**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 X. 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.

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**Mahanavami Videsha:**

1. उत्तर पत्र इस परीक्षा पुस्तिका के अंदर रखा है। जब आपको परीक्षा पुस्तिका खोलने को कहा जाए, तो उत्तर पत्र निकाल कर धान्यारूपक पृष्ठ-1 एवं पृष्ठ-2 पर केवल नीले / काले बॉयट बॉयट येन्से निबंधन करें।

2. परीक्षा की अवधि 3 घंटे है एवं परीक्षा पुस्तिका में 180 प्रश्न हैं। प्रत्येक प्रश्न 4 अंक का है | प्रत्येक सही उत्तर के लिए परीक्षार्थी को 4 अंक दिए जाएंगे | प्रत्येक गलत उत्तर के लिए कुल योग में से एक अंक घटाए जाएंगे | अधिकतम अंक 720 हैं।

3. इस पृष्ठ पर विवेचन अंकित करने एवं उत्तर पत्र पर निबंधन लगाने के लिए केवल नीले / काले बॉयट बॉयट येन्से का प्रयोग करें।

4. रूफ कार्य इस परीक्षा पुस्तिका में निर्देशित स्थान पर ही करें।

5. परीक्षा समाप्त होने पर, परीक्षार्थी काख / हॉल छोड़ने से पूर्व उत्तर पत्र कश निर्देशित को अवधि रूप से हैं। परीक्षार्थी अपने साथ प्रथम पुस्तिका को लेकर जा सकते हैं।

6. इस पुस्तिका का संकेत है X। यह सुनिश्चित करें कि इस पुस्तिका का संकेत, उत्तर पत्र के पृष्ठ-2 पर छोड़े संकेत से मिलता है। अगर यह मिलता हो तो परीक्षार्थी दूसरी परीक्षा पुस्तिका और उत्तर पत्र लेने के लिए निर्देशित को मुश्किल अवस्था करें।

7. परीक्षार्थी सुनिश्चित करें कि इस उत्तर पत्र को मौजूदा जानें एवं उस पर कोई अन्य निर्देशन न लगाएं। परीक्षार्थी अपना अनुसूचित प्रथम पुस्तिका / उत्तर पत्र में निर्देशित स्थान के अल्पक्षित अन्यता न रखिए।

8. उत्तर पत्र पर किसी प्रकार के संसूचनात्मक अवस रहता/प्रहार के प्रयोग की अनुमति नहीं हैं।

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

**Name of the Candidate (in Capitals):**

परीक्षार्थी का नाम (बड़े अक्षरों में):

**Roll Number:**

in figures: 65051210

in words: जितें देशभक्ति सिखे मेरे हाथ मे देश

**Centre of Examination (in Capitals):**

India Superintendence Office, New Delhi 110 001

**Candidate’s Signature:**

परीक्षार्थी के हस्ताक्षर:

**Invigilator’s Signature:**

निरीक्षक के हस्ताक्षर:

Fascimile signature stamp of Centre Superintendent:
1. The addition of a catalyst during a chemical reaction alters which of the following quantities?
   (1) Internal energy
   (2) Enthalpy
   (3) Activation energy
   (4) Entropy

2. Predict the correct order among the following:
   (1) lone pair - lone pair > bond pair - bond pair > lone pair - bond pair
   (2) bond pair - bond pair > lone pair - bond pair > lone pair - lone pair
   (3) lone pair - bond pair > bond pair - bond pair > lone pair - lone pair
   (4) lone pair - lone pair > lone pair - bond pair > bond pair - bond pair

3. The correct statement regarding the basicity of arylamines is:
   (1) Arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalized by interaction with the aromatic ring π electron system.
   (2) Arylamines are generally more basic than alkylamines because of aryl group.
   (3) Arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is sp-hybridized.
   (4) Arylamines are generally less basic than alkylamines because the nitrogen lone-pair electrons are delocalized by interaction with the aromatic ring π electron system.

4. When copper is heated with conc. HNO₃ it produces:
   (1) Cu(NO₃)₂ and NO
   (2) Cu(NO₃)₂, NO and NO₂
   (3) Cu(NO₃)₂ and N₂O
   (4) Cu(NO₃)₂ and NO₂
5. For the following reactions:

(a) \( \text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{KOH} \rightarrow \text{CH}_3\text{CH} = \text{CH}_2 + \text{KBr} + \text{H}_2\text{O} \)

(b) \( \text{CH}_3\text{CH} = \text{CH}_2 + \text{KOH} \rightarrow \text{CH}_3\text{C} = \text{CH}_2 + \text{KBr} \)

Which of the following statements is correct?

1. (a) is elimination, (b) is substitution and (c) is addition reaction.
2. (a) is elimination, (b) and (c) are substitution reactions.
3. (a) is substitution, (b) and (c) are addition reactions.
4. (a) and (b) are elimination reactions and (c) is addition reaction.

6. Two electrons occupying the same orbital are distinguished by:

1. Magnetic quantum number
2. Azimuthal quantum number
3. Spin quantum number
4. Principal quantum number

7. The reaction

\( \text{OH} \xrightarrow{\text{NaH}} \text{OH} \)

can be classified as:

1. Alcohol formation reaction
2. Dehydration reaction
3. Williamson alcohol synthesis reaction
4. Williamson ether synthesis reaction

8. The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are:

(a) \([\text{Xe}]^4\text{f}^{76}5\text{d}^16\text{s}^2, [\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\) and \([\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\)

(b) \([\text{Xe}]^4\text{f}^{76}5\text{d}^16\text{s}^2, [\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\) and \([\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\)

(c) \([\text{Xe}]^4\text{f}^{76}5\text{d}^16\text{s}^2, [\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\) and \([\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\)

(d) \([\text{Xe}]^4\text{f}^{76}5\text{d}^16\text{s}^2, [\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\) and \([\text{Xe}]^4\text{f}^{75}6\text{d}^2\text{f}^8\)
9. At 100°C the vapour pressure of a solution of 6.5 g of a solute in 100 g water is 732 mm. If \( K_b = 0.52 \), the boiling point of this solution will be:

(1) 100°C
(2) 102°C
(3) 103°C
(4) 101°C

10. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane, is:

(1) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain.
(2) The eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain.
(3) The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain.
(4) The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain.

11. Which one of the following characteristics is associated with adsorption?

(1) \( \Delta G, \Delta H \) and \( \Delta S \) all are negative
(2) \( \Delta G \) and \( \Delta H \) are negative but \( \Delta S \) is positive
(3) \( \Delta G \) and \( \Delta S \) are negative but \( \Delta H \) is positive
(4) \( \Delta G \) is negative but \( \Delta H \) and \( \Delta S \) are positive

12. Match the compounds given in column I with the hybridisation and shape given in column II and mark the correct option.

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) XeF₆</td>
<td>(i) distorted octahedral</td>
</tr>
<tr>
<td>(b) XeO₃</td>
<td>(ii) square planar</td>
</tr>
<tr>
<td>(c) XeOF₄</td>
<td>(iii) pyramidal</td>
</tr>
<tr>
<td>(d) XeF₄</td>
<td>(iv) square pyramidal</td>
</tr>
</tbody>
</table>

Code:

(a) (b) (c) (d)

(1) (i) (ii) (iv) (iii)
(2) (iv) (iii) (i) (ii)
(3) (iv) (i) (ii) (iii)
(4) (i) (iii) (iv) (ii)
13. The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon, is:

(1) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.

(2) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation.

(3) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism.

(4) a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.

14. In a protein molecule various amino acids are linked together by:

(1) β- glycosidic bond
(2) peptide bond
(3) dative bond
(4) α- glycosidic bond

15. Match items of Column I with the items of Column II and assign the correct code:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Cyanide process</td>
<td>(i) Ultrapure Ge</td>
</tr>
<tr>
<td>(b) Froth floatation process</td>
<td>(ii) Dressing of ZnS</td>
</tr>
<tr>
<td>(c) Electrolytic reduction</td>
<td>(iii) Extraction of Al</td>
</tr>
<tr>
<td>(d) Zone refining</td>
<td>(iv) Extraction of Au</td>
</tr>
<tr>
<td></td>
<td>(v) Purification of Ni</td>
</tr>
</tbody>
</table>

Code:

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

16. Which of the following is an analgesic?

(1) Penicillin
(2) Streptomycin
(3) Chloromycetin
(4) Novalgin

13. काबोनिल वींकित जिनमें α-कार्बन पर हाइड्रोजन उपस्थित है, के लिए सही कथन है:

(1) काबोनिल वींकित जिनमें α-कार्बन पर हाइड्रोजन उपस्थित है, यह इनके अनुरूप इंग्लिश में आसानी से सामायिक में होते हैं और यह प्रक्रम ऐल्डोहाइड - कैटो ग्रुप सामायिक में कहलाता है।

(2) काबोनिल वींकित जिनमें α-कार्बन हाइड्रोजन उपस्थित है, यह इंग्लिश में आसानी से सामायिक में होते हैं और यह प्रक्रम वाइल्द-इंग्लिश कहलाता है।

(3) काबोनिल वींकित जिनमें α-कार्बन हाइड्रोजन उपस्थित है, यह इंग्लिश में आसानी से सामायिक में होते हैं और यह प्रक्रम काबोनिल सहकरण कहलाता है।

(4) काबोनिल वींकित जिनमें α-कार्बन पर हाइड्रोजन उपस्थित है, यह इनके अनुरूप इंग्लिश में आसानी से सामायिक में नहीं होता है।

14. प्रोटीन अमेरिकन के बिंबिसारित मात्र एक दूरे से क्षुद्र होते हैं:

(1) β- ग्लाइकोसिडिक आवध के द्वारा
(2) पेप्टाइड आवध के द्वारा
(3) दाता आवध के द्वारा
(4) α- ग्लाइकोसिडिक आवध के द्वारा

15. सम्बंध I के उत्तरोत्तर को सम्बंध II के उत्तरोत्तर से मिलायें। सही संकेत पहुंचिए हैं:

<table>
<thead>
<tr>
<th>सम्बंध I</th>
<th>सम्बंध II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) सॉपनाइड प्रक्रम</td>
<td>(i) अतिशुद्ध Ge</td>
</tr>
<tr>
<td>(b) फेन एक्स्ट्रैक्शन</td>
<td>(ii) ZnS का प्रस्तावना</td>
</tr>
<tr>
<td>(c) विषुद्ध अपश्रेष्ठ अवशेष</td>
<td>(iii) Al का निकायन</td>
</tr>
<tr>
<td>(d) मॉडल परिचय</td>
<td>(iv) Au का निकायन</td>
</tr>
</tbody>
</table>

कोड:

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

16. निम्न में से कौन सा दवा एक पीढ़ीहारी है?

