**Important Instructions:**

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on **Side-1** and **Side-2** carefully with blue/black ball point pen only.

2. The test is of **3 hours** duration and Test Booklet contains **180** questions. Each question carries **4 marks**. For each correct response, the candidate will get **4 marks**. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.

3. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.

4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

5. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**

6. The CODE for this Booklet is **AA**. Make sure that the CODE printed on **Side-2** of the Answer Sheet is the same as that on this Test Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.

7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.

8. Use of white fluid for correction is **not** permissible on the Answer Sheet.

**Mahanypura Nirdesh:**

1. उपर पत्रिका हाँच परीक्षा पत्रिका मध्ये आहे, जेवढा तुम्हाला उपर पत्रिका उपयोगाने संगीतले जाहील तेथा उपर पत्रिका कांठा पृष्ठ-1 व पृष्ठ-2 वर फक्त निर्देशक कायदा बॉल पॉइंट पेन नेच सप्टीकरण भरावे।

2. परीक्षणाच्या अधिक 3 तास आहे. तसेच परीक्षा पत्रिका मध्ये 180 प्रश्न आहेत. प्रत्येक प्रश्नात 4 गुण आहेत. प्रत्येक बोर्ड उत्तरात 4 अंक दिले जातील. तसेच उत्तर चुकीचे ह्या उत्तरात एकुण अंकाकून एक अंक वजा केला जाईल. अधिकतम गुण 720 आहेत।

3. हा पाठ्यांक प्रश्नांकन करण्यासाठी तसेच उपर पत्रिकेच्या लिथिणीसाठी फक्त निर्देशक कायदा बॉल पॉइंट पेनचा वापर करवा।

4. रफ काम हा परीक्षेमध्ये निर्धारित स्थानावरच चरवावे।

5. परीक्षा संयुक्त नंतर परीक्षार्थी कक्षा/हॉल सोडण्यासाठी उपर पत्रिका कक्ष निरीक्षकांना अपवाद दिले. तसेच परीक्षार्थी प्रश्न पत्रिका आपल्या बोर्डवर घेऊन जाऊ शकतात।

6. हा पत्रिकेच्या कोड/संकेत **AA** आहे. हा पत्रिकेचा कोड/संकेत उपर पत्रिकेच्या पृष्ठ-2 वर आपलेल्या कोड/संकेता शी मिळत जुव्वला असावा. कोड/संकेत केल्या असल्याने परीक्षार्थी निरीक्षकांना हा बारत सूचना दाखवा.

7. परीक्षार्थीने आपल्या उपर पत्रिकेच्या कोणताही मोड किंवा कोणताही अन्य चिंता लावू नये, परीक्षार्थीने आपल्या अनुक्रमाने प्रश्न पत्रिका/उपर पत्रिकेच्या दिलेल्या स्थानावरच लिथिणी करावा.

8. उपर पत्रिकेच्या कोणताही प्रश्नांकनी चुक यथार्थांकांसाठी व्हाईट-फ्लाइड चा उपयोग करू नये।

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**In case of any ambiguity in translation of any question, English version shall be treated as final.**

प्रश्नांकनाची अनुवादात कोणतीही अस्पष्टता असल्यास इंग्लिश अनुवाद अंतिम मानला जाईल।

Name of the Candidate (in Capitals): ________________________________

Roll Number: in figures ____________________________

: in words ____________________________

Centre of Examination (in Capitals): ________________________________

Candidate’s Signature: ____________________________ Invigilator’s Signature: ____________________________

Facsimile signature stamp of
Centre Superintendent: ____________________________

ACHLA/AA/Page 1
1. The volume \((V)\) of a monatomic gas varies with its temperature \((T)\), as shown in the graph. The ratio of work done by the gas, to the heat absorbed by it, when it undergoes a change from state A to state B, is

\[
\frac{\Delta U}{q} = \frac{\frac{2}{3} - \frac{2}{5}}{2} = \frac{\frac{4}{5}}{2} = \frac{2}{5}.
\]

2. The fundamental frequency in an open organ pipe is equal to the third harmonic of a closed organ pipe. If the length of the closed organ pipe is 20 cm, the length of the open organ pipe is

1. 12·5 cm
2. 8 cm
3. 13·2 cm
4. 16 cm

3. At what temperature will the rms speed of oxygen molecules become just sufficient for escaping from the Earth’s atmosphere?

\[
\text{rms} \; \text{speed} = \sqrt{\frac{8kT}{m}}
\]

\[
\begin{align*}
\text{(1)} & \quad 5\cdot016 \times 10^4 \; \text{K} \\
\text{(2)} & \quad 8\cdot360 \times 10^4 \; \text{K} \\
\text{(3)} & \quad 2\cdot508 \times 10^4 \; \text{K} \\
\text{(4)} & \quad 1\cdot254 \times 10^4 \; \text{K}
\end{align*}
\]

4. The efficiency of an ideal heat engine working between the freezing point and boiling point of water, is

\[
\begin{align*}
\text{(1)} & \quad 6\cdot25\% \\
\text{(2)} & \quad 20\% \\
\text{(3)} & \quad 26\cdot8\% \\
\text{(4)} & \quad 12\cdot5\%
\end{align*}
\]
5. A carbon resistor of \((47 \pm 4.7) \text{k}\Omega\) is to be marked with rings of different colours for its identification. The colour code sequence will be
   (1) Yellow – Green – Violet – Gold
   (2) Yellow – Violet – Orange – Silver
   (3) Violet – Yellow – Orange – Silver
   (4) Green – Orange – Violet – Gold

6. A set of ‘n’ equal resistors, of value ‘R’ each, are connected in series to a battery of emf ‘E’ and internal resistance ‘R’. The current drawn is I. Now, the ‘n’ resistors are connected in parallel to the same battery. Then the current drawn from battery becomes 10 I. The value of ‘n’ is
   (1) 20
   (2) 11
   (3) 10
   (4) 9

7. A battery consists of a variable number ‘n’ of identical cells (having internal resistance ‘r’ each) which are connected in series. The terminals of the battery are short-circuited and the current I is measured. Which of the graphs shows the correct relationship between I and n?
   (1) ![Graph 1]
   (2) ![Graph 2]
   (3) ![Graph 3]
   (4) ![Graph 4]
8. Unpolarised light is incident from air on a plane surface of a material of refractive index ‘μ’. At a particular angle of incidence ‘i’, it is found that the reflected and refracted rays are perpendicular to each other. Which of the following options is correct for this situation?

(1) \( i = \sin^{-1} \left( \frac{1}{\mu} \right) \)

(2) Reflected light is polarised with its electric vector perpendicular to the plane of incidence

(3) Reflected light is polarised with its electric vector parallel to the plane of incidence

(4) \( i = \tan^{-1} \left( \frac{1}{\mu} \right) \)

9. In Young’s double slit experiment the separation d between the slits is 2 mm, the wavelength \( \lambda \) of the light used is 5896 Å and distance D between the screen and slits is 100 cm. It is found that the angular width of the fringes is 0·20°. To increase the fringe angular width to 0·21° (with same \( \lambda \) and D) the separation between the slits needs to be changed to

(1) 2·1 mm
(2) 1·9 mm
(3) 1·8 mm
(4) 1·7 mm

10. An astronomical refracting telescope will have large angular magnification and high angular resolution, when it has an objective lens of

(1) large focal length and large diameter
(2) large focal length and small diameter
(3) small focal length and large diameter
(4) small focal length and small diameter
11. The ratio of kinetic energy to the total energy of an electron in a Bohr orbit of the hydrogen atom, is
   (1) 2 : −1
   (2) 1 : −1
   (3) 1 : 1
   (4) 1 : −2

12. An electron of mass \( m \) with an initial velocity \( \vec{V} = V_0 \hat{i} \) \((V_0 > 0)\) enters an electric field \( \vec{E} = −E_0 \hat{i} \) \((E_0 = \text{constant} > 0)\) at \( t = 0 \). If \( \lambda_0 \) is its de-Broglie wavelength initially, then its de-Broglie wavelength at time \( t \) is
   (1) \( \lambda_0 t \)
   (2) \( \lambda_0 \left(1 + \frac{eE_0}{mV_0} t\right) \)
   (3) \( \frac{\lambda_0}{\left(1 + \frac{eE_0}{mV_0} t\right)} \)
   (4) \( \lambda_0 \)

13. For a radioactive material, half-life is 10 minutes. If initially there are 600 number of nuclei, the time taken (in minutes) for the disintegration of 450 nuclei is
   (1) 30
   (2) 10
   (3) 20
   (4) 15

14. When the light of frequency \( 2v_0 \) \((v_0 \text{ is threshold frequency})\), is incident on a metal plate, the maximum velocity of electrons emitted is \( v_1 \). When the frequency of the incident radiation is increased to \( 5v_0 \), the maximum velocity of electrons emitted from the same plate is \( v_2 \). The ratio of \( v_1 \) to \( v_2 \) is
   (1) 4 : 1
   (2) 1 : 4
   (3) 1 : 2
   (4) 2 : 1

11. वायुमूढक अणुघ बोहरच्या क्षेत्रीय इलेक्ट्रॉनीच्या गतिज उडीज एकूण उडीजभर गुणोंतर ________ आहे.
   (1) 2 : −1
   (2) 1 : −1
   (3) 1 : 1
   (4) 1 : −2

