→archesporium → megaspore → embryosac
(3) Megaspore → megaspore mother cell → archesporium → embryosac
(4) Archesporium → megaspore mother cell → megaspore → embryosac

147. Red data book is published by:
(1) IUCN  (2) ICZN
(3) ICBN  (4) WWF

148. Which one of the following is most appropriately defined?
(1) Amensalism is a relationship in which one species is benefited where as the other is unaffected.
(2) Predator is an organism that catches and kills other organism for food.
(3) Parasite is an organism which always lives inside the body of other organism and may kill it.
(4) Host is an organism which provides only food to another organism.

149. Ramesh Chandra Dagar, a farmer of sonipat has created the Haryana Kisan welfare club, it is related to:
(1) Integrated organic farming
(2) Uses of fertilizer
(3) Limited use of pesticides
(4) Case study of Remedy for plastic waste
150. In a plant one allelic pair is incompletely dominant and another allelic pair also incompletely dominant then what will be percentage of offspring with genotype (TtRr) by selfing of a plant with genotype TtRr

(1) \[ \frac{1}{16} \]  (2) \[ \frac{4}{16} \]  (3) \[ \frac{1}{8} \]  (4) \[ \frac{6}{16} \]

151. The wing of a bird and wing of a butterfly are :-
(1) Homologous but not analogous
(2) Analogous but not homologous
(3) Homologous and analogous
(4) Neither homologous and nor analogous

152. Fertilization most commonly occurs if the ovum and sperms are transported simultaneously to
(1) Fimbriae-Infundibulum junction
(2) Infundibulum-Ampulla junction
(3) Ampulla
(4) Isthmus-Fundus junction

153. Which vaccine is made by multiplication of surface antigen by genetic engineering :-
(1) BCG  (2) Small pox vaccine  (3) Hepatitis B vaccine  (4) Polio vaccine

154. Predict from the following chart :

(1) Character is dominant and carried by X-chromosome
(2) Character is carried by Y-chromosome
(3) Character is sex linked recessive
(4) Character is recessive autosomal

155. Which of the following is true for Lac-operon ?
(i) Inactive repressor is formed
(ii) Operates in anabolic pathway
(iii) Inducer, inactivates repressor
(iv) Three structured genes z, y, a are involved
(v) i-gene synthesized repressor constitutively
(1) i, ii, iii, iv  (2) ii, iii, iv  (3) ii, iii, v  (4) iii, iv, v
156. Wind pollinated flowers differ from insect pollinating flowers in having:
(1) Small perianth and sticky pollen grains
(2) Coloured perianth and heavy pollens
(3) Nectarless flowers and light pollens
(4) Large coloured perianth and sticky pollens

157. The salt concentration (measured as salinity in part per thousand) in Inland water:
(1) less than 5 %
(2) 30-35 %
(3) More than 5%
(4) 100 %

158. Which one of the following pairs is mismatched:
(1) Tundra Biome – Tree less biome
(2) Temperate deciduous forest – Taiga Biome
(3) Chaparral – Scrub forest
(4) Rain forest – Highest Biodiversity

159. Ecology is basically concerned with levels of biological organisation, they are:
(1) Organism, population, communities
(2) Organism, biosphere, communities
(3) Organism, biosphere, ecosystem
(4) Organism, communities and biome

160. Given below, is a typical agarose gel in which electrophoresis had occurred.

In this agarose gel:
(1) Lane–1 shows migration of digested DNA fragments
(2) Only Lane–4 shows migration of digested DNA fragments
(3) Lane–2 to 4 shows migration of digested set of DNA fragments
(4) Wells are always placed towards positive electrode during electrophoresis

161. Turtles, lizards; snakes and tuatars are evolved from:
(1) Thecodonts
(2) Sauropsida
(3) Synapsides
(4) Pelycosaurs
162. Subsequent encounter with the same pathogen elicits a highly intensified _____ response:–
(1) Secondary immune response
(2) Primary immune response
(3) Anamnestic response
(4) 1 & 3 both

163. The Punnett square shown below represents the pattern of inheritance in dihybrid cross, when round (R) is dominant over wrinkled (r) seeds and yellow (Y) is dominant over green (y) seeds.