(1) पेनिसिलिन
(2) स्लेप्टोमाइसिन
(3) क्लोरोम्यक्सिन
(4) नोवालिन
17. Which is the correct statement for the given acids?
(1) Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid.
(2) Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid.
(3) Both are triprotic acids.
(4) Both are diprotic acids.

18. The pair of electron in the given carbanion, CH₂C≡C⁻, is present in which of the following orbitals?
(1) sp³
(2) sp²
(3) sp
(4) 2p

19. Consider the molecules CH₄, NH₃ and H₂O. Which of the given statements is false?
(1) The H – O – H bond angle in H₂O is larger than the H – C – H bond angle in CH₄.
(2) The H – O – H bond angle in H₂O is smaller than the H – N – H bond angle in NH₃.
(3) The H – C – H bond angle in CH₄ is larger than the H – N – H bond angle in NH₃.
(4) The H – C – H bond angle in CH₄, the H – N – H bond angle in NH₃, and the H – O – H bond angle in H₂O are all greater than 90°.

20. Which one of the following statements is correct when SO₂ is passed through acidified K₂Cr₂O₇ solution?
(1) The solution is decolorized.
(2) SO₂ is reduced.
(3) Green Cr₂(SO₄)₃ is formed.
(4) The solution turns blue.

21. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is:
(1) ΔH > 0 and ΔS < 0
(2) ΔH < 0 and ΔS > 0
(3) ΔH < 0 and ΔS < 0
(4) ΔH < 0 and ΔS = 0

22. Natural rubber has:
(1) All trans-configuration
(2) Alternate cis- and trans-configuration
(3) Random cis- and trans-configuration
(4) All cis-configuration

23. Which one of the following statements is correct when SO₂ is passed through acidified K₂Cr₂O₇ solution?
(1) The solution is decolorized.
(2) SO₂ is reduced.
(3) Green Cr₂(SO₄)₃ is formed.
(4) The solution turns blue.

24. Which one of the following statements is correct when SO₂ is passed through acidified K₂Cr₂O₇ solution?
(1) The solution is decolorized.
(2) SO₂ is reduced.
(3) Green Cr₂(SO₄)₃ is formed.
(4) The solution turns blue.

25. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is:
(1) ΔH > 0 and ΔS < 0
(2) ΔH < 0 and ΔS > 0
(3) ΔH < 0 and ΔS < 0
(4) ΔH < 0 and ΔS = 0

26. Natural rubber has:
(1) All trans-configuration
(2) Alternate cis- and trans-configuration
(3) Random cis- and trans-configuration
(4) All cis-configuration
23. In which of the following options the order of arrangement does not agree with the variation of property indicated against it?

(1) B < C < N < O (increasing first ionisation enthalpy)
(2) I < Br < Cl < F (increasing electron gain enthalpy)
(3) Li < Na < K < Rb (increasing metallic radius)
(4) Al^{3+} < Mg^{2+} < Na^{+} < F^{-} (increasing ionic size)

24. Which of the following reagents would distinguish cis-cyclopenta-1,2-diol from the trans-isomer?

(1) Ozone
(2) MnO_{2}
(3) Aluminium isopropoxide
(4) Acetone

25. The product obtained as a result of a reaction of nitrogen with CaC_{2} is:

(1) CaCN
(2) CaCN_{3}
(3) Ca_{2}CN
(4) Ca(CN)_{2}

26. Fog is a colloidal solution of:

(1) Gas in liquid
(2) Solid in gas
(3) Gas in gas
(4) Liquid in gas

27. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?

(1) Cl_{2} > Br_{2} > F_{2} > I_{2}
(2) Br_{2} > I_{2} > F_{2} > Cl_{2}
(3) F_{2} > Cl_{2} > Br_{2} > I_{2}
(4) I_{2} > Br_{2} > Cl_{2} > F_{2}

28. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape?

(1) 1/4
(2) 3/8
(3) 1/2
(4) 1/8
29. Lithium has a bcc structure. Its density is 530 kg m\(^{-3}\) and its atomic mass is 6.94 g mol\(^{-1}\). Calculate the edge length of a unit cell of Lithium metal. \((N_A = 6.02 \times 10^{23} \text{ mol}^{-1})\)

(1) 352 pm
(2) 527 pm
(3) 264 pm
(4) 154 pm

30. Which of the following statements about the composition of the vapour over an ideal 1:1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at 25°C. (Given, Vapour Pressure Data at 25°C, benzene = 12.8 kPa, toluene = 3.85 kPa)

(1) The vapour will contain a higher percentage of toluene.
(2) The vapour will contain equal amounts of benzene and toluene.
(3) Not enough information is given to make a prediction.
(4) The vapour will contain a higher percentage of benzene.

31. Which of the following has longest C–O bond length? (Free C–O bond length in CO is 1.128 Å.)

(1) \([\text{Co(CO)}_4]^2-\)
(2) \([\text{Fe(CO)}_4]^2-\)
(3) \([\text{Mn(CO)}_4]^+\)
(4) \([\text{Ni(CO)}_4]\)

32. Among the following, the correct order of acidity is:

(1) \(\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4\)
(2) \(\text{HClO}_2 < \text{HClO} < \text{HClO}_3 < \text{HClO}_4\)
(3) \(\text{HClO}_4 < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}\)
(4) \(\text{HClO}_3 < \text{HClO}_4 < \text{HClO}_2 < \text{HClO}\)

33. In the reaction

\[
\text{H} + \text{C} = \text{CH} \xrightarrow{(1) \text{NaNH}_2/\text{liq. NH}_3} \text{X} \xrightarrow{(2) \text{CH}_3\text{CH}_2\text{Br}} \text{Y},
\]

X and Y are:

(1) \(\text{X} = 2\text{-Butyne}; \text{Y} = 3\text{-Hexyne}\)
(2) \(\text{X} = 2\text{-Butyne}; \text{Y} = 2\text{-Hexyne}\)
(3) \(\text{X} = 1\text{-Butyne}; \text{Y} = 2\text{-Hexyne}\)
(4) \(\text{X} = 1\text{-Butyne}; \text{Y} = 3\text{-Hexyne}\)
34. MY and NY3, two nearly insoluble salts, have the same $K_{sp}$ values of $6.2 \times 10^{-13}$ at room temperature. Which statement would be true in regard to MY and NY3?

1. The molar solubility of MY in water is less than that of NY3.
2. The salts MY and NY3 are more soluble in 0.5 M KY than in pure water.
3. The addition of the salt of KY to solution of MY and NY3 will have no effect on their solubilities.
4. The molar solubilities of MY and NY3 in water are identical.

35. Consider the nitration of benzene using mixed conc. H$_2$SO$_4$ and HNO$_3$. If a large amount of KHSO$_4$ is added to the mixture, the rate of nitration will be:

1. slower
2. unchanged
3. doubled
4. faster

36. The product formed by the reaction of an aldehyde with a primary amine is:

1. Ketone
2. Carboxylic acid
3. Aromatic acid
4. Schiff base

37. The pressure of H$_2$ required to make the potential of H$_2$ electrode zero in pure water at 298 K is:

1. $10^{-12}$ atm
2. $10^{-10}$ atm
3. $10^{-4}$ atm
4. $10^{-14}$ atm

38. The correct statement regarding RNA and DNA, respectively is:

1. The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose.
2. The sugar component in RNA is arabinose and the sugar component in DNA is ribose.
3. The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose.
4. The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deoxyribose.

39. Which one given below is a non-reducing sugar?

1. Lactose
2. Glucose
3. Sucrose
4. Maltose
40. Which of the following statements about hydrogen is incorrect?
   (1) Hydrogen never acts as cation in ionic salts.
   (2) Hydronium ion, $\text{H}_3\text{O}^+$ exists freely in solution.
   (3) Dihydrogen does not act as a reducing agent.
   (4) Hydrogen has three isotopes of which tritium is the most common.

41. Consider the following liquid - vapour equilibrium. Liquid $\rightleftharpoons$ Vapour
Which of the following relations is correct?
   (1) $\frac{d\ln P}{dT} = -\frac{\Delta H_f}{RT}$
   (2) $\frac{d\ln P}{dT^2} = -\frac{\Delta H_f}{T^2}$
   (3) $\frac{d\ln P}{dT} = \frac{\Delta H_f}{RT^2}$
   (4) $\frac{d\ln G}{dT^2} = \frac{\Delta H_f}{RT^2}$

42. Which of the following biphenyls is optically active?
   (1) ![Biphenyl 1]
   (2) ![Biphenyl 2]
   (3) ![Biphenyl 3]
   (4) ![Biphenyl 4]

43. Which of the following statements is false?
   (1) $\text{Ca}^{2+}$ ions are important in blood clotting.
   (2) $\text{Ca}^{2+}$ ions are not important in maintaining the regular beating of the heart.
   (3) $\text{Mg}^{2+}$ ions are important in the green parts of plants.
   (4) $\text{Mg}^{2+}$ ions form a complex with ATP.
44. The ionic radii of A\(^+\) and B\(^-\) ions are \(0.98 \times 10^{-10}\) m and \(1.81 \times 10^{-10}\) m. The coordination number of each ion in AB is:

(1) 4
(2) 8
(3) 2
(4) 6

45. The rate of a first-order reaction is 0.04 mol l\(^{-1}\) s\(^{-1}\) at 10 seconds and 0.03 mol l\(^{-1}\) s\(^{-1}\) at 20 seconds after initiation of the reaction. The half-life period of the reaction is:

(1) 34.1 s
(2) 44.1 s
(3) 54.1 s
(4) 24.1 s

46. The two polypeptides of human insulin are linked together by:

(1) Phosphodiester bond
(2) Covalent bond
(3) Disulphide bridges
(4) Hydrogen bonds

47. The coconut water from tender coconut represents:

(1) Fleshy mesocarp
(2) Free nuclear proembryo
(3) Free nuclear endosperm
(4) Endocarp

48. Which of the following is not a feature of the plasmids?

(1) Circular structure
(2) Transferable
(3) Single-stranded
(4) Independent replication

49. Which is the National Aquatic Animal of India?

(1) River dolphin
(2) Blue whale
(3) Sea-horse
(4) Gangetic shark

50. The *Avena* curvature is used for bioassay of:

(1) GA\(_3\)
(2) IAA
(3) Ethylene
(4) ABA
51. Which of the following is the most important cause of animals and plants being driven to extinction?

(1) Alien species invasion
(2) Habitat loss and fragmentation
(3) Co-extinctions
(4) Over-exploitation

52. Which of the following approaches does not give the defined action of contraceptive?

<table>
<thead>
<tr>
<th>Approach</th>
<th>Defined Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Intra uterine devices</td>
<td>Increase phagocytosis of sperms, suppress sperm motility and fertilizing capacity of sperms</td>
</tr>
<tr>
<td>(2) Hormonal contraceptives</td>
<td>Prevent/retard entry of sperms, prevent ovulation and fertilization</td>
</tr>
<tr>
<td>(3) Vasectomy</td>
<td>Prevents spermatogenesis</td>
</tr>
<tr>
<td>(4) Barrier methods</td>
<td>Prevent fertilization</td>
</tr>
</tbody>
</table>

53. In a testcross involving F1 dihybrid flies, more parental-type offspring were produced than the recombinant-type offspring. This indicates:

(1) Chromosomes failed to separate during meiosis.
(2) The two genes are linked and present on the same chromosome.
(3) Both of the characters are controlled by more than one gene.
(4) The two genes are located on two different chromosomes.

54. A typical fat molecule is made up of:

(1) One glycerol and three fatty acid molecules
(2) One glycerol and one fatty acid molecule
(3) Three glycerol and three fatty acid molecules
(4) Three glycerol molecules and one fatty acid molecule
55. Match the terms in Column I with their description in Column II and choose the correct option:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Dominance</td>
<td>(i) Many genes govern a single character</td>
</tr>
<tr>
<td>(b) Codominance</td>
<td>(ii) In a heterozygous organism only one allele expresses itself</td>
</tr>
<tr>
<td>(c) Pleiotropy</td>
<td>(iii) In a heterozygous organism both alleles express themselves fully</td>
</tr>
<tr>
<td>(d) Polygenic inheritance</td>
<td>(iv) A single gene influences many characters</td>
</tr>
</tbody>
</table>

**Code:**

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

56. Which of the following statements is not correct?

1. Insects that consume pollen or nectar without bringing about pollination are called pollen/nectar robbers.
2. Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil.
3. Some reptiles have also been reported as pollinators in some plant species.
4. Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.

57. Which of the following features is not present in *Periplaneta americana*?

1. Indeterminate and radial cleavage during embryonic development
2. Exoskeleton composed of N-acetylglucosamine
3. Metamerically segmented body
4. Schizocoelom as body cavity

58. Water soluble pigments found in plant cell vacuoles are:

1. Chlorophylls
2. Carotenoids
3. Anthocyanins
4. Xanthophylls

55. कॉलम I की शब्दों को कॉलम II में दिये गए, उनके परिणाम से मैं कौन जाने के स्वरूप चुना है: 

<table>
<thead>
<tr>
<th>कॉलम I</th>
<th>कॉलम II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) राजनैतिक</td>
<td>(i) अनेक जीन एकल लक्षण का नियंत्रण करते हैं</td>
</tr>
<tr>
<td>(b) सहरार्थी</td>
<td>(ii) विषयपुरणीय जीव में केवल एक ही ऐलोइन स्वरुप का अभिव्यक्ति करता है।</td>
</tr>
<tr>
<td>(c) बहुतांतरित</td>
<td>(iii) विषयपुरणीय जीव में दोनों ही ऐलोइन स्वरुप का पूरा स्वरुप अभिव्यक्ति करता है।</td>
</tr>
<tr>
<td>(d) बहुजीवी वंशात्मक</td>
<td>(iv) एकल जीन अनेक लक्षणों का प्रभावित करता है।</td>
</tr>
</tbody>
</table>

**कोड:**

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

56. निम्नलिखित में से कौन सा कथन सत्य नहीं है?

1. किस जीव ने पारंपरिक रूप से पारंपरिक या मकरंड को ग्रहण करते हैं, उन्हें पारंपरिक मकरंड कहते हैं।
2. पराक्रम अंशुरगुण तथा पारंपरिक वृद्धि पराक्रम तथा वैज्ञानिक सारणी की पहली पहल होने रजूशांक रासायनिक सारणी के द्वारा नियंत्रित होती है।
3. कुछ स्वरूप, कुछ पारंपरिक जीतों में पराक्रम करते हुए बहार गये हैं।
4. बहुत सारी जीतों के पराक्रम एक पूरा के विलयकाल पर अंकृति हो सकते हैं परंतु उसी जीत के पराक्रमों को केवल एक पूरा पराक्रम-लिंग वर्तक में आगे बढ़ती है।

57. निम्नलिखित में से कौन-सा लक्षण परिपथ १ अमेरिकन में नहीं पाया जाता?

1. सशांचे परिपथ के दौरान अन्यांत्रित और अलंपिय विकलप
2. N - एसिटिलनुक्लीसायीन से निर्मित बालककाली
3. धारित देह
4. देवगुण के रूप में दूरगुण

58. पादप कोशिका की रसथामाँ में जल पुलित वर्षक कौन से होते हैं?

(a) पराक्रम
(b) एसिटीलिंडर
c) प्रायोगिक
d) जीवीकुल
99. A cell at telophase stage is observed by a student in his laboratory. He tells his teacher that this stage is similar to the division stage of a plant cell, which is not like other cell stages. There is no formation of cell plate and thus the cell is not divided into two cells. Compare the following with telophase stage:

- (1) Prophase
- (2) Metaphase
- (3) Anaphase
- (4) Telophase

Which of the following statements is true?

A. Telophase is the stage where the nuclear envelope reforms and the chromosomes disappear.
B. Telophase is the stage where the spindle fibers are present.
C. Telophase is the stage where the chromosomes are aligned at the equator.
D. Telophase is the stage where the chromosomes are replicated.

100. A plant in your garden avoids photosynthetic loss by improving water use efficiency. It shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilization. In which of the following physiological processes would you assign this plant?

- (1) CAM
- (2) C₃
- (3) C₄
- (4) Nitrogen fixation

101. In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self-cells, then it leads to:

- (1) Graft rejection
- (2) Auto-Immune disease
- (3) Active immunity
- (4) Allergic response

102. Emerson's enhancement effect and Red drop have been instrumental in the discovery of:

- (1) Two photosystems operating simultaneously
- (2) Photophosphorylation and cyclic electron transport
- (3) Photophosphorylation and non-cyclic electron transport
- (4) The role of water in photosynthesis

103. Select the correct statement:

- (1) Salvia, Girgo, and Pinus all are evergreen coniferous trees.
- (2) Gymnosperms are not well adapted to extremes of climate.
- (3) The leaves of gymnosperms are well adapted to extremes of climate.
- (4) Gymnosperms are both homosporous and heterosporous
64. Which of the following is not a characteristic feature during mitosis in somatic cells?
(1) Disappearance of nucleolus
(2) Chromosome movement
(3) Synapsis
(4) Spindle fibres

65. Blood pressure in the pulmonary artery is:
(1) more than that in the carotid.
(2) more than that in the pulmonary vein.
(3) less than that in the venae cavae.
(4) same as that in the aorta.

66. Which of the following structures is homologous to the wing of a bird?
(1) Wing of a Moth
(2) Hind limb of Rabbit
(3) Flipper of Whale
(4) Dorsal fin of a Shark

67. Seed formation without fertilization in flowering plants involves the process of:
(1) Budding
(2) Somatic hybridization
(3) Apomixis
(4) Sporulation

68. Name the chronic respiratory disorder caused mainly by cigarette smoking:
(1) Asthma
(2) Respiratory acidosis
(3) Respiratory alkalosis
(4) Emphysema

69. Spindle fibres attach on to:
(1) Kinetochore of the chromosome
(2) Centromere of the chromosome
(3) Kinetosome of the chromosome
(4) Telomere of the chromosome
70. In context of Amniocentesis, which of the following statement is incorrect?

(1) It is used for prenatal sex determination.
(2) It can be used for detection of Down syndrome.
(3) It can be used for detection of Cleft palate.
(4) It is usually done when a woman is between 14 - 16 weeks pregnant.

71. Stems modified into flat green organs performing the functions of leaves are known as:

(1) Phyllodes.
(2) Phylloclades.
(3) Scales.
(4) Cladodes.

72. In a chloroplast the highest number of protons are found in:

(1) Lumen of thylakoids.
(2) Inter membrane space.
(3) Antennae complex.
(4) Stroma.

73. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature?

(1) The first word in a biological name represents the genus name, and the second is a specific epithet.
(2) The names are written in Latin and are italicised.
(3) When written by hand, the names are to be underlined.
(4) Biological names can be written in any language.

74. In meiosis crossing over is initiated at:

(1) Leptotene.
(2) Zygotene.
(3) Diplotene.
(4) Pachytene.
75. Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain:
(1) Harvested antibodies
(2) Gamma globulin
(3) Attenuated pathogens
(4) Activated pathogens

76. The Taq polymerase enzyme is obtained from:
(1) *Thiobacillus ferrooxidans*
(2) *Bacillus subtilis*
(3) *Pseudomonas putida*
(4) *Thermus aquaticus*

77. Which of the following most appropriately describes haemophilia?
(1) X-linked recessive gene disorder
(2) Chromosomal disorder
(3) Dominant gene disorder
(4) Recessive gene disorder

78. The standard petal of a papilionaceous corolla is also called:
(1) Pappus
(2) Vexillum
(3) Corona
(4) Carina

79. Which part of the tobacco plant is infected by *Meloidogyne incognita*?
(1) Leaf
(2) Stem
(3) Root
(4) Flower

80. Which of the following statements is wrong for viroids?
(1) They are smaller than viruses
(2) They cause infections
(3) Their RNA is of high molecular weight
(4) They lack a protein coat
81. Which of the following statements is not true for cancer cells in relation to mutations?

(1) Mutations destroy telomerase inhibitor.
(2) Mutations inactivate the cell control.
(3) Mutations inhibit production of telomerase. 
(4) Mutations in proto-oncogenes accelerate the cell cycle.

82. Which type of tissue correctly matches with its location?

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areolar tissue</td>
<td>Tendons</td>
</tr>
<tr>
<td>Transitional epithelium</td>
<td>Tip of nose</td>
</tr>
<tr>
<td>Cuboidal epithelium</td>
<td>Lining of stomach</td>
</tr>
<tr>
<td>Smooth muscle</td>
<td>Wall of intestine</td>
</tr>
</tbody>
</table>

83. Which of the following pairs of hormones are not antagonistic (having opposite effects) to each other?

(1) Insulin - Glucagon
(2) Aldosterone - Atrial Natriuretic Factor
(3) Relaxin - Inhibin
(4) Parathormone - Calcitonin

84. Specialised epidermal cells surrounding the guard cells are called:

(1) Subsidiary cells
(2) Bulliform cells
(3) Lenticels
(4) Complementary cells

85. Fertilization in humans is practically feasible only if:

(1) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the fallopian tube.
(2) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the cervix.
(3) the sperms are transported into cervix within 48 hrs of release of ovum in uterus.
(4) the sperms are transported into vagina just after the release of ovum in fallopian tube.

86. Which one of the following is the starter codon?

(1) UGA
(2) UAA
(3) UAG
(4) AUG
87. A river with an inflow of domestic sewage rich in organic waste may result in:
   (1) Increased population of aquatic food web organisms.
   (2) An increased production of fish due to biodegradable nutrients.
   (3) Death of fish due to lack of oxygen.
   (4) Drying of the river very soon due to algal bloom.

88. Following are the two statements regarding the origin of life:
   (a) The earliest organisms that appeared on the earth were non-green and presumably anaerobes.
   (b) The first autotrophic organisms were the chemoautotrophs that never released oxygen.

Of the above statements which one of the following options is correct?
   (1) (b) is correct but (a) is false.
   (2) Both (a) and (b) are correct.
   (3) Both (a) and (b) are false.
   (4) (a) is correct but (b) is false.

89. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called:
   (1) Contour farming
   (2) Strip farming
   (3) Shifting agriculture
   (4) Ley farming

90. Gause’s principle of competitive exclusion states that:
   (1) Competition for the same resources excludes species having different food preferences.
   (2) No two species can occupy the same niche indefinitely for the same limiting resources.
   (3) Larger organisms exclude smaller ones through competition.
   (4) More abundant species will exclude the less abundant species through competition.
91. Which of the following characteristic features always holds true for the corresponding group of animals?

<table>
<thead>
<tr>
<th>(1) Viviparous</th>
<th>Mammalia</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Possess a mouth with an upper and a lower jaw</td>
<td>Chordata</td>
</tr>
<tr>
<td>(3) 3-chambered heart with one incompletely divided ventricle</td>
<td>Reptilia</td>
</tr>
<tr>
<td>(4) Cartilaginous endoskeleton</td>
<td>Chordrichthyes</td>
</tr>
</tbody>
</table>

92. Changes in GnRH pulse frequency in females is controlled by circulating levels of:

(1) estrogen and inhibin
(2) progesterone only
(3) progesterone and inhibin
(4) estrogen and progesterone

93. Microtubules are the constituents of:

(1) Spindle fibres, Centrioles and Cilia
(2) Centrioles, Spindle fibres and Chromatin
(3) Centrosome, Nucleosome and Centrioles
(4) Cilia, Flagella and Peroxisomes

94. Mitochondria and chloroplast are:

(a) semi-autonomous organelles.
(b) formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery.

Which one of the following options is correct?

(1) (b) is true but (a) is false.
(2) (a) is true but (b) is false.
(3) Both (a) and (b) are false.
(4) Both (a) and (b) are correct.

95. Photosensitive compound in human eye is made up of:

(1) Opsin and Retinal
(2) Opsin and Retinol
(3) Transducin and Retinene
(4) Guanosine and Retinol

96. Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom:

(1) Protista
(2) Fungi
(3) Animalia
(4) Monera
97. The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the:

(1) Thermoacidophiles
(2) Methanogens
(3) Eubacteria
(4) Halophiles

98. Identify the correct statement on ‘inhibin’:

(1) Is produced by granulose cells in ovary and inhibits the secretion of FSH.
(2) Is produced by granulose cells in ovary and inhibits the secretion of LH.
(3) Is produced by nurse cells in testes and inhibits the secretion of LH.
(4) Inhibits the secretion of LH, FSH and Prolactin.

99. It is much easier for a small animal to run uphill than for a large animal, because:

(1) Smaller animals have a higher metabolic rate.
(2) Small animals have a lower O2 requirement.
(3) The efficiency of muscles in large animals is less than in the small animals.
(4) It is easier to carry a small body weight.

100. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F1 plants were selfed the resulting genotypes were in the ratio of:

(1) 1:2:1: Tall heterozygous : Tall homozygous : Dwarf
(2) 3 : 1 : Tall : Dwarf
(3) 3 : 1 : Dwarf : Tall
(4) 1:2:1 : Tall homozygous : Tall heterozygous : Dwarf

101. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers:

(1) Ozone
(2) Ammonia
(3) Methane
(4) Nitrous oxide
102. Which one of the following is a characteristic feature of cropland ecosystem?

(1) Least genetic diversity
(2) Absence of weeds
(3) Ecological succession
(4) Absence of soil organisms

103. Tricarpellary, syncarpous gynoecium is found in flowers of:

(1) Solanaceae
(2) Fabaceae
(3) Poaceae
(4) Liliaceae

104. In which of the following, all three are macronutrients?

(1) Iron, copper, molybdenum
(2) Molybdenum, magnesium, manganese
(3) Nitrogen, nickel, phosphorus
(4) Boron, zinc, manganese

105. Reduction in pH of blood will:

(1) reduce the blood supply to the brain.
(2) decrease the affinity of hemoglobin with oxygen.
(3) release bicarbonate ions by the liver.
(4) reduce the rate of heart beat.

106. Lack of relaxation between successive stimuli in sustained muscle contraction is known as:

(1) Fatigue
(2) Tetanus
(3) Tonus
(4) Spasm

107. Which one of the following statements is wrong?

(1) Golden algae are also called desmids.
(2) Eubacteria are also called false bacteria.
(3) Phycomycetes are also called algal fungi.
(4) Cyanobacteria are also called blue-green algae.

108. Which of the following is a restriction endonuclease?

(1) Protease
(2) DNase I
(3) RNase
(4) Hind II
109. Which of the following would appear as the pioneer organisms on bare rocks?

(1) Liverworts
(2) Mosses
(3) Green algae
(4) Lichens

110. Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using one of following options:

(1) Both processes can happen together because the diffusion coefficient of water and CO₂ is different.
(2) The above processes happen only during night time.
(3) One process occurs during day time, and the other at night.
(4) Both processes cannot happen simultaneously.

111. Cotyledon of maize grain is called:

(1) coleorhiza
(2) coleoptile
(3) scutellum
(4) plumule

112. Which of the following guards the opening of hepatopancreatic duct into the duodenum?

(1) Ileocaecal valve
(2) Pyloric sphincter
(3) Sphincter of Oddi
(4) Semilunar valve

113. In the stomach, gastric acid is secreted by the:

(1) parietal cells
(2) peptic cells
(3) acidic cells
(4) gastrin secreting cells

114. In mammals, which blood vessel would normally carry largest amount of urea?

(1) Dorsal Aorta
(2) Hepatic Vein
(3) Hepatic Portal Vein
(4) Renal Vein
115. The term ecosystem was coined by:
(1) A.G. Tansley
(2) E. Haeckel
(3) E. Warming
(4) E.P. Odum

116. Which of the following is required as inducer(s) for the expression of Lac operon?
(1) galactose
(2) lactose
(3) lactose and galactose
(4) glucose

117. Which of the following is wrongly matched in the given table?

<table>
<thead>
<tr>
<th>Microbe</th>
<th>Product</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monascus purpureus</td>
<td>Statins</td>
<td>lowering of blood cholesterol</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>Streptokinase</td>
<td>removal of clot from blood vessel</td>
</tr>
<tr>
<td>Clostridium butylicum</td>
<td>Lipase</td>
<td>removal of oil stains</td>
</tr>
<tr>
<td>Trichoderma polysporum</td>
<td>Cyclosporin A</td>
<td>immunosuppressive drug</td>
</tr>
</tbody>
</table>

118. When does the growth rate of a population following the logistic model equal zero? The logistic model is given as $\frac{dN}{dt} = rN(1-N/K)$:
(1) when $N$ nears the carrying capacity of the habitat.
(2) when $N/K$ equals zero.
(3) when death rate is greater than birth rate.
(4) when $N/K$ is exactly one.

119. Which one of the following statements is not true?
(1) Exine of pollen grains is made up of sporopollenin
(2) Pollen grains of many species cause severe allergies
(3) Stored pollen in liquid nitrogen can be used in the crop breeding programmes
(4) Tapetum helps in the dehiscence of anther

116. लैक चैन्यलेक्स की अवधारणा के लिए निम्नलिखित में से कौन सी प्रौढ़ के प्रकार कार्य करने के लिए आवश्यक होगी?
(1) गैलेक्टोज
(2) लैकेटोज
(3) लैकेटोज और गैलेक्टोज
(4) ग्लूकोज

117. नीचे दी गई तालिका में मिलती-मिलती गव्यी मददों को जुड़ें:

<table>
<thead>
<tr>
<th>सूचीबद्ध क्रम</th>
<th>उपादान</th>
<th>अनुप्रयोग</th>
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</thead>
<tbody>
<tr>
<td>(1) मोनेस्कस</td>
<td>स्टेटिस</td>
<td>रॉपर-कोलेस्ट्रॉल को कम करना</td>
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<td>(2) स्ट्रेप्टोकॉकस</td>
<td>स्ट्रेप्टोकिनास</td>
<td>रॉपर-वाहिका से धब्बे को हटाना</td>
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<td>(3) क्लोस्ट्रिडियम ब्यूटीलिकम</td>
<td>लिपास</td>
<td>तेल के धब्बों को हटाना</td>
</tr>
<tr>
<td>(4) ट्रिचोडेर्मा पोल्स्पोराम</td>
<td>सिक्लोस्पोरिन A</td>
<td>प्रतिरक्षा संदर्भ उपचार</td>
</tr>
</tbody>
</table>

118. लॉगिस्टिक मॉडल का अनुसरण करते हुए किसी समान्तर वृद्धि के बावजूद कब होगी?

$\frac{dN}{dt} = rN(1-N/K)$
(1) बज N पर्यावरण की धारिता क्षमता के समीप हो।
(2) बज N/K शून्य के बावजूद हो।
(3) बज जनजाति को अपेक्षा मूल्य कम अधिक हो।
(4) बज N/K ठीक एक हो।

119. निम्नलिखित में से कौन सा कथन सत्य नहीं है?
(1) पाराग्राफ की बाह्यफोड स्पोरोपॉलेनिंस को बनी होटी?
(2) बहुत सी जीवित के पाराग्राफ ग्रंथी प्रयोज्तता है करते हैं
(3) द्रवित फलवृक्ष में भंडारित पाराग्राफ, फसल प्रजनन योजनाओं में प्रयुक्त किये जा सकते हैं
(4) पाराग्राफ के स्कूटन में टेम्पॉर क्याहारता करती है
120. In bryophytes and pteridophytes, transport of male gametes requires:
(1) Insects
(2) Birds
(3) Water
(4) Wind

121. Which of the following is not a stem modification?
(1) Thorns of citrus
(2) Tendrils of cucumber
(3) Flattened structures of Opuntia
(4) Pitcher of Nepenthes

122. Which one of the following cell organelles is enclosed by a single membrane?
(1) Chloroplasts
(2) Lysosomes
(3) Nuclei
(4) Mitochondria

123. Analogous structures are a result of:
(1) Convergent evolution
(2) Shared ancestry
(3) Stabilizing selection
(4) Divergent evolution

124. Which one of the following statements is wrong?
(1) Cellulose is a polysaccharide.
(2) Uracil is a pyrimidine.
(3) Glycine is a sulphur containing amino acid.
(4) Sucrose is a disaccharide.

125. Proximal end of the filament of stamen is attached to the:
(1) Connective
(2) Placenta
(3) Thalamus or petal
(4) Anther

126. Which of the following is not required for any of the techniques of DNA fingerprinting available at present?
(1) Zinc finger analysis
(2) Restriction enzymes
(3) DNA - DNA hybridization
(4) Polymerase chain reaction
127. Which one of the following characteristics is not shared by birds and mammals?
   (1) Breathing using lungs
   (2) Viviparity
   (3) Warm blooded nature
   (4) Ossified endoskeleton

128. Select the incorrect statement:
   (1) LH triggers ovulation in ovary.
   (2) LH and FSH decrease gradually during the follicular phase.
   (3) LH triggers secretion of androgens from the Leydig cells.
   (4) FSH stimulates the sertoli cells which help in spermiogenesis.

129. The amino acid Tryptophan is the precursor for the synthesis of:
   (1) Thyroxine and Triiodothyronine
   (2) Estrogen and Progesterone
   (3) Cortisol and Cortisone
   (4) Melatonin and Serotonin

130. Joint Forest Management Concept was introduced in India during:
   (1) 1970s
   (2) 1980s
   (3) 1990s
   (4) 1960s

131. One of the major components of cell wall of most fungi is:
   (1) Peptidoglycan
   (2) Cellulose
   (3) Hemicellulose
   (4) Chitin

132. A complex of ribosomes attached to a single strand of RNA is known as:
   (1) Polymer
   (2) Polypeptide
   (3) Okazaki fragment
   (4) Polysome

133. Which of the following features is not present in the Phylum - Arthropoda?
   (1) Metameric segmentation
   (2) Parapodia
   (3) Jointed appendages
   (4) Chitinous exoskeleton
134. Asthma may be attributed to:
(1) allergic reaction of the mast cells in the lungs
(2) inflammation of the trachea
(3) accumulation of fluid in the lungs
(4) bacterial infection of the lungs

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

136. A capacitor of 2 μF is charged as shown in the diagram. When the switch S is turned to position 2, the percentage of its stored energy dissipated is:
(1) 20%
(2) 75%
(3) 80%
(4) 0%

137. To get output 1 for the following circuit, the correct choice for the input is:
(1) A = 1, B = 0, C = 0
(2) A = 1, B = 1, C = 0
(3) A = 1, B = 0, C = 1
(4) A = 0, B = 1, C = 0
138. A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 30 cm and 40 cm from the positive end of the wire in the two cases. The ratio of the cells is:

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

139. When a metallic surface is illuminated with radiation of wavelength \( \lambda \), the stopping potential is \( V \). If the same surface is illuminated with radiation of wavelength \( \lambda' \), the stopping potential is \( V' \). The threshold wavelength \( \lambda_0 \) for the metallic surface is:

\[ \frac{\lambda}{\lambda_0} = \frac{V}{V'} \]

140. Two non-mixing liquids of densities \( \rho \) and \( \rho' > \rho \) are put in a container. The height of each liquid is \( h \). A solid cylinder of length \( L \) and density \( \delta \) is put in this container. The cylinder floats with its axis vertical and length \( L \). In the denser liquid, the density of the cylinder is:

(1) \( \frac{\rho}{\rho'} \) 
(2) \( \frac{\rho'}{\rho} \) 
(3) \( \frac{\rho'}{\rho} + 1 \) 
(4) \( \frac{\rho}{\rho'} - 1 \)

141. Out of the following options which one can be used to produce a propagating electromagnetic wave?

(1) A stationary charge 
(2) A chargeless particle 
(3) An accelerating charge 
(4) A change moving at constant velocity
42. The charge flowing through a resistance $R$ varies with time $t$ as $Q = at - bt^2$, where $a$ and $b$ are positive constants. The total heat produced in $R$ is:

1. $\frac{a^3R}{3b}$
2. $\frac{a^3R}{2b}$
3. $\frac{a^3R}{b}$
4. $\frac{a^3R}{6b}$

43. At what height from the surface of the earth the gravitation potential and the value of $g$ are $-5.4 \times 10^7 \text{J kg}^{-2}$ and $6.0 \text{ms}^{-2}$ respectively? Take the radius of earth as 6400 km:

1. 1600 km
2. 1400 km
3. 2000 km
4. 2600 km

44. Coefficient of linear expansion of brass and steel rods are $\alpha_1$ and $\alpha_2$. Lengths of brass and steel rods are $l_1$ and $l_2$ respectively. If $(l_2 - l_1)$ is maintained same at all temperatures, which one of the following relations holds good?

1. $\alpha_1 l_2^2 = \alpha_2 l_1^2$
2. $\alpha_1^2 l_2 = \alpha_2^2 l_1$
3. $\alpha_1 l_1 = \alpha_2 l_1$
4. $\alpha_1 l_2 = \alpha_2 l_1$

45. The intensity at the maximum in a Young’s double slit experiment is $I_0$. Distance between two slits is $d = 5\lambda$, where $\lambda$ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance $D = 10d$?

1. $\frac{I_0}{4}$
2. $\frac{3}{4} I_0$
3. $\frac{I_0}{2}$
4. $I_0$
146. Given the value of Rydberg constant is $10^7 \text{ m}^{-1}$, the wave number of the last line of the Balmer series in hydrogen spectrum will be:

(1) $0.5 \times 10^7 \text{ m}^{-1}$
(2) $0.25 \times 10^7 \text{ m}^{-1}$
(3) $2.5 \times 10^7 \text{ m}^{-1}$
(4) $0.025 \times 10^4 \text{ m}^{-1}$

147. The ratio of escape velocity at earth ($v_e$) to the escape velocity at a planet ($v_p$) whose radius and mean density are twice as that of earth is:

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

148. A long solenoid has 1000 turns. When a current of 4 A flows through it, the magnetic flux linked with each turn of the solenoid is $4 \times 10^{-3}$ Wb. The self-inductance of the solenoid is:

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

149. A car is negotiating a curved road of radius $R$. The road is banked at an angle $\theta$. The coefficient of friction between the tyres of the car and the road is $\mu_s$. The maximum safe velocity on this road is:

(1) $\sqrt{\frac{gR}{\mu_s + \tan\theta}}$ \(1 - \mu_s \tan\theta\)
(2) $\frac{g}{R} \frac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}$
(3) $\frac{g}{R^2} \frac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}$
(4) $\sqrt{\frac{gR^2}{\mu_s + \tan\theta}} \frac{1}{1 - \mu_s \tan\theta}$

150. The magnetic susceptibility is negative for:

(1) paramagnetic material only
(2) ferromagnetic material only
(3) paramagnetic and ferromagnetic materials
(4) diamagnetic material only

146. रिडबर्ग नियमतक का मान $10^7 \text{ m}^{-1}$ दिया गया है, हाइड्रोजन स्पेक्ट्रम की बार्मे श्रेणी की अंतिम लाइन की तरंग संख्या होगी:

(1) $0.5 \times 10^7 \text{ m}^{-1}$
(2) $0.25 \times 10^7 \text{ m}^{-1}$
(3) $2.5 \times 10^7 \text{ m}^{-1}$
(4) $0.025 \times 10^4 \text{ m}^{-1}$

147. पृथ्वी पर पलायन क्रेग ($v_e$) तथा उस ग्रह पर पलायन क्रेग ($v_p$) में क्या अनुपात होगा, जिसकी त्रिज्या और औसत अंतर्गत ज्बल को दोगुना है?

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

148. किसी लम्बी परिवर्तनिक में फेंकों की संख्या 1000 है। जब परिवर्तनिक से 4 A धारा प्रवाहित होती है, तब इस परिवर्तनिक के प्रत्येक फेंक से संबंधित चुम्बकीय फोक्स $4 \times 10^{-3}$ Wb है। इस परिवर्तनिक का स्व-प्रेरक है:

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

149. कोई कार त्रिज्या $R$ की बार्म क्र संख्या पर गतिमान है। संख्य कोण $\theta$ पर खुली है। कार के टार्मी और संख्य के वर्तन्-गुणांक $\mu_s$ है। इस संख्य पर कार का अधिकतम संख्य है:

(1) $\sqrt{\frac{gR}{\mu_s + tan\theta}}$ \(1 - \mu_s \tan\theta\)
(2) $\frac{g}{R} \frac{\mu_s + tan\theta}{1 - \mu_s \tan\theta}$
(3) $\frac{g}{R^2} \frac{\mu_s + tan\theta}{1 - \mu_s \tan\theta}$
(4) $\sqrt{\frac{gR^2}{\mu_s + tan\theta}} \frac{1}{1 - \mu_s \tan\theta}$

150. चुम्बकीय सुप्रभाविता उपयोगिता होती है:

(1) केवल अनुचुम्बकीय पदार्थ के लिए
(2) केवल लीम-चुम्बकीय पदार्थ के लिए
(3) अनुचुम्बकीय और लीम-चुम्बकीय पदार्थ के लिए
(4) केवल प्रतिचुम्बकीय पदार्थ के लिए
151. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 ms\(^{-1}\). Then, the frequency of sound that the observer hears in the echo reflected from the cliff is:

(Take velocity of sound in air = 330 ms\(^{-1}\))

(1) 800 Hz
(2) 838 Hz
(3) 885 Hz
(4) 765 Hz

152. A body of mass 1 kg begins to move under the action of a time dependent force \(\mathbf{F} = (2t\mathbf{i} + 3t^2\mathbf{j}) \text{N}\), where \(\mathbf{i}\) and \(\mathbf{j}\) are unit vectors along \(x\) and \(y\) axis. What power will be developed by the force at the time \(t\)?

(1) \((2t^2 + 4t^3)\) W
(2) \((2t^3 + 3t^2)\) W
(3) \((2t^3 + 3t^2)\) W
(4) \((2t^2 + 3t^3)\) W

153. From a disc of radius \(R\) and mass \(M\), a circular hole of diameter \(K\), whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre?

(1) 13 MR\(^2\)/32
(2) 11 MR\(^2\)/32
(3) 9 MR\(^2\)/32
(4) 15 MR\(^2\)/32

154. In a diffraction pattern due to a single slit of width ‘\(a\)’, the first minimum is observed at an angle 30° when light of wavelength 5000 Å is incident on the slit. The first secondary maximum is observed at an angle of:

(1) \(\sin^{-1}\left(\frac{2}{3}\right)\)
(2) \(\sin^{-1}\left(\frac{1}{2}\right)\)
(3) \(\sin^{-1}\left(\frac{3}{4}\right)\)
(4) \(\sin^{-1}\left(\frac{1}{4}\right)\)

155. 800 Hz आवृत्ति की ध्वनि उत्सव करते बाल कोई सामने किसी प्रेसक से एक चट्टन का ओर 15 ms\(^{-1}\) की चाल से गति मिलता है। तब उस ध्वनि की आवृत्ति, जिसे चट्टन से प्रभावित प्रतिवधात के रूप में वह प्रेसक सुनता है, क्या होगी?

(अनुया में ध्वनि की चाल = 330 ms\(^{-1}\) लेखिए)

(1) 800 Hz
(2) 838 Hz
(3) 885 Hz
(4) 765 Hz

155. 1 kg व्यापार का कोई पिंड किसी कालाधिपति बल \(\mathbf{F} = (2t\mathbf{i} + 3t^2\mathbf{j}) \text{N}\), यहाँ \(\mathbf{i}\) और \(\mathbf{j}\) वर्ष के अनुदिश मात्रक सदिश हैं, के अधीन गति आरम्भ करता है, तो समय \(t\) पर इस बल द्वारा विकसित शक्ति क्या होगी?

(1) \((2t^2 + 4t^3)\) W
(2) \((2t^3 + 3t^2)\) W
(3) \((2t^3 + 3t^2)\) W
(4) \((2t^2 + 3t^3)\) W

153. व्यापार \(M\) तथा क्रिया \(R\) की किसी डिस्क से \(R\) व्यास का कोई वृत्तकार छिद्र इस प्रकार काटा जाता है कि उसकी नेटि डिस्क के केंद्र से गुजरे। डिस्क के शेष भाग का, डिस्क के लम्बवट उसके केंद्र से गुजरने वाले अक्ष के परिसर जड़व आवृत्ति क्या है?

(1) 13 MR\(^2\)/32
(2) 11 MR\(^2\)/32
(3) 9 MR\(^2\)/32
(4) 15 MR\(^2\)/32

154. जब चौकाई ‘\(a\)’ को किसी एकल छिद्री पर 5000 Å तरंगदैर्घ्य का प्रकाश आमतौर पर काटता है, तो छिद्रों के कारण उत्सव विविधता पैटर्न में 30° के कोण पर पहला निम्नित दिखाई देता है। पहला द्वितीय उच्चतम जिस कोण पर दिखाई देगा, वह है:

(1) \(\sin^{-1}\left(\frac{2}{3}\right)\)
(2) \(\sin^{-1}\left(\frac{1}{2}\right)\)
(3) \(\sin^{-1}\left(\frac{3}{4}\right)\)
(4) \(\sin^{-1}\left(\frac{1}{4}\right)\)
155. A square loop ABCD carrying a current $i$, is placed near and coplanar with a long straight conductor XY carrying a current $I$, the net force on the loop will be:

\[(2) \frac{2\mu_0 liL}{3\pi}\]

156. A black body is at a temperature of 5760 K. The energy of radiation emitted by the body at wavelength 250 nm is $U_1$, at wavelength 500 nm is $U_2$ and that at 1000 nm is $U_3$. Wien's constant, $b = 2.88 \times 10^6$ nmK. Which of the following is correct?

\[
\begin{align*}
(1) & \quad U_3 = 0 \\
(2) & \quad U_1 > U_2 \\
(3) & \quad U_2 > U_1 \\
(4) & \quad U_1 = 0 
\end{align*}
\]

157. An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50 cm. The next larger length of the column resonating with the same tuning fork is:

\[
\begin{align*}
(1) & \quad 100 \text{ cm} \\
(2) & \quad 150 \text{ cm} \\
(3) & \quad 200 \text{ cm} \\
(4) & \quad 66.7 \text{ cm} 
\end{align*}
\]
A npn transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800 Ω is connected in the collector circuit and the voltage drop across it is 0.8 V. If the current through the collector is 10 mA and the power gain of the amplifier is 0.96 and the input resistance of the circuit is 192 kΩ, the voltage gain and the power gain of the amplifier will respectively be:

(1) 3.69, 3.84
(2) 4, 4
(3) 4, 3.69
(4) 3.84, 4

A astronomical telescope has an objective and eyepiece of focal lengths 40 cm and 4 cm respectively. To view an object 200 cm away from the objective, the lenses must be separated by a distance:

(1) 46.0 cm
(2) 50.0 cm
(3) 54.0 cm
(4) 37.3 cm

If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is:

(1) 90°
(2) 45°
(3) 180°
(4) 0°
163. A gas is compressed isothermally to half its initial volume. The same gas is compressed separately through an adiabatic process until its volume is again reduced to half. Then:

1. Compressing the gas through adiabatic process will require more work to be done.
2. Compressing the gas isothermally or adiabatically will require the same amount of work.
3. Which of the case (whether compression through isothermal or through adiabatic process) requires more work will depend upon the atomicity of the gas.
4. Compressing the gas isothermally will require more work to be done.

164. A long straight wire of radius \(a\) carries a steady current \(I\). The current is uniformly distributed over its cross-section. The ratio of the magnetic fields \(B\) and \(B'\), at radial distances \(\frac{a}{2}\) and \(2a\) respectively, from the axis of the wire is:

1. \(\frac{1}{2}\)
2. 1
3. 4
4. \(\frac{1}{4}\)

165. Match the corresponding entries of column 1 with column 2. [Where \(m\) is the magnification produced by the mirror]

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) (m = -2)</td>
<td>(a) Convex mirror</td>
</tr>
<tr>
<td>(B) (m = -\frac{1}{2})</td>
<td>(b) Concave mirror</td>
</tr>
<tr>
<td>(C) (m = +2)</td>
<td>(c) Real image</td>
</tr>
<tr>
<td>(D) (m = +\frac{1}{2})</td>
<td>(d) Virtual image</td>
</tr>
</tbody>
</table>

| 1 | A → a and c; B → a and d; C → a and b; D → c and d |
| 2 | A → a and d; B → b and c; C → b and d; D → b and c |
| 3 | A → c and d; B → b and d; C → b and c; D → a and d |
| 4 | A → b and c; B → b and c; C → b and d; D → a and d |

166. किसी गैस को समतापिय रूप से उसके आधे आयाम से \(\frac{1}{2}\) संपीडित किया जाता है। इसी गैस को पृथक रूप से रूढ़िश प्रक्रिया द्वारा उसके आधे आयाम तक संपीडित किया जाता तब:

1. गैस को रूढ़िश प्रक्रिया द्वारा संपीडित करने में अधिक कार्य करने की आवश्यकता होगी।
2. गैस को समतापिय प्रक्रिया अथवा रूढ़िश प्रक्रिया द्वारा ही समान कार्य करने की आवश्यकता होगी।
3. चाहे समतापिय प्रक्रिया द्वारा संपीडित करने अथवा रूढ़िश प्रक्रिया द्वारा संपीडित करने, किस प्रक्रिया में अधिक कार्य करने की आवश्यकता होगी, वह गैस की प्रतिभा पर निर्भर करेगा।
4. गैस को समतापिय प्रक्रिया द्वारा संपीडित करने में अधिक कार्य करने की आवश्यकता होगी।

166. किसी \(a\) के किसी लंबे सिंधु तार से कोई स्पर्शी धारा प्रवाहित हो रही है। इस तार की अनुप्रस्थ कार्य \(\frac{a}{2}\) एकसमान रूप से वितरित है। तार के अंश से किसी दूरी \(\frac{a}{2}\) और \(2a\) पर क्रमशः सुबंधित क्षेत्रों \(B\) और \(B'\) का अनुपात:

1. \(\frac{1}{2}\)
2. 1
3. 4
4. \(\frac{1}{4}\)

166. कॉलम-1 की संगत प्रविष्टियों का मिलान कॉलम-2 प्रविष्टियों से कैशिये। यहाँ 'म' दर्शाया उपर आया है।

<table>
<thead>
<tr>
<th>कॉलम - 1</th>
<th>कॉलम - 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) (m = -2)</td>
<td>(a) उत्तल दर्शन</td>
</tr>
<tr>
<td>(B) (m = -\frac{1}{2})</td>
<td>(b) अवतल दर्शन</td>
</tr>
<tr>
<td>(C) (m = +2)</td>
<td>(c) वास्तविक प्रति तिया</td>
</tr>
<tr>
<td>(D) (m = +\frac{1}{2})</td>
<td>(d) आभासी प्रति तिया</td>
</tr>
</tbody>
</table>

| 1 | A → a \(\cap\) c; B → a \(\cap\) d; C → a \(\cap\) b; D → c \(\cap\) d |
| 2 | A → a \(\cap\) d; B → b \(\cap\) c; C → b \(\cap\) d; D → b \(\cap\) c |
| 3 | A → c \(\cap\) d; B → b \(\cap\) d; C → b \(\cap\) c; D → a \(\cap\) d |
| 4 | A → b \(\cap\) c; B → b \(\cap\) c; C → b \(\cap\) d; D → a \(\cap\) d |
166. If the velocity of a particle is \( v = At + Bt^2 \), where \( A \) and \( B \) are constants, then the distance travelled by it between 1s and 2s is:

1. \( 3A + 7B \)
2. \( \frac{3}{2}A + \frac{7}{3}B \)
3. \( \frac{A}{2} + \frac{B}{3} \)
4. \( \frac{3}{2}A + 4B \)

167. A disk and a sphere of same radius but different masses roll off on two inclined planes of the same altitude and length. Which one of the two objects gets to the bottom of the plane first?

1. Sphere
2. Both reach at the same time
3. Depends on their masses
4. Disk

168. Two identical charged spheres suspended from a common point by two massless strings of lengths \( l \), are initially at a distance \( d \) (\( d < < l \)) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity \( v \). Then \( v \) varies as a function of the distance \( x \) between the spheres, as:

1. \( v \propto x \)
2. \( v \propto \frac{1}{x^2} \)
3. \( v \propto \frac{1}{x} \)
4. \( v \propto x^2 \)

169. A particle moves so that its position vector is given by \( \vec{r} = \cos \omega t \hat{x} + \sin \omega t \hat{y} \). Where \( \omega \) is a constant.

Which of the following is true?

1. Velocity and acceleration both are parallel to \( \vec{r} \).
2. Velocity is perpendicular to \( \vec{r} \) and acceleration is directed towards the origin.
3. Velocity is perpendicular to \( \vec{r} \) and acceleration is directed away from the origin.
4. Velocity and acceleration both are perpendicular to \( \vec{r} \).
170. A piece of ice falls from a height $h$ so that it melts completely. Only one-quarter of the heat produced is absorbed by the ice and all energy of ice gets converted into heat during its fall. The value of $h$ is:

[Latent heat of ice is $3.4 \times 10^5$ J/kg and $g = 10$ N/kg]

(1) $544$ km
(2) $136$ km
(3) $68$ km
(4) $34$ km

171. A uniform circular disc of radius 50 cm at rest is free to turn about an axis which is perpendicular to its plane and passes through its centre. It is subjected to a torque which produces a constant angular acceleration of $2.0$ rad $s^{-2}$. Its net acceleration in ms$^{-2}$ at the end of $2.0$ s is approximately:

(1) $7.0$
(2) $6.0$
(3) $3.0$
(4) $8.0$

172. What is the minimum velocity with which a body of mass $m$ must enter a vertical loop of radius $R$ so that it can complete the loop?

(1) $\sqrt{2gR}$
(2) $\sqrt{3gR}$
(3) $\sqrt{5gR}$
(4) $\sqrt{gR}$

173. A small signal voltage $V(t) = V_0 \sin \omega t$ is applied across an ideal capacitor $C$:

(1) Over a full cycle the capacitor $C$ does not consume any energy from the voltage source.
(2) Current $I(t)$ is in phase with voltage $V(t)$.
(3) Current $I(t)$ leads voltage $V(t)$ by $180^\circ$.
(4) Current $I(t)$, lags voltage $V(t)$ by $90^\circ$.

174. A uniform circular disc of radius 50 cm at rest is free to turn about an axis which is perpendicular to its plane and passes through its centre. It is subjected to a torque which produces a constant angular acceleration of $2.0$ rad $s^{-2}$. Its net acceleration in ms$^{-2}$ at the end of $2.0$ s is approximately:

(1) $7.0$
(2) $6.0$
(3) $3.0$
(4) $8.0$

175. What is the minimum velocity with which a body of mass $m$ must enter a vertical loop of radius $R$ so that it can complete the loop?

(1) $\sqrt{2gR}$
(2) $\sqrt{3gR}$
(3) $\sqrt{5gR}$
(4) $\sqrt{gR}$

176. A small signal voltage $V(t) = V_0 \sin \omega t$ is applied across an ideal capacitor $C$:

(1) Over a full cycle the capacitor $C$ does not consume any energy from the voltage source.
(2) Current $I(t)$ is in phase with voltage $V(t)$.
(3) Current $I(t)$ leads voltage $V(t)$ by $180^\circ$.
(4) Current $I(t)$, lags voltage $V(t)$ by $90^\circ$.
174. A uniform rope of length $L$ and mass $m_1$ hangs vertically from a rigid support. A block of mass $m_2$ is attached to the free end of the rope. A transverse pulse of wavelength $\lambda_1$ is produced at the lower end of the rope. The wavelength of the pulse when it reaches the top of the rope is $\lambda_2$. The ratio $\lambda_2/\lambda_1$ is:

1. \[ \sqrt{\frac{m_1 + m_2}{m_2}} \]
2. \[ \sqrt{\frac{m_2}{m_1}} \]
3. \[ \sqrt{\frac{m_1 + m_2}{m_1}} \]
4. \[ \sqrt{\frac{m_1}{m_2}} \]

175. An inductor 20 mH, a capacitor 50 $\mu$F and a resistor 40 $\Omega$ are connected in series across a source of emf $V = 10 \sin 340t$. The power loss in A.C. circuit is:

1. 0.67 W
2. 0.76 W
3. 0.89 W
4. 0.51 W

176. An electron of mass $m$ and a photon have the same energy $E$. The ratio of de-Broglie wavelengths associated with them is:

1. \[ \left( \frac{E}{2m} \right)^{\frac{1}{2}} \]
2. \[ c \left( 2mE \right)^{\frac{1}{2}} \]
3. \[ \frac{1}{c} \left( \frac{2m}{E} \right)^{\frac{1}{2}} \]
4. \[ \frac{1}{c} \left( \frac{E}{2m} \right)^{\frac{1}{2}} \]

($c$ being velocity of light)
177. When an $\alpha$-particle of mass $'m'$ moving with velocity $'v'$ bombards on a heavy nucleus of charge $'Ze'$, its distance of closest approach from the nucleus depends on $m$ as:

(1) $\frac{1}{\sqrt{m}}$
(2) $\frac{1}{m^2}$
(3) $m$
(4) $\frac{1}{m}$

178. A refrigerator works between 4°C and 30°C. It is required to remove 600 calories of heat every second in order to keep the temperature of the refrigerated space constant. The power required is:

(Take $1 \text{cal} = 4.2 \text{Joules}$)

(1) 23.65 W
(2) 236.5 W
(3) 2365 W
(4) 2.365 W

179. A particle of mass 10 g moves along a circle of radius 6.4 cm with a constant tangential acceleration. What is the magnitude of this acceleration if the kinetic energy of the particle becomes equal to $8 \times 10^{-4}$ J by the end of the second revolution after the beginning of the motion?

(1) 0.15 m/s²
(2) 0.2 m/s²
(3) 0.18 m/s²
(4) 0.2 m/s²

180. The angle of incidence for a ray of light at a refracting surface of a prism is 45°. The angle of prism is 60°. If the ray suffers minimum deviation through the prism, the angle of minimum deviation and refractive index of the material of the prism respectively, are:

(1) 30°; $\sqrt{2}$
(2) 45°; $\sqrt{2}$
(3) 30°; $\frac{1}{\sqrt{2}}$
(4) 45°; $\frac{1}{\sqrt{2}}$
**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 Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.

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.

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**निम्नलिखित निर्देश ध्यान से पढ़ें:**

1. पूछे जाने पर प्रत्येक परीक्षार्थी, निरीक्षक को अपना प्रवेश-कार्ड दिखाएं।

2. अधीश्वर या निरीक्षक की विशेष अनुमति के बिना कोई परीक्षार्थी अपना स्थान न छोड़ें।

3. कार्यस्थल निरीक्षक को अपना उत्तर पत्र दिए बिना एवं उपस्थित-पत्रक पर दुबारा हस्ताक्षर किए बिना कोई परीक्षार्थी परीक्षा हॉल नहीं छोड़ें। यदि किसी परीक्षार्थी ने दूसरी बार उपस्थित-पत्रक पर हस्ताक्षर नहीं किया तो यह माना जाएगा कि उसके उत्तर पत्र नहीं लिखा है और यह अनुचित साधन का मामला माना जाएगा।

4. इलेक्ट्रॉनिक/हस्तचारित परीक्षक का उपयोग चूर्ण है।

5. परीक्षार्थी-हॉल में आवश्यक के लिए परीक्षार्थी बोर्ड के नियमों एवं विनियमों के अनुसार ही होगा। अनुचित साधन के सभी मामलों का पैला हॉल बोर्ड के नियमों एवं विनियमों के अनुसार होगा।

6. किसी हालत में परीक्षा पुर्तिका और उत्तर पत्र का कोई भाग अलग न करें।

7. परीक्षा पुर्तिका / उत्तर पत्र में दिए गए परीक्षा पुर्तिका संकेत को परीक्षार्थी सही तरीके से उपरस्थित-पत्र में लिखें।
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 Z. 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.

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

Name of the Candidate (in Capitals): GIRISH SUNDAR

Roll Number: in figures 64034168

Centre of Examination (in Capitals): B. V. R. VIDYASHRAM JAIPUR- 30

Candidate’s Signature: 
Invigilator’s Signature: 

Fascimile signature stamp of Centre Superintendent:
1. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 ms\(^{-1}\). Then, the frequency of sound that the observer hears in the echo reflected from the cliff is:

(Take velocity of sound in air = 330 ms\(^{-1}\))

\[
\begin{align*}
(1) & \quad 838 \text{ Hz} \\
(2) & \quad 885 \text{ Hz} \\
(3) & \quad 765 \text{ Hz} \\
(4) & \quad 800 \text{ Hz}
\end{align*}
\]

2. Out of the following options which one can be used to produce a propagating electromagnetic wave?

\[
\begin{align*}
(1) & \quad \text{A chargeless particle} \\
(2) & \quad \text{An accelerating charge} \\
(3) & \quad \text{A charge moving at constant velocity} \\
(4) & \quad \text{A stationary charge}
\end{align*}
\]

3. An inductor 20 mH, a capacitor 50 \(\mu\)F and a resistor 40 \(\Omega\) are connected in series across a source of emf \(V = 10 \sin 340 t\). The power loss in A.C. circuit is:

\[
\begin{align*}
(1) & \quad 0.76 \text{ W} \\
(2) & \quad 0.89 \text{ W} \\
(3) & \quad 0.51 \text{ W} \\
(4) & \quad 0.67 \text{ W}
\end{align*}
\]

4. Match the corresponding entries of column 1 with column 2. [Where \(m\) is the magnification produced by the mirror]

\[
\begin{align*}
\text{Column 1} & \quad \text{Column 2} \\
(A) & \quad m = -2 & (a) & \quad \text{Convex mirror} \\
(B) & \quad m = -\frac{1}{2} & (b) & \quad \text{Concave mirror} \\
(C) & \quad m = +2 & (c) & \quad \text{Real image} \\
(D) & \quad m = +\frac{1}{2} & (d) & \quad \text{Virtual image}
\end{align*}
\]

\[
\begin{align*}
(1) & \quad A \rightarrow a \text{ and } d; \quad B \rightarrow b \text{ and } c; \quad C \rightarrow b \text{ and } d; \quad D \rightarrow b \text{ and } c \\
(2) & \quad A \rightarrow c \text{ and } d; \quad B \rightarrow b \text{ and } d; \quad C \rightarrow b \text{ and } c; \quad D \rightarrow a \text{ and } d \\
(3) & \quad A \rightarrow b \text{ and } c; \quad B \rightarrow b \text{ and } c; \quad C \rightarrow b \text{ and } d; \quad D \rightarrow a \text{ and } d \\
(4) & \quad A \rightarrow a \text{ and } c; \quad B \rightarrow a \text{ and } d; \quad C \rightarrow a \text{ and } b; \quad D \rightarrow c \text{ and } d
\end{align*}
\]
5. Coefficient of linear expansion of brass and steel rods are $\alpha_1$ and $\alpha_2$. Lengths of brass and steel rods are $l_1$ and $l_2$ respectively. If $(l_2 - l_1)$ is maintained same at all temperatures, which one of the following relations holds good?

1. $\alpha_1^2 l_2 = \alpha_2^2 l_1$
2. $\alpha_1 l_1 = \alpha_2 l_2$
3. $\alpha_1 l_2 = \alpha_2 l_1$
4. $\alpha_1^2 l_2 = \alpha_2^2 l_2$

6. At what height from the surface of earth the gravitation potential and the value of $g$ are $-5.4 \times 10^7$ J kg$^{-2}$ and 6.0 ms$^{-2}$ respectively? Take the radius of earth as 6400 km:

1. 1400 km
2. 2000 km
3. 2600 km
4. 1600 km

7. A piece of ice falls from a height $h$ so that it melts completely. Only one-quarter of the heat produced is absorbed by the ice and all energy of ice gets converted into heat during its fall. The value of $h$ is: [Latent heat of ice is $3.4 \times 10^5$ J/kg and $g = 10$ N/kg]

1. 136 km
2. 68 km
3. 34 km
4. 544 km

8. In a diffraction pattern due to a single slit of width 'a', the first minimum is observed at an angle 30° when light of wavelength 5000 Å is incident on the slit. The first secondary maximum is observed at an angle of:

1. $\sin^{-1}\left(\frac{1}{2}\right)$
2. $\sin^{-1}\left(\frac{3}{4}\right)$
3. $\sin^{-1}\left(\frac{1}{4}\right)$
4. $\sin^{-1}\left(\frac{2}{3}\right)$
9. A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of emf’s is:

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

10. A particle of mass 10 g moves along a circle of radius 6.4 cm with a constant tangential acceleration. What is the magnitude of this acceleration if the kinetic energy of the particle becomes equal to $8 \times 10^{-4}$ J by the end of the second revolution after the beginning of the motion?

(1) 0.18 m/s$^2$
(2) 0.2 m/s$^2$
(3) 0.1 m/s$^2$
(4) 0.15 m/s$^2$

11. An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50 cm. The next larger length of the column resonating with the same tuning fork is:

(1) 150 cm
(2) 200 cm
(3) 66.7 cm
(4) 100 cm

12. To get output 1 for the following circuit, the correct choice for the input is:

```
A
B
C
```

(1) $A = 1, B = 1, C = 0$
(2) $A = 1, B = 0, C = 1$
(3) $A = 0, B = 1, C = 0$
(4) $A = 1, B = 0, C = 0$
13. A gas is compressed isothermally to half its initial volume. The same gas is compressed separately through an adiabatic process until its volume is again reduced to half. Then:

(1) Compressing the gas isothermally or adiabatically will require the same amount of work.

(2) Which of the case (whether compression through isothermal or through adiabatic process) requires more work will depend upon the atomicity of the gas.

(3) Compressing the gas isothermally will require more work to be done.

(4) Compressing the gas through adiabatic process will require more work to be done.

14. The intensity at the maximum in a Young’s double slit experiment is $I_0$. Distance between two slits is $d = 5\lambda$, where $\lambda$ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance $D = 10d$?

(1) $\frac{3}{4} I_0$

(2) $\frac{I_0}{2}$

(3) $I_0$

(4) $\frac{I_0}{4}$

15. A car is negotiating a curved road of radius $R$. The road is banked at an angle $\theta$. The coefficient of friction between the tyres of the car and the road is $\mu_s$. The maximum safe velocity on this road is:

(1) $\sqrt{\frac{g}{R} \frac{\mu_s + \tan \theta}{1 - \mu_s \tan \theta}}$

(2) $\sqrt{\frac{g}{R^2} \frac{\mu_s + \tan \theta}{1 - \mu_s \tan \theta}}$

(3) $\sqrt{\frac{gR^2}{1 - \mu_s \tan \theta}}$

(4) $\sqrt{\frac{gR}{\mu_s + \tan \theta}}$
16. An electron of mass \( m \) and a photon have same energy \( E \). The ratio of de-Broglie wavelengths associated with them is:

\[
\text{(1)} \quad \frac{1}{c} \left( \frac{2mE}{c^2} \right)^{\frac{1}{2}}
\]

\[
\text{(2)} \quad \frac{1}{c} \left( \frac{2mE}{E} \right)^{\frac{1}{2}}
\]

\[
\text{(3)} \quad \frac{1}{c} \left( \frac{E}{2m} \right)^{\frac{1}{2}}
\]

\[
\text{(4)} \quad \left( \frac{E}{2m} \right)^{\frac{1}{2}}
\]

\( c \) being velocity of light.

17. A black body is at a temperature of 5760 K. The energy of radiation emitted by the body at wavelength 250 nm is \( U_1 \), at wavelength 500 nm is \( U_2 \) and that at 1000 nm is \( U_3 \). Wien