12. \( m \) वस्तुमानाचा इलेक्ट्रॉन सुरुवातीच्या \( \vec{V} = V_0 \hat{i} \) \((V_0 > 0)\) वेगाने \( \vec{E} = −E_0 \hat{i} \) \((E_0 = \text{स्थिर} > 0)\) हा विद्युत क्षेत्रात \( t = 0 \) असताना प्रवेश करतो. जर सुरुवातीला \( \lambda_0 \) हि दे-ब्रोली तररळांकी आहे, तर \( t \) असताना त्याच्या दे-ब्रोली तररळांकी ________ आहे.
   (1) \( \lambda_0 t \)
   (2) \( \lambda_0 \left(1 + \frac{eE_0}{mV_0} t\right) \)
   (3) \( \frac{\lambda_0}{\left(1 + \frac{eE_0}{mV_0} t\right)} \)
   (4) \( \lambda_0 \)

13. एका किरणोत्सारी पदार्थासाठी, अर्थात्कुल 10 मिनिटे आहे. जर सुरुवातीस ते 600 केंद्रके आहेत, तर 450 केंद्रकांचे विघटन होण्यासाठी (मिनिट्मध्ये) लागलेला काल ________ आहे.
   (1) 30
   (2) 10
   (3) 20
   (4) 15

14. \( 2v_0 \) \((v_0 \text{ हि अध:सीमा वारंबारता आहे})\) वारंबारतेचा प्रकाश धातुत्व पद्धतेच हिमाती होतो तेव्हा बाहेर पदोलेल्या इलेक्ट्रॉनिच जास्तीतजास्त वेग \( v_1 \) आहे. जेव्हा आपाती प्राणांच्या वारंबारता \( 5v_0 \) पर्यंत वाढविली, तेव्हा त्याच पदोळ्यांक हा बाहेर पदोलेल्या इलेक्ट्रॉनिच जास्तीतजास्त वेग \( v_2 \) आहे. \( v_1 \) व \( v_2 \) चे गुणोंतर ________ आहे.
   (1) 4 : 1
   (2) 1 : 4
   (3) 1 : 2
   (4) 2 : 1
15. In the circuit shown in the figure, the input voltage $V_i$ is 20 V, $V_{BE} = 0$ and $V_{CE} = 0$. The values of $I_B$, $I_C$ and $\beta$ are given by

\begin{align*}
(1) \quad & I_B = 20 \mu A, \quad I_C = 5 mA, \quad \beta = 250 \\
(2) \quad & I_B = 25 \mu A, \quad I_C = 5 mA, \quad \beta = 200 \\
(3) \quad & I_B = 40 \mu A, \quad I_C = 10 mA, \quad \beta = 250 \\
(4) \quad & I_B = 40 \mu A, \quad I_C = 5 mA, \quad \beta = 125
\end{align*}

16. In a p-n junction diode, change in temperature due to heating

(1) does not affect resistance of p-n junction
(2) affects only forward resistance
(3) affects only reverse resistance
(4) affects the overall $V-I$ characteristics of p-n junction

17. In the combination of the following gates the output $Y$ can be written in terms of inputs $A$ and $B$ as

\begin{align*}
(1) \quad & \overline{A} \cdot \overline{B} + A \cdot B \\
(2) \quad & A \cdot \overline{B} + \overline{A} \cdot B \\
(3) \quad & \overline{A} \cdot B \\
(4) \quad & A + B
\end{align*}
18. An em wave is propagating in a medium with a velocity $\mathbf{V} = V \mathbf{j}$. The instantaneous oscillating electric field of this em wave is along +y axis. Then the direction of oscillating magnetic field of the em wave will be along

1. $-y$ direction
2. $+z$ direction
3. $-z$ direction
4. $-x$ direction

19. The refractive index of the material of a prism is $\sqrt{2}$ and the angle of the prism is $30^\circ$. One of the two refracting surfaces of the prism is made a mirror inwards, by silver coating. A beam of monochromatic light entering the prism from the other face will retrace its path (after reflection from the silvered surface) if its angle of incidence on the prism is

1. $30^\circ$
2. $45^\circ$
3. $60^\circ$
4. zero

20. An object is placed at a distance of 40 cm from a concave mirror of focal length 15 cm. If the object is displaced through a distance of 20 cm towards the mirror, the displacement of the image will be

1. 30 cm towards the mirror
2. 36 cm away from the mirror
3. 30 cm away from the mirror
4. 36 cm towards the mirror

21. The magnetic potential energy stored in a certain inductor is 25 mJ, when the current in the inductor is 60 mA. This inductor is of inductance

1. $1.389$ H
2. $138.88$ H
3. $0.138$ H
4. $13.89$ H
22. An electron falls from rest through a vertical distance \( h \) in a uniform and vertically upward directed electric field \( E \). The direction of electric field is now reversed, keeping its magnitude the same. A proton is allowed to fall from rest in it through the same vertical distance \( h \). The time of fall of the electron, in comparison to the time of fall of the proton is

(1) 10 times greater  
(2) 5 times greater  
(3) smaller  
(4) equal

23. The electrostatic force between the metal plates of an isolated parallel plate capacitor \( C \) having a charge \( Q \) and area \( A \), is

(1) proportional to the square root of the distance between the plates.  
(2) linearly proportional to the distance between the plates.  
(3) independent of the distance between the plates.  
(4) inversely proportional to the distance between the plates.

24. A tuning fork is used to produce resonance in a glass tube. The length of the air column in this tube can be adjusted by a variable piston. At room temperature of \( 27^\circ C \) two successive resonances are produced at 20 cm and 73 cm of column length. If the frequency of the tuning fork is 320 Hz, the velocity of sound in air at \( 27^\circ C \) is

(1) 350 m/s  
(2) 339 m/s  
(3) 330 m/s  
(4) 300 m/s

25. A pendulum is hung from the roof of a sufficiently high building and is moving freely to and fro like a simple harmonic oscillator. The acceleration of the bob of the pendulum is 20 m/s^2 at a distance of 5 m from the mean position. The time period of oscillation is

(1) 2 s  
(2) \( \pi \) s  
(3) 2\( \pi \) s  
(4) 1 s
26. A metallic rod of mass per unit length 0·5 kg m\(^{-1}\) is lying horizontally on a smooth inclined plane which makes an angle of 30° with the horizontal. The rod is not allowed to slide down by flowing a current through it when a magnetic field of induction 0·25 T is acting on it in the vertical direction. The current flowing in the rod to keep it stationary is
   (1) 14·76 A
   (2) 5·98 A
   (3) 7·14 A
   (4) 11·32 A

27. A thin diamagnetic rod is placed vertically between the poles of an electromagnet. When the current in the electromagnet is switched on, then the diamagnetic rod is pushed up, out of the horizontal magnetic field. Hence the rod gains gravitational potential energy. The work required to do this comes from
   (1) the lattice structure of the material of the rod
   (2) the magnetic field
   (3) the current source
   (4) the induced electric field due to the changing magnetic field

28. An inductor 20 mH, a capacitor 100 \( \mu \)F and a resistor 50 \( \Omega \) are connected in series across a source of emf, \( V = 10 \sin 314 \) t. The power loss in the circuit is
   (1) 2·74 W
   (2) 0·43 W
   (3) 0·79 W
   (4) 1·13 W

29. Current sensitivity of a moving coil galvanometer is 5 div/mA and its voltage sensitivity (angular deflection per unit voltage applied) is 20 div/V. The resistance of the galvanometer is
   (1) 250 \( \Omega \)
   (2) 25 \( \Omega \)
   (3) 40 \( \Omega \)
   (4) 500 \( \Omega \)
30. A body initially at rest and sliding along a frictionless track from a height \( h \) (as shown in the figure) just completes a vertical circle of diameter \( AB = D \). The height \( h \) is equal to

\[
\begin{align*}
(1) \quad & \frac{7}{5} D \\
(2) \quad & D \\
(3) \quad & \frac{3}{2} D \\
(4) \quad & \frac{5}{4} D
\end{align*}
\]

31. Three objects, \( A \) : (a solid sphere), \( B \) : (a thin circular disk) and \( C \) : (a circular ring), each have the same mass \( M \) and radius \( R \). They all spin with the same angular speed \( \omega \) about their own symmetry axes. The amounts of work \( (W) \) required to bring them to rest, would satisfy the relation

\[
\begin{align*}
(1) \quad & W_B > W_A > W_C \\
(2) \quad & W_A > W_B > W_C \\
(3) \quad & W_C > W_B > W_A \\
(4) \quad & W_A > W_C > W_B
\end{align*}
\]

32. A moving block having mass \( m \), collides with another stationary block having mass \( 4m \). The lighter block comes to rest after collision. When the initial velocity of the lighter block is \( v \), then the value of coefficient of restitution \((e)\) will be

\[
\begin{align*}
(1) \quad & 0.8 \\
(2) \quad & 0.25 \\
(3) \quad & 0.5 \\
(4) \quad & 0.4
\end{align*}
\]

33. Which one of the following statements is incorrect?

(1) Frictional force opposes the relative motion.
(2) Limiting value of static friction is directly proportional to normal reaction.
(3) Rolling friction is smaller than sliding friction.
(4) Coefficient of sliding friction has dimensions of length.

30. एक सुरुवातीला स्थिर असलेली बॉल, \( h \) एकडा उंचीवर ध्वन्यातिरिक्त मार्गवर्ती हातसात येत असून (आकृतीत दाखविलेले प्रमाण) ती \( AB = D \) व्यास असलेले उभे वर्तुळ पूर्ण करते. उंची \( h \) हि \______ आहे.

\[
\begin{align*}
(1) \quad & \frac{7}{5} D \\
(2) \quad & D \\
(3) \quad & \frac{3}{2} D \\
(4) \quad & \frac{5}{4} D
\end{align*}
\]

31. तीन बॉल, \( A \) : (भरी गोल्डा), \( B \) : (बायीर गोलाकार तबकडी) व \( C \) : (बर्तुळाकार कडी) निर्माणाची त्रिज्या \( R \) असून वस्तुमान \( M \) सारखे आहे. ते सर्व स्थःच्या समवेतिरिक्ता अक्षांशेच्या सारख्याची \( \omega \) हा कोणी े बेन्या फिरत आहेत. त्यान्या ध्वन्यानेची लागणारं कार्य \((W)\) \______ हे संबंध पूर्ण करती.

\[
\begin{align*}
(1) \quad & W_B > W_A > W_C \\
(2) \quad & W_A > W_B > W_C \\
(3) \quad & W_C > W_B > W_A \\
(4) \quad & W_A > W_C > W_B
\end{align*}
\]

32. \( m \) वस्तुमानाचा गतिमान ठोकला \( 4m \) वस्तुमानाचा दूसरा ध्वन्याच्या स्थिर ठोकल्यावर आपडतो. टक्केने झाल्यानंतर हल्का ठोकला ध्वन्यात होतो. जेव्हा हलक्या ठोकल्याचा सुरुवातीला वेग \( v \) आहे, तर प्रत्येकसामान्य गुणकांची किंमत \((e)\) \______ असेल.

\[
\begin{align*}
(1) \quad & 0.8 \\
(2) \quad & 0.25 \\
(3) \quad & 0.5 \\
(4) \quad & 0.4
\end{align*}
\]

33. खालीलपैकी कोणते विधान \चुकीचे \आहे?

(1) ध्वन्य बल हे सापेक्ष गतीसंग विरोध करते.
(2) स्थितिक ध्वन्याची मर्यादित किंमत प्रसामान्य अभिक्रियेस समानुपाती असते.
(3) लोपण ध्वन्य हे घसरण ध्वन्यपेक्षा कमी आहे.
(4) घसरण ध्वन्याचा गुणक हा झाल्याच्या मित्रप्रमाणे आहे.
34. A toy car with charge q moves on a frictionless horizontal plane surface under the influence of a uniform electric field \( \mathbf{E} \). Due to the force \( q \mathbf{E} \), its velocity increases from 0 to 6 m/s in one second duration. At that instant the direction of the field is reversed. The car continues to move for two more seconds under the influence of this field. The average velocity and the average speed of the toy car between 0 to 3 seconds are respectively
   (1) 1 m/s, 3·5 m/s
   (2) 1 m/s, 3 m/s
   (3) 2 m/s, 4 m/s
   (4) 1·5 m/s, 3 m/s

35. A block of mass \( m \) is placed on a smooth inclined wedge ABC of inclination \( \theta \) as shown in the figure. The wedge is given an acceleration ‘a’ towards the right. The relation between \( a \) and \( \theta \) for the block to remain stationary on the wedge is
   \[ a = g \cos \theta \]
   \[ a = \frac{g}{\sin \theta} \]
   \[ a = \frac{g}{\csc \theta} \]
   \[ a = g \tan \theta \]

36. The moment of the force, \( \mathbf{F} = 4 \mathbf{i} + 5 \mathbf{j} - 6 \mathbf{k} \), at (2, 0, -3), about the point (2, -2, -2), is given by
   (1) \(-7 \mathbf{i} - 8 \mathbf{j} - 4 \mathbf{k}\)
   (2) \(-4 \mathbf{i} - \mathbf{j} - 8 \mathbf{k}\)
   (3) \(-8 \mathbf{i} - 4 \mathbf{j} - 7 \mathbf{k}\)
   (4) \(-7 \mathbf{i} - 4 \mathbf{j} - 8 \mathbf{k}\)

37. A student measured the diameter of a small steel ball using a screw gauge of least count 0·001 cm. The main scale reading is 5 mm and zero of circular scale division coincides with 25 divisions above the reference level. If screw gauge has a zero error of –0·004 cm, the correct diameter of the ball is
   (1) 0·053 cm
   (2) 0·525 cm
   (3) 0·521 cm
   (4) 0·529 cm
38. A solid sphere is rotating freely about its symmetry axis in free space. The radius of the sphere is increased keeping its mass same. Which of the following physical quantities would remain constant for the sphere?
   (1) Rotational kinetic energy
   (2) Moment of inertia
   (3) Angular velocity
   (4) Angular momentum

39. The kinetic energies of a planet in an elliptical orbit about the Sun, at positions A, B and C are \( K_A, K_B \) and \( K_C \), respectively. AC is the major axis and SB is perpendicular to AC at the position of the Sun S as shown in the figure. Then

\[ (1) \quad K_B < K_A < K_C \]
\[ (2) \quad K_A > K_B > K_C \]
\[ (3) \quad K_A < K_B < K_C \]
\[ (4) \quad K_B > K_A > K_C \]

40. If the mass of the Sun were ten times smaller and the universal gravitational constant were ten times larger in magnitude, which of the following is not correct?
   (1) Time period of a simple pendulum on the Earth would decrease.
   (2) Walking on the ground would become more difficult.
   (3) Raindrops will fall faster.
   (4) ‘g’ on the Earth will not change.

41. A solid sphere is in rolling motion. In rolling motion a body possesses translational kinetic energy \( (K_t) \) as well as rotational kinetic energy \( (K_r) \) simultaneously. The ratio \( K_t : (K_t + K_r) \) for the sphere is
   (1) 10 : 7
   (2) 5 : 7
   (3) 7 : 10
   (4) 2 : 5
42. A small sphere of radius ‘r’ falls from rest in a viscous liquid. As a result, heat is produced due to viscous force. The rate of production of heat when the sphere attains its terminal velocity, is proportional to

(1) \( r^5 \)
(2) \( r^2 \)
(3) \( r^3 \)
(4) \( r^4 \)

43. The power radiated by a black body is P and it radiates maximum energy at wavelength, \( \lambda_0 \). If the temperature of the black body is now changed so that it radiates maximum energy at wavelength \( \frac{3}{4} \lambda_0 \), the power radiated by it becomes nP. The value of n is

(1) \( \frac{256}{81} \)
(2) \( \frac{4}{3} \)
(3) \( \frac{3}{4} \)
(4) \( \frac{81}{256} \)

44. Two wires are made of the same material and have the same volume. The first wire has cross-sectional area A and the second wire has cross-sectional area 3A. If the length of the first wire is increased by \( \Delta l \) on applying a force F, how much force is needed to stretch the second wire by the same amount?

(1) \( 4F \)
(2) \( 6F \)
(3) \( 9F \)
(4) \( F \)

45. A sample of 0·1 g of water at 100°C and normal pressure (1·013 \( \times 10^5 \) Nm\(^{-2} \)) requires 54 cal of heat energy to convert to steam at 100°C. If the volume of the steam produced is 167·1 cc, the change in internal energy of the sample, is

(1) 42·2 J
(2) 208·7 J
(3) 104·3 J
(4) 84·5 J
46. The correct order of N-compounds in its decreasing order of oxidation states is
   (1) HNO₃, NH₄Cl, NO, N₂
   (2) HNO₃, NO, NH₄Cl, N₂
   (3) HNO₃, NO, N₂, NH₄Cl
   (4) NH₄Cl, N₂, NO, HNO₃

47. Which one of the following elements is unable to form MF₆⁻ ion?
   (1) B
   (2) Al
   (3) Ga
   (4) In

48. Considering Ellingham diagram, which of the following metals can be used to reduce alumina?
   (1) Mg
   (2) Zn
   (3) Fe
   (4) Cu

49. The correct order of atomic radii in group 13 elements is
   (1) B < Ga < Al < Tl < In
   (2) B < Al < Ga < In < Tl
   (3) B < Al < In < Ga < Tl
   (4) B < Ga < Al < In < Tl

50. Which of the following statements is not true for halogens?
   (1) All but fluorine show positive oxidation states.
   (2) All are oxidizing agents.
   (3) All form monobasic oxyacids.
   (4) Chlorine has the highest electron-gain enthalpy.

51. In the structure of ClF₃, the number of lone pairs of electrons on central atom ‘Cl’ is
   (1) four
   (2) two
   (3) one
   (4) three
52. Identify the major products P, Q and R in the following sequence of reactions:

\[
\text{C}_6\text{H}_5 + \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} \xrightarrow{\text{AlCl}_3} \]

\[
P \xrightarrow{(i) \text{O}_2} Q + R \quad \xrightarrow{(ii) \text{H}_3\text{O}^+/\Delta} P
\]

P Q R

(1) CH(\text{CH}_3)_2, \text{OH}, \text{CH}_3\text{CH}(\text{OH})\text{CH}_3

(2) CH_2\text{CH}_2\text{CH}_3, \text{CHO}, \text{COOH}

(3) CH_2\text{CH}_2\text{CH}_3, \text{CHO}, \text{CH}_3\text{CH}_2\text{OH}

(4) \text{CH}(\text{CH}_3)_2, \text{OH}, \text{CH}_3 - \text{CO} - \text{CH}_3

53. Which of the following compounds can form a zwitterion?

(1) Benzoic acid
(2) Acetanilide
(3) Aniline
(4) Glycine

52. खालील क्रमांकेत प्रमुख उत्पाद अनुक्रमे P, Q व R आहेत:

\[
\text{C}_6\text{H}_5 + \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} \xrightarrow{\text{AlCl}_3} \]

\[
P \xrightarrow{(i) \text{O}_2} Q + R \quad \xrightarrow{(ii) \text{H}_3\text{O}^+/\Delta} P
\]

P Q R

(1) CH(\text{CH}_3)_2, \text{OH}, \text{CH}_3\text{CH}(\text{OH})\text{CH}_3

(2) CH_2\text{CH}_2\text{CH}_3, \text{CHO}, \text{COOH}

(3) CH_2\text{CH}_2\text{CH}_3, \text{CHO}, \text{CH}_3\text{CH}_2\text{OH}

(4) \text{CH}(\text{CH}_3)_2, \text{OH}, \text{CH}_3 - \text{CO} - \text{CH}_3

53. खालील कोणते संयुक्त स्विट्टर आयन तयार करू शकते?

(1) बेंजोइड आम्ल
(2) ऑसिटानिलाइड
(3) अमिलिन
(4) ग्लावसिन
54. Regarding cross-linked or network polymers, which of the following statements is incorrect?
(1) Examples are bakelite and melamine.
(2) They are formed from bi- and tri-functional monomers.
(3) They contain covalent bonds between various linear polymer chains.
(4) They contain strong covalent bonds in their polymer chains.

55. Nitration of aniline in strong acidic medium also gives m-nitroaniline because
(1) In absence of substituents nitro group always goes to m-position.
(2) In electrophilic substitution reactions amino group is meta directive.
(3) In spite of substituents nitro group always goes to only m-position.
(4) In acidic (strong) medium aniline is present as anilinium ion.

56. The difference between amylose and amylopectin is
(1) Amylopectin have 1 → 4 α-linkage and 1 → 6 β-linkage
(2) Amylose have 1 → 4 α-linkage and 1 → 6 β-linkage
(3) Amylopectin have 1 → 4 α-linkage and 1 → 6 α-linkage
(4) Amylose is made up of glucose and galactose

57. A mixture of 2·3 g formic acid and 4·5 g oxalic acid is treated with conc. H₂SO₄. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be
(1) 2·8
(2) 3·0
(3) 1·4
(4) 4·4

58. Which of the following oxides is most acidic in nature?
(1) BaO
(2) BeO
(3) MgO
(4) CaO
59. Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity?

(1) N₂O
(2) NO₂
(3) N₂O₅
(4) NO

60. The compound A on treatment with Na gives B, and with PCl₅ gives C. B and C react together to give diethyl ether. A, B and C are in the order

(1) C₂H₅Cl, C₂H₆, C₂H₅OH
(2) C₂H₅OH, C₂H₅Cl, C₂H₅ONa
(3) C₂H₅OH, C₂H₆, C₂H₅Cl
(4) C₂H₅OH, C₂H₅ONa, C₂H₅Cl

61. The compound C₇H₈ undergoes the following reactions:

\[ \text{C}_7\text{H}_8 \xrightarrow{3\ \text{Cl}_2/\Delta} \text{A} \xrightarrow{\text{Br}_2/\text{Fe}} \text{B} \xrightarrow{\text{Zn}/\text{HCl}} \text{C} \]

The product 'C' is:

(1) 3-bromo-2,4,6-trichlorotoluene
(2) o-bromotoluene
(3) m-bromotoluene
(4) p-bromotoluene

62. Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms. (A) is

(1) CH₃ – CH₃
(2) CH₂ = CH₂
(3) CH ≡ CH
(4) CH₄
63. Which of the following molecules represents the order of hybridisation \( sp^2, sp^3, sp, sp \) from left to right atoms?

(1) \( \text{CH}_2 = \text{CH} – \text{CH} = \text{CH}_2 \)

(2) \( \text{CH}_2 = \text{CH} – \text{C} \equiv \text{CH} \)

(3) \( \text{HC} \equiv \text{C} – \text{C} \equiv \text{CH} \)

(4) \( \text{CH}_3 – \text{CH} = \text{CH} – \text{CH}_3 \)

64. Which of the following carbocations is expected to be most stable?

(1) [Image of carbocation with nitro group and a nitrogen atom]

(2) [Image of carbocation with nitro group and a carbon atom]

(3) [Image of carbocation with nitro group and two carbon atoms]

(4) [Image of carbocation with nitro group and a nitrogen atom]

65. Which of the following is correct with respect to \(-I\) effect of the substituents? (R = alkyl)

(1) \(-\text{NH}_2 > -\text{OR} > -\text{F}\)

(2) \(-\text{NR}_2 < -\text{OR} < -\text{F}\)

(3) \(-\text{NH}_2 < -\text{OR} < -\text{F}\)

(4) \(-\text{NR}_2 > -\text{OR} > -\text{F}\)
66. In the reaction

\[
\text{OH} + \text{CHCl}_3 + \text{NaOH} \rightarrow \text{CHO}
\]

the electrophile involved is

1. dichloromethyl anion \((\text{CHCl}_2^-)\)
2. formyl cation \((\text{CHO}^+)\)
3. dichloromethyl cation \((\text{CHCl}_2^+)\)
4. dichlorocarbene \((:\text{CCl}_2)\)

67. Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their

1. more extensive association of carboxylic acid via van der Waals force of attraction
2. formation of carboxylate ion
3. formation of intramolecular H-bonding
4. formation of intermolecular H-bonding

68. Compound A, \(\text{C}_8\text{H}_{10}\text{O}\), is found to react with \(\text{NaOI}\) (produced by reacting \(Y\) with \(\text{NaOH}\)) and yields a yellow precipitate with characteristic smell. A and Y are respectively

1. \(\text{CH} - \text{CH}_3\) and \(\text{I}_2\)
2. \(\text{CH}_2 - \text{CH}_2 - \text{OH}\) and \(\text{I}_2\)
3. \(\text{H}_3\text{C} - \text{CH}_2 - \text{OH}\) and \(\text{I}_2\)
4. \(\text{CH}_3 - \text{OH}\) and \(\text{I}_2\)
69. Match the metal ions given in Column I with the spin magnetic moments of the ions given in Column II and assign the correct code:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Co(^{3+})</td>
<td>i. (\sqrt{8}) B.M.</td>
</tr>
<tr>
<td>b. Cr(^{3+})</td>
<td>ii. (\sqrt{35}) B.M.</td>
</tr>
<tr>
<td>c. Fe(^{3+})</td>
<td>iii. (\sqrt{3}) B.M.</td>
</tr>
<tr>
<td>d. Ni(^{2+})</td>
<td>iv. (\sqrt{24}) B.M.</td>
</tr>
<tr>
<td></td>
<td>v. (\sqrt{15}) B.M.</td>
</tr>
</tbody>
</table>

(a) b c d

(1) iv i ii iii
(2) i ii iii iv
(3) iv v ii i
(4) iii v i ii

70. Which one of the following ions exhibits d-d transition and paramagnetism as well?

(1) MnO\(_4\)\(^-\)
(2) Cr\(_2\)O\(_7\)\(^2-\)
(3) CrO\(_4\)\(^2-\)
(4) MnO\(_4\)\(^2-\)

71. Iron carbonyl, Fe(CO)\(_5\) is
(1) trinuclear
(2) mononuclear
(3) tetranuclear
(4) dinuclear

72. The type of isomerism shown by the complex [CoCl\(_2\)(en)\(_2\)] is
(1) Ionization isomerism
(2) Coordination isomerism
(3) Geometrical isomerism
(4) Linkage isomerism

73. The geometry and magnetic behaviour of the complex [Ni(CO)\(_4\)] are
(1) square planar geometry and paramagnetic
(2) tetrahedral geometry and diamagnetic
(3) square planar geometry and diamagnetic
(4) tetrahedral geometry and paramagnetic
74. Following solutions were prepared by mixing different volumes of NaOH and HCl of different concentrations:

a. 60 mL $\frac{M}{10}$ HCl + 40 mL $\frac{M}{10}$ NaOH
b. 55 mL $\frac{M}{10}$ HCl + 45 mL $\frac{M}{10}$ NaOH
c. 75 mL $\frac{M}{5}$ HCl + 25 mL $\frac{M}{5}$ NaOH
d. 100 mL $\frac{M}{10}$ HCl + 100 mL $\frac{M}{10}$ NaOH

pH of which one of them will be equal to 1?
(1) d  (2) a  (3) b  (4) c

75. On which of the following properties does the coagulating power of an ion depend?
(1) Both magnitude and sign of the charge on the ion
(2) Size of the ion alone
(3) The magnitude of the charge on the ion alone
(4) The sign of charge on the ion alone

76. Given van der Waals constant for NH$_3$, H$_2$, O$_2$ and CO$_2$ are respectively 4·17, 0·244, 1·36 and 3·59, which one of the following gases is most easily liquefied?
(1) O$_2$  (2) H$_2$  (3) NH$_3$  (4) CO$_2$

77. The solubility of BaSO$_4$ in water is $2·42 \times 10^{-3}$ gL$^{-1}$ at 298 K. The value of its solubility product ($K_{sp}$) will be
(Given molar mass of BaSO$_4$ = 233 g mol$^{-1}$)
(1) $1·08 \times 10^{-14}$ mol$^2$ L$^{-2}$
(2) $1·08 \times 10^{-12}$ mol$^2$ L$^{-2}$
(3) $1·08 \times 10^{-10}$ mol$^2$ L$^{-2}$
(4) $1·08 \times 10^{-8}$ mol$^2$ L$^{-2}$
78. In which case is the number of molecules of water maximum?
(1) 0.00224 L of water vapours at 1 atm and 273 K
(2) 0.18 g of water
(3) 18 mL of water
(4) $10^{-3}$ mol of water

79. The correct difference between first- and second-order reactions is that
(1) a first-order reaction can be catalyzed; a second-order reaction cannot be catalyzed
(2) the half-life of a first-order reaction does not depend on $[A]_0$; the half-life of a second-order reaction does depend on $[A]_0$
(3) the rate of a first-order reaction does not depend on reactant concentrations; the rate of a second-order reaction does depend on reactant concentrations
(4) the rate of a first-order reaction does depend on reactant concentrations; the rate of a second-order reaction does not depend on reactant concentrations

80. Among CaH$_2$, BeH$_2$, BaH$_2$, the order of ionic character is
(1) BeH$_2$ < BaH$_2$ < CaH$_2$
(2) CaH$_2$ < BeH$_2$ < BaH$_2$
(3) BeH$_2$ < CaH$_2$ < BaH$_2$
(4) BaH$_2$ < BeH$_2$ < CaH$_2$

81. Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below:

\[
\begin{align*}
\text{BrO}_4^- & \xrightarrow{1.82 \text{ V}} \text{BrO}_3^- & \xrightarrow{1.5 \text{ V}} \text{HBrO} \\
\text{Br}^- & \xleftarrow{1.0652 \text{ V}} \text{Br}_2 & \xleftarrow{1.595 \text{ V}} \\
\end{align*}
\]

Then the species undergoing disproportionation is
(1) Br$_2$
(2) BrO$_4^-$
(3) BrO$_3^-$
(4) HBrO

82. In which case is the number of molecules of water maximum?
(1) 1 atm & 273 K & 0.00224 L \text{ पानीपानीचे बापण}
(2) 0.18 g पानी
(3) 18 mL पानी
(4) $10^{-3}$ mol पानी

83. The correct difference between first- and second-order reactions is that
(1) प्रथम कोटी अभिक्रिया ही उत्प्रेरित होऊ हे शकते; द्वितीय कोटी अभिक्रिया ही उत्प्रेरित होऊ हे शकत नाही
(2) प्रथम कोटी अभिक्रियेचे अर्थ आणुव्य [A]$_0$ वर अवलंबून नाही; द्वितीय कोटी अभिक्रियेचे अर्थ आणुव्य [A]$_0$ वर अवलंबून आहे
(3) प्रथम कोटी अभिक्रियेचा दर अभिक्रियेचा संहितावर अवलंबून नाही; द्वितीय कोटी अभिक्रियेचा दर हा अभिक्रियेचा संहितावर अवलंबून आहे
(4) प्रथम कोटी अभिक्रियेचा दर अभिक्रियेचा संहितावर अवलंबून आहे; द्वितीय कोटी अभिक्रियेचा दर हा अभिक्रियेचा संहितावर अवलंबून नाही

84. Among CaH$_2$, BeH$_2$, BaH$_2$, the order of ionic character is
(1) BeH$_2$ < BaH$_2$ < CaH$_2$
(2) CaH$_2$ < BeH$_2$ < BaH$_2$
(3) BeH$_2$ < CaH$_2$ < BaH$_2$
(4) BaH$_2$ < BeH$_2$ < CaH$_2$

85. Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below:

\[
\begin{align*}
\text{BrO}_4^- & \xrightarrow{1.82 \text{ V}} \text{BrO}_3^- & \xrightarrow{1.5 \text{ V}} \text{HBrO} \\
\text{Br}^- & \xleftarrow{1.0652 \text{ V}} \text{Br}_2 & \xleftarrow{1.595 \text{ V}} \\
\end{align*}
\]

Then the species undergoing disproportionation is
(1) Br$_2$
(2) BrO$_4^-$
(3) BrO$_3^-$
(4) HBrO
82. For the redox reaction
\[ \text{MnO}_4^- + C_2O_4^{2-} + H^+ \rightarrow \text{Mn}^{2+} + CO_2 + H_2O \]
the correct coefficients of the reactants for the balanced equation are

<table>
<thead>
<tr>
<th>( \text{MnO}_4^- )</th>
<th>( C_2O_4^{2-} )</th>
<th>( H^+ )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 2</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>(2) 2</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>(3) 16</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>(4) 5</td>
<td>16</td>
<td>2</td>
</tr>
</tbody>
</table>

83. Which one of the following conditions will favour maximum formation of the product in the reaction,
\[ A_2(g) + B_2(g) \rightleftharpoons X_2(g) \quad \Delta H = -X \text{ kJ} \]
(1) High temperature and high pressure
(2) Low temperature and low pressure
(3) Low temperature and high pressure
(4) High temperature and low pressure

84. When initial concentration of the reactant is doubled, the half-life period of a zero order reaction
(1) is tripled
(2) is doubled
(3) is halved
(4) remains unchanged

85. The bond dissociation energies of \( X_2 \), \( Y_2 \) and \( XY \) are in the ratio of 1 : 0.5 : 1. \( \Delta H \) for the formation of \( XY \) is \(-200 \text{ kJ mol}^{-1}\). The bond dissociation energy of \( X_2 \) will be
(1) 800 kJ mol\(^{-1}\)
(2) 100 kJ mol\(^{-1}\)
(3) 200 kJ mol\(^{-1}\)
(4) 400 kJ mol\(^{-1}\)

86. The correction factor ‘\( a \)’ to the ideal gas equation corresponds to
(1) electric field present between the gas molecules
(2) volume of the gas molecules
(3) density of the gas molecules
(4) forces of attraction between the gas molecules
87. Consider the following species:

\[ \text{CN}^+, \text{CN}^-, \text{NO} \text{ and } \text{CN} \]

Which one of these will have the highest bond order?
(1) \( \text{CN}^+ \)
(2) \( \text{CN}^- \)
(3) \( \text{NO} \)
(4) \( \text{CN} \)

88. Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is \( 1s^2 \quad 2s^2 \quad 2p^3 \), the simplest formula for this compound is
(1) \( \text{Mg}_2\text{X} \)
(2) \( \text{MgX}_2 \)
(3) \( \text{Mg}_2\text{X}_3 \)
(4) \( \text{Mg}_3\text{X}_2 \)

89. Iron exhibits bcc structure at room temperature. Above 900°C, it transforms to fcc structure. The ratio of density of iron at room temperature to that at 900°C (assuming molar mass and atomic radii of iron remains constant with temperature) is
(1) \( \frac{3\sqrt{3}}{4\sqrt{2}} \)
(2) \( \frac{4\sqrt{3}}{3\sqrt{2}} \)
(3) \( \frac{\sqrt{3}}{\sqrt{2}} \)
(4) \( \frac{1}{2} \)

90. Which one is a wrong statement?
(1) The electronic configuration of N atom is
\[
\begin{array}{c}
1s^2 \\
2s^2 \\
2p_x^1 \\
2p_y^1 \\
2p_z^1
\end{array}
\]
(2) An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers.
(3) Total orbital angular momentum of electron in ‘s’ orbital is equal to zero.
(4) The value of \( m \) for \( d_{z^2} \) is zero.
91. Oxygen is **not** produced during photosynthesis by  
(1) Cycas  
(2) Nostoc  
(3) Green sulphur bacteria  
(4) Chara

92. Double fertilization is  
(1) Fusion of two male gametes with one egg  
(2) Fusion of one male gamete with two polar nuclei  
(3) Fusion of two male gametes of a pollen tube with two different eggs  
(4) Syngamy and triple fusion

93. Which one of the following plants shows a very close relationship with a species of moth, where none of the two can complete its life cycle without the other?  
(1) Banana  
(2) Yucca  
(3) Hydrilla  
(4) Viola

94. Pollen grains can be stored for several years in liquid nitrogen having a temperature of  
(1) – 196°C  
(2) – 80°C  
(3) – 120°C  
(4) – 160°C

95. Which of the following elements is responsible for maintaining turgor in cells?  
(1) Potassium  
(2) Sodium  
(3) Magnesium  
(4) Calcium

96. What is the role of NAD\(^+\) in cellular respiration?  
(1) It is a nucleotide source for ATP synthesis.  
(2) It functions as an electron carrier.  
(3) It functions as an enzyme.  
(4) It is the final electron acceptor for anaerobic respiration.

97. In which of the following forms is iron absorbed by plants?  
(1) Free element  
(2) Ferrous  
(3) Ferric  
(4) Both ferric and ferrous
98. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes?
(1) \(\lambda\) phage
(2) Ti plasmid
(3) Retrovirus
(4) pBR 322

99. Use of bioresources by multinational companies and organisations without authorisation from the concerned country and its people is called
(1) Biodegradation
(2) Biopiracy
(3) Bio-infringement
(4) Bioexploitation

100. In India, the organisation responsible for assessing the safety of introducing genetically modified organisms for public use is
(1) Research Committee on Genetic Manipulation (RCGM)
(2) Council for Scientific and Industrial Research (CSIR)
(3) Indian Council of Medical Research (ICMR)
(4) Genetic Engineering Appraisal Committee (GEAC)

101. The correct order of steps in Polymerase Chain Reaction (PCR) is
(1) Denaturation, Extension, Annealing
(2) Annealing, Extension, Denaturation
(3) Extension, Denaturation, Annealing
(4) Denaturation, Annealing, Extension

102. Select the correct match:
(1) T.H. Morgan – Transduction
(2) \(F_2\) \(\times\) Reccessive parent – Dihybrid cross
(3) Ribozyme – Nucleic acid
(4) G. Mendel – Transformation

103. A ‘new’ variety of rice was patented by a foreign company, though such varieties have been present in India for a long time. This is related to
(1) Lerma Rojo
(2) Sharbati Sonora
(3) Co-667
(4) Basmati
104. Which of the following pairs is **wrongly** matched?

1. XO type sex : Grasshopper determination
2. ABO blood grouping : Co-dominance
3. Starch synthesis in pea : Multiple alleles
4. T.H. Morgan : Linkage

105. Select the **correct** statement:

1. Spliceosomes take part in translation.
2. Punnett square was developed by a British scientist.
3. Franklin Stahl coined the term “linkage”.
4. Transduction was discovered by S. Altman.

106. The experimental proof for semiconservative replication of DNA was first shown in a

1. Plant
2. Bacterium
3. Fungus
4. Virus

107. Which of the following flowers only once in its lifetime?

1. Mango
2. Jackfruit
3. Bamboo species
4. Papaya

108. Offsets are produced by

1. Parthenocarpy
2. Mitotic divisions
3. Meiotic divisions
4. Parthenogenesis

109. Select the **correct** match:

1. Matthew Meselson and F. Stahl – *Pisum sativum*
2. Alfred Hershey and Martha Chase – TMV
3. Alec Jeffreys – *Streptococcus pneumoniae*
4. Francois Jacob and Jacques Monod – *Lac operon*

110. Which of the following has proved helpful in preserving pollen as fossils?

1. Oil content
2. Cellulosic intine
3. Pollenkitt
4. Sporopollenin

104. **खालीलपेकी अवगोष्ठी जोडी कोणती?**

1. XO प्रकारचे लिंग निर्धारण: नाकलोटा
2. ABO स्थानफर: सहभ्रमकी
3. वाटाण्यातील मंड वस्तू प्रश्न: बहुविध युपकिलप
4. टी.एच. मॉर्गन: सहलगणता

105. **योग्य विधान ओळखा:**

1. प्रतिलिपिक वस्‍त्राची ओळख - सहभ्रमक्षा सहभाग असतो.
2. पोट कुत्रा हा ब्रिटिश शासकजाने बनवला.
3. फ्लेक्सीलीन स्ट्राइड ब्रांडने “संकल्प” ही संकल्पना मांडली.
4. एस. ऑडल्मन नी ‘जीववन’ शोध आवश्यक.

106. **अर्थ डी.एं.ए. प्रतीकूलीचा प्रायोगिक पुरावा प्रथमत: कसात दाखविला?**

1. बनसपती
2. जीवाणू
3. बुधारी
4. विवाणू

107. **खालीलपेकी कोणती बनसपती आयुष्यात फक्त एकदाच बहरते?**

1. आंबा
2. फणसा
3. बांधू प्रजाती
4. पपई

108. **भूस्तिरिका वा पापूत संपत्**

1. अनिष्काजनन
2. सुरिव विभाजन
3. अर्थसुस्त्री विभाजन
4. अनिष्काजनन

109. **योग्य जोडी नविदा:**

1. मधुमेष सेल्लसन व एफ. स्ट्राइड – पायसम सैंटरम्हाम
2. ऑफ्रेड ह्यू म्हणून बाघाचे वेस – टी.एम.व्ही. (T.M.V.)
3. आलेक जैक्सन – स्ट्रेपटोकोकस न्युमोनी
4. फ्रेंक्वास जेक्ब व जॅक्बे मोनोड – लेक ऑपरॉन

110. **खालीलपेकी काय पराकरणाना जीवाशांतीच्या रूपात संग्रहित करण्यास उपयोगी आहे?**

1. तेलीय अंश
2. सेल्युलोसिक अंश: चोला
3. पप्प कंचु (पोलनकिट)
4. स्पोरोपोलेनीन
111. Natality refers to
(1) Number of individuals leaving the habitat
(2) Birth rate
(3) Death rate
(4) Number of individuals entering a habitat

112. World Ozone Day is celebrated on
(1) 16th September
(2) 21st April
(3) 5th June
(4) 22nd April

113. Which of the following is a secondary pollutant?
(1) SO₂
(2) CO₂
(3) CO
(4) O₃

114. Niche is
(1) the range of temperature that the organism needs to live
(2) the physical space where an organism lives
(3) all the biological factors in the organism’s environment
(4) the functional role played by the organism where it lives

115. What type of ecological pyramid would be obtained with the following data?
   Secondary consumer : 120 g
   Primary consumer : 60 g
   Primary producer : 10 g
(1) Upright pyramid of numbers
(2) Pyramid of energy
(3) Inverted pyramid of biomass
(4) Upright pyramid of biomass

116. In stratosphere, which of the following elements acts as a catalyst in degradation of ozone and release of molecular oxygen?
(1) Fe
(2) Cl
(3) Carbon
(4) Oxygen

111. जननसम्प्रमाण म्हणजेचे
(1) अधिवास सोडून जात असलेल्या सजीवांची संख्या
(2) जनमदर
(3) मृत्युदर
(4) अधिवासात प्रवेश करत असलेल्या सजीवांची संख्या

112. जागतिक ओझोन दिवस या दिवशी साजरा केला जातो
(1) 16th सप्टेंबर
(2) 21st एप्रिल
(3) 5th जून
(4) 22nd एप्रिल

113. खालीलप्रेक्षी कोणता दुष्प्रकार प्रदूषण आहे?
(1) SO₂
(2) CO₂
(3) CO
(4) O₃

114. सूर्यालय म्हणजे
(1) सजीवांचा जगण्यासाठी लागणार्या तापमानाची व्यापारी.
(2) सजीव ज्या प्रकोप, अधिवासातील भौतिक स्थितीचा बापर करतो.
(3) सजीवांच्या अधिवासातील सर्व जैविक घटक.
(4) सजीवांचे अधिवासातील उद्दीपित भूमिका.

115. खालील दिलेल्या महत्त्वाच्या, कोणतया प्रकारचा पारिस्थितिकीय शंकू तयार होईल?
   द्वितीय भक्षण : 120 g
   प्रथम भक्षण : 60 g
   प्रथम उपजात : 10 g
(1) निमुखता संख्या शंकू
(2) उर्जा शंकू
(3) उत्पाद जैविक वस्तुमान शंकू
(4) निमुखता जैविक वस्तुमान शंकू

116. स्ट्रॉस्टेफ़क्शन मध्ये खालीलप्रेक्षी कोणते मूलद्रव्य उद्भवक होऊन ओझोन (O₃) चे अपघटन करून रेखीय O₂ सुकृत करतो?
(1) Fe
(2) Cl
(3) कार्बन (Carbon)
(4) ऑक्सिजन (Oxygen)
117. The two functional groups characteristic of sugars are
(1) carbonyl and phosphate
(2) carbonyl and methyl
(3) hydroxyl and methyl
(4) carbonyl and hydroxyl

118. Which among the following is not a prokaryote?
(1) Nostoc
(2) Mycobacterium
(3) Saccharomyces
(4) Oscillatoria

119. The Golgi complex participates in
(1) Respiration in bacteria
(2) Formation of secretory vesicles
(3) Fatty acid breakdown
(4) Activation of amino acid

120. Which of the following is not a product of light reaction of photosynthesis?
(1) NADPH
(2) NADH
(3) ATP
(4) Oxygen

121. Which of the following is true for nucleolus?
(1) It takes part in spindle formation.
(2) It is a membrane-bound structure.
(3) Larger nucleoli are present in dividing cells.
(4) It is a site for active ribosomal RNA synthesis.

122. Stomatal movement is not affected by
(1) O₂ concentration
(2) Light
(3) Temperature
(4) CO₂ concentration

123. The stage during which separation of the paired homologous chromosomes begins is
(1) Diakinesis
(2) Diploptene
(3) Pachytene
(4) Zygotene

124. Stomata in grass leaf are
(1) Rectangular
(2) Kidney shaped
(3) Dumb-bell shaped
(4) Barrel shaped
125. Secondary xylem and phloem in dicot stem are produced by
(1) Phellogen
(2) Vascular cambium
(3) Apical meristems
(4) Axillary meristems

126. Pneumatophores occur in
(1) Carnivorous plants
(2) Free-floating hydrophytes
(3) Halophytes
(4) Submerged hydrophytes

127. Casparian strips occur in
(1) Cortex
(2) Pericycle
(3) Epidermis
(4) Endodermis

128. Plants having little or no secondary growth are
(1) Conifers
(2) Deciduous angiosperms
(3) Grasses
(4) Cycads

129. Sweet potato is a modified
(1) Tap root
(2) Adventitious root
(3) Stem
(4) Rhizome

130. Which of the following statements is correct?
(1) Horsetails are gymnosperms.
(2) Selaginella is heterosporous, while Salvinia is homosporous.
(3) Ovules are not enclosed by ovary wall in gymnosperms.
(4) Stems are usually unbranched in both Cycas and Cedrus.

131. Select the wrong statement:
(1) Pseudopodia are locomotory and feeding structures in Sporozoans.
(2) Mushrooms belong to Basidiomycetes.
(3) Cell wall is present in members of Fungi and Plantae.
(4) Mitochondria are the powerhouse of the cell in all kingdoms except Monera.
132. After karyogamy followed by meiosis, spores are produced exogenously in

(1) Agaricus
(2) Alternaria
(3) Neurospora
(4) Saccharomyces

133. Match the items given in Column I with those in Column II and select the correct option given below:

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134. Winged pollen grains are present in

(1) Mango
(2) Cycas
(3) Mustard
(4) Pinus

135. Which one is wrongly matched?

(1) Gemma cups – Marchantia
(2) Biflagellate zoospores – Brown algae
(3) Uniflagellate gametes – Polysiphonia
(4) Unicellular organism – Chlorella

132. केंद्रिक विभाजन झाल्यांतर यात बहिर्जात बीजाणु तयार होतात

(1) अंगिरिकस
(2) अल्टरनरीया
(3) न्युरोस्पोरा
(4) संकरोमायसेस

133. स्तम्भ I व स्तम्भ II यांच्या घटकांच्या योग जोडणा लाभ :

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(2) साफकस
(3) मोहरी
(4) पाशवस

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136. Which of the following options correctly represents the lung conditions in asthma and emphysema, respectively?
(1) Increased respiratory surface; Inflammation of bronchioles
(2) Increased number of bronchioles; Increased respiratory surface
(3) Inflammation of bronchioles; Decreased respiratory surface
(4) Decreased respiratory surface; Inflammation of bronchioles

137. Match the items given in Column I with those in Column II and select the correct option given below:

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<td>i. Between left atrium and left ventricle</td>
</tr>
<tr>
<td>b. Bicuspid valve</td>
<td>ii. Between right ventricle and pulmonary artery</td>
</tr>
<tr>
<td>c. Semilunar valve</td>
<td>iii. Between right atrium and right ventricle</td>
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<td>ii. 1100 – 1200 mL</td>
</tr>
<tr>
<td>c. Expiratory Reserve volume</td>
<td>iii. 500 – 550 mL</td>
</tr>
<tr>
<td>d. Residual volume</td>
<td>iv. 1000 – 1100 mL</td>
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AGLASem Admission
139. The transparent lens in the human eye is held in its place by
(1) smooth muscles attached to the iris
(2) ligaments attached to the iris
(3) ligaments attached to the ciliary body
(4) smooth muscles attached to the ciliary body

140. Which of the following is an amino acid derived hormone?
(1) Estradiol
(2) Ecdysone
(3) Epinephrine
(4) Estriol

141. Which of the following hormones can play a significant role in osteoporosis?
(1) Estrogen and Parathyroid hormone
(2) Progesterone and Aldosterone
(3) Aldosterone and Prolactin
(4) Parathyroid hormone and Prolactin

142. Which of the following structures or regions is **incorrectly** paired with its function?
(1) Hypothalamus : production of releasing hormones and regulation of temperature, hunger and thirst.
(2) Limbic system : consists of fibre tracts that interconnect different regions of brain; controls movement.
(3) Medulla oblongata : controls respiration and cardiovascular reflexes.
(4) Corpus callosum : band of fibers connecting left and right cerebral hemispheres.

139. मानवी डोक्टरातील परामर्शक भिंग त्याच्याप्रमाणे कशाही?
(1) परितारिक्षें जोडलेल्या पडून स्नायुमुळे
(2) परितारिक्षें जोडलेल्या अस्थिरज्ञमुळे
(3) रोमकपिंडास जोडलेल्या अस्थिरज्ञमुळे
(4) रोमकपिंडास जोडलेल्या पडून स्नायुमुळे

140. खालीलपैकी कोणते संप्रेक्ष अभिनोआभापासून तयार झालेले असेल?
(1) एस्ट्रोडोल
(2) एक्टायसौन
(3) एपिनेफ्रिन
(4) एस्ट्रोअल

141. अस्थिसुस्थितीमध्ये (ऑस्टिओपोरोसिस) कोणत्या संप्रेक्षकांची भूमिका महत्त्वपूर्ण असेल?
(1) इस्ट्रोजेन आणि पराथायरोइड संप्रेक्ष
(2) प्रोजेस्टेरॉन आणि एल्डोस्टेरॉन
(3) एल्डोस्टेरॉन आणि प्रोलिफेंटिन
(4) पराथायरोइड संप्रेक्ष आणि प्रोलिफेंटिन

142. खालीलपैकी कोणत्या संप्रेक्ष अथवा भागाची त्याच्या कार्यांवर चूकीची जोडी जुळविली आहे?
(1) हायपोबेंडमस : सावै संप्रेक्ष तयार करणे आणि तपासणे, भूक आणि तहाचे यांचे नियम करतो.
(2) लिंबिक संस्था : मेंढूच्या विविध भागांना जोडणारे तंतू, अस्तांत, हालचालीच्या नियंत्रण ठेवणे.
(3) परचमस्तिक्षपुँच्च : रस्सन आणि हदश-रक्तवाहिन्यांच्या (मेड्वुला) आवेगांवर नियंत्रण.
(4) कॉर्पस कॅलोसम : मेंढूच्या डाव्या आणि उज्वला गोलांमध्ये जोडणार्या तंतुची पढूनका.
143. The amnion of mammalian embryo is derived from
(1) mesoderm and trophoblast
(2) endoderm and mesoderm
(3) ectoderm and mesoderm
(4) ectoderm and endoderm

144. Hormones secreted by the placenta to maintain pregnancy are
(1) hCG, hPL, progestogens, estrogens
(2) hCG, hPL, estrogens, relaxin, oxytocin
(3) hCG, hPL, progestogens, prolactin
(4) hCG, progestogens, estrogens, glucocorticoids

145. The difference between spermiogenesis and spermiation is
(1) In spermiogenesis spermatozoa from sertoli cells are released into the cavity of seminiferous tubules, while in spermiation spermatids are formed.
(2) In spermiogenesis spermatozoa are formed, while in spermiation spermatids are formed.
(3) In spermiogenesis spermatids are formed, while in spermiation spermatozoa are formed.
(4) In spermiogenesis spermatozoa are formed, while in spermiation spermatozoa are released from sertoli cells into the cavity of seminiferous tubules.

146. The contraceptive ‘SAHELI’
(1) is an IUD.
(2) increases the concentration of estrogen and prevents ovulation in females.
(3) blocks estrogen receptors in the uterus, preventing eggs from getting implanted.
(4) is a post-coital contraceptive.
147. Ciliates differ from all other protozoans in
(1) using pseudopodia for capturing prey
(2) having a contractile vacuole for removing excess water
(3) using flagella for locomotion
(4) having two types of nuclei

148. Identify the vertebrate group of animals characterized by crop and gizzard in its digestive system.
(1) Aves
(2) Reptilia
(3) Amphibia
(4) Osteichthyes

149. Which of the following features is used to identify a male cockroach from a female cockroach?
(1) Forewings with darker tegmina
(2) Presence of caudal styles
(3) Presence of a boat shaped sternum on the 9th abdominal segment
(4) Presence of anal cerci

150. Which one of these animals is not a homeotherm?
(1) Camelus
(2) Chelone
(3) Macropus
(4) Psittacula

151. Which of the following animals does not undergo metamorphosis?
(1) Moth
(2) Tunicate
(3) Earthworm
(4) Starfish

152. Which of the following organisms are known as chief producers in the oceans?
(1) Cyanobacteria
(2) Diatoms
(3) Dinoflagellates
(4) Euglenoids
153. Which one of the following population interactions is widely used in medical science for the production of antibiotics?
(1) Parasitism
(2) Mutualism
(3) Commensalism
(4) Amensalism

154. All of the following are included in ‘Ex-situ conservation’ except
(1) Botanical gardens
(2) Sacred groves
(3) Wildlife safari parks
(4) Seed banks

155. Match the items given in Column I with those in Column II and select the correct option given below:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Eutrophication</td>
<td>i. UV-B radiation</td>
</tr>
<tr>
<td>b. Sanitary landfill</td>
<td>ii. Deforestation</td>
</tr>
<tr>
<td>c. Snow blindness</td>
<td>iii. Nutrient enrichment</td>
</tr>
<tr>
<td>d. Jhum cultivation</td>
<td>iv. Waste disposal</td>
</tr>
</tbody>
</table>

156. In a growing population of a country,
(1) reproductive and pre-reproductive individuals are equal in number.
(2) reproductive individuals are less than the post-reproductive individuals.
(3) pre-reproductive individuals are more than the reproductive individuals.
(4) pre-reproductive individuals are less than the reproductive individuals.

157. Which part of poppy plant is used to obtain the drug “Smack”?
(1) Roots
(2) Latex
(3) Flowers
(4) Leaves
158. All of the following are part of an operon except
(1) an enhancer
(2) structural genes
(3) an operator
(4) a promoter

159. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by
(1) Only grandchildren
(2) Only sons
(3) Only daughters
(4) Both sons and daughters

160. According to Hugo de Vries, the mechanism of evolution is
(1) Phenotypic variations
(2) Saltation
(3) Multiple step mutations
(4) Minor mutations

161. AGGTATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding sequence of the transcribed mRNA?
(1) ACCUAUGCGAU
(2) UGGTUTCGCAT
(3) AGGUAUCGCAU
(4) UCCAUAGCGUA

162. Match the items given in Column I with those in Column II and select the correct option given below:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Proliferative Phase</td>
<td>i. Breakdown of endometrial lining</td>
</tr>
<tr>
<td>b. Secretory Phase</td>
<td>ii. Follicular Phase</td>
</tr>
<tr>
<td>c. Menstruation</td>
<td>iii. Luteal Phase</td>
</tr>
</tbody>
</table>

a b c
(1) ii iii i
(2) i iii ii
(3) iii ii i
(4) iii i ii
163. Match the items given in Column I with those in Column II and select the correct option given below:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Glycosuria</td>
<td>i. Accumulation of uric acid in joints</td>
</tr>
<tr>
<td>b. Gout</td>
<td>ii. Mass of crystallised salts within the kidney</td>
</tr>
<tr>
<td>c. Renal calculi</td>
<td>iii. Inflammation in glomeruli</td>
</tr>
<tr>
<td>d. Glomerular nephritis</td>
<td>iv. Presence of glucose in urine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) i i ii iii iv</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) i ii iii iv</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(3) iii ii iv i</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) iv i ii iii</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

164. Match the items given in Column I with those in Column II and select the correct option given below:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Ultrafiltration</td>
<td>i. Henle's loop</td>
</tr>
<tr>
<td>b. Concentration of urine</td>
<td>ii. Ureter</td>
</tr>
<tr>
<td>c. Transport of urine</td>
<td>iii. Urinary bladder</td>
</tr>
<tr>
<td>d. Storage of urine</td>
<td>iv. Malpighian corpuscle</td>
</tr>
<tr>
<td></td>
<td>v. Proximal convoluted tubule</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) v iv i ii</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) iv i ii iii</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) iv v ii iii</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) v iv i iii</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
165. Which of the following gastric cells indirectly help in erythropoiesis?

(1) Goblet cells
(2) Mucous cells
(3) Chief cells
(4) Parietal cells

166. Match the items given in Column I with those in Column II and select the correct option given below:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Fibrinogen</td>
<td>i. Osmotic balance</td>
</tr>
<tr>
<td>b. Globulin</td>
<td>ii. Blood clotting</td>
</tr>
<tr>
<td>c. Albumin</td>
<td>iii. Defence mechanism</td>
</tr>
</tbody>
</table>

166. a b c
(1) i iii ii
(2) i ii iii
(3) iii ii i
(4) ii iii i

167. Which of the following is an occupational respiratory disorder?

(1) Botulism
(2) Silicosis
(3) Anthracis
(4) Emphysema

168. Calcium is important in skeletal muscle contraction because it

(1) detaches the myosin head from the actin filament.
(2) activates the myosin ATPase by binding to it.
(3) binds to troponin to remove the masking of active sites on actin for myosin.
(4) prevents the formation of bonds between the myosin cross bridges and the actin filament.
169. Nissl bodies are mainly composed of
   (1) Nucleic acids and SER
   (2) DNA and RNA
   (3) Proteins and lipids
   (4) Free ribosomes and RER

170. Which of these statements is **incorrect**?
   (1) Glycolysis operates as long as it is supplied with NAD that can pick up hydrogen atoms.
   (2) Glycolysis occurs in cytosol.
   (3) Enzymes of TCA cycle are present in mitochondrial matrix.
   (4) Oxidative phosphorylation takes place in outer mitochondrial membrane.

171. Select the **incorrect** match:
   (1) Submetacentric – L-shaped chromosomes
   (2) Allosomes – X chromosomes
   (3) Lampbrush – Dupont chromosomes
   (4) Polytene – Oocytes of amphibians

172. Which of the following terms describe human dentition?
   (1) Pleurodont, Monophyodont, Homodont
   (2) Thecodont, Diphyodont, Heterodont
   (3) Thecodont, Diphyodont, Homodont
   (4) Pleurodont, Diphyodont, Heterodont

173. Which of the following events does **not** occur in rough endoplasmic reticulum?
   (1) Cleavage of signal peptide
   (2) Protein glycosylation
   (3) Protein folding
   (4) Phospholipid synthesis

174. Many ribosomes may associate with a single mRNA to form multiple copies of a polypeptide simultaneously. Such strings of ribosomes are termed as
   (1) Plastidome
   (2) Polyhedral bodies
   (3) Polysome
   (4) Nucleosome
175. In which disease does mosquito transmitted pathogen cause chronic inflammation of lymphatic vessels?  
(1) Ringworm disease  
(2) Ascariasis  
(3) Elephantiasis  
(4) Amoebiasis

176. Which of the following is not an autoimmune disease?  
(1) Alzheimer's disease  
(2) Rheumatoid arthritis  
(3) Psoriasis  
(4) Vitiligo

177. Among the following sets of examples for divergent evolution, select the incorrect option:  
(1) Brain of bat, man and cheetah  
(2) Heart of bat, man and cheetah  
(3) Forelimbs of man, bat and cheetah  
(4) Eye of octopus, bat and man

178. Conversion of milk to curd improves its nutritional value by increasing the amount of  
(1) Vitamin B₁₂  
(2) Vitamin A  
(3) Vitamin D  
(4) Vitamin E

179. The similarity of bone structure in the forelimbs of many vertebrates is an example of  
(1) Convergent evolution  
(2) Analogy  
(3) Homology  
(4) Adaptive radiation

180. Which of the following characteristics represent 'Inheritance of blood groups' in humans?  
a. Dominance  
b. Co-dominance  
c. Multiple allele  
d. Incomplete dominance  
e. Polygenic inheritance  
(1) b, d and e  
(2) a, b and c  
(3) b, c and e  
(4) a, c and e
Read carefully the following instructions:

1. Each candidate must show on demand his/her Admit Card to the Invigilator.

2. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.

3. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign the Attendance Sheet twice. **Cases where a candidate has not signed the Attendance Sheet second time will be deemed not to have handed over the Answer Sheet and dealt with as an unfair means case.**

4. Use of Electronic/Manual Calculator is prohibited.

5. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.

6. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.

7. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

**खालील नियम काळजीपूर्वक वाचावे:**

1. प्रवेश कार्ड विचारात्यास परीक्षार्थीनने निरीक्षकांना आपले प्रवेश कार्ड दाखवावे.

2. अत्याधिक किंवा निरीक्षकाच्या विशेष परवानगी शिवाय कोणत्याही परीक्षार्थीने आपले स्थान सोडू नये.

3. उपस्थित निरीक्षकांना आपली उत्तर पत्रिका दिल्यास तसेच उपस्थिती पत्रिकेच्या हस्ताक्षर केल्यास खातं कोणत्याही परीक्षार्थीनने परीक्षा हाळ सोडू नये. जर कोणत्याही परीक्षार्थीने दुसऱ्या वेळी उपस्थिती पत्राच्या हस्ताक्षर केलेल्या नाहीत तर असे मानले जाईल कि त्यांना उत्तर पत्रिका दिली नाही आणि हे अनूठे किंवा चुकीचे मानले जाईल.

4. इलेक्ट्रॉनिक/हस्तचित्त कॅलकुलेटर चा उपयोग वर्जित आहे.

5. परीक्षा हाळ मध्ये परीक्षार्थींचे आचरण परीक्षाच्या नियमानुसार असावे. कोणत्याही अनुचित साधनांचा वापर केल्यास परीक्षाच्या नियमानुसार निर्णय केला जाईल.

6. कोणत्याही परिस्थितित परीक्षा पुस्तिका व उत्तर पत्रिकेच्या कोणताही भाग फादू नये।

7. परीक्षा पुस्तिका/उत्तर पत्रिकेचा दिलेल्या परीक्षा पुस्तिकेचा संकेत (कोड) परीक्षार्थीने बरोबर उपस्थिती-पट्रां मध्ये लिहावा.