<table>
<thead>
<tr>
<th></th>
<th>RY</th>
<th>Ry</th>
</tr>
</thead>
<tbody>
<tr>
<td>RY</td>
<td>F</td>
<td>N</td>
</tr>
<tr>
<td>Ry</td>
<td>G</td>
<td>O</td>
</tr>
<tr>
<td>rY</td>
<td>H</td>
<td>P</td>
</tr>
<tr>
<td>ry</td>
<td>I</td>
<td>M</td>
</tr>
</tbody>
</table>

Find out the odd one –
(1) G  (2) K  (3) H  (4) L

164. In a man brown eyes (B) are dominant to blue (b) and dark hairs (R) are dominant to red hairs (r).

A man with brown eyes and dark hairs marries a woman with blue eyes & dark hairs. They have one child with blue eyes & red hairs. What will be possible genotype of man, woman & child respectively?
(1) BBRR, bbRR, bbrr  (2) BBRr, bbRr, bbrr  (3) BbRr, bbRr, bbrr  (4) BbRR, bbRR, bbRr

165. Frederick sanger is associated with
(1) Developing method for determination of amino acid sequence
(2) Developing method for biochemical analysis of macromolecule
(3) Artificial gene
(4) Formation of cloning vector

166. What would be the number of chromosomes in the cells of the aleurone layer in a plant species with 8 chromosomes in its antipodals?
(1) 8  (2) 16  (3) 24  (4) 32

167. The percolation and water holding capacity of the soil depends on:–
(1) Soil composition
(2) Grain size
(3) Aggregation of soil particles
(4) All of the above
168. Ozone is gaseous “secondary” air pollutant because:-
(1) It is not an important pollutant
(2) It causes secondary effects on plants and animals
(3) It is formed by the oxides of nitrogen in sunlight and warm temperature
(4) It is formed by the oxidation of oxygen in atmosphere

169. Match the following

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Eurythermal</td>
<td>(a) Restricted to a narrow range of temperature</td>
</tr>
<tr>
<td>(ii) Stenothermal</td>
<td>(b) Restricted to a narrow range of salinity</td>
</tr>
<tr>
<td>(iii) Euryhaline</td>
<td>(c) Tolerate wide range of temperature</td>
</tr>
<tr>
<td>(iv) Stenohaline</td>
<td>(d) Tolerate wide range of salinities</td>
</tr>
</tbody>
</table>

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

170. Which variety of 'Brassica' is resistant to white rust disease :-
(1) Pusa Gaurav
(2) Pusa Swarnim
(3) Pusa Komal
(4) Pusa sadabahar

171. As per the theory of biogenesis, the :-
(1) Spontaneous generation is the key of evolution
(2) Present day organisms have developed from pre-existing living ones
(3) Plants have evolved from animals
(4) Animals have evolved from plants

172. Amoebiasis (amoebic dysentery) is caused by:-
(1) Entamoeba coli
(2) Entamoeba gingivalis
(3) Entamoeba histolytica
(4) 1 & 3 both

173. Which statement is not correct :-
(i) Male individual is hemizygous for autosomal character
(ii) Seven Mendelian characters genes are located on chromosome number 1st, 3rd, 5th and 7th
(iii) Unmodified allele produce normal enzyme.
(iv) Polydactyly is an example of continuous variation
(v) In pea plant green pod colour is a dominant character

(1) i, ii
(2) i, ii, iii, iv
(3) i, ii, iv
(4) i, ii, iv, v
174. In a family the parents are carrier for albinism and both have blood group 'AB'. What will be probability of normal and type A blood group children :-
   (1) 3/16  (2) 6/16
   (3) 2/16  (4) 1/16

175. In cloning vector PBR322, the number 322 indicates:-
   (1) That it is a plasmid.
   (2) A code given to a scientists who constructed it.
   (3) A number of base pairs it contains.
   (4) A number given to distinguish this plasmid from other developed in the same laboratory.

176. In flowering plants, a 'mature male gametophyte' is derived from a pollen mother cell by :-
   (1) Three mitotic divisions
   (2) One meiotic and two mitotic divisions
   (3) Two meiotic divisions
   (4) A single meiotic divisions

177. Niche overlapping is a result of -
   (1) Competitive exclusion
   (2) Competitive release
   (3) Resource Partitioning
   (4) Symbiosis

178. What is correct about Green house effect ?
   (a) Salinity of sea water will increase
   (b) Water absorption capacity of atmosphere will increase
   (c) Photosynthetic rate will increase
   (d) Stomatal movement of affected
   (1) a, b, d  (2) a, c, d
   (3) b, c, d  (4) a, d

179. Improved wheat variety, developed by mutation breeding is :-
   (1) Shakti  (2) Pusa Gaurav
   (3) Pusa lerma  (4) Remei

180. The entire collection of (plants/seeds) having all the diverse alleles for all genes in a given crop is called :-
   (1) Gene bank
   (2) Germplasm collection
   (3) Genetic erosion
   (4) Genetic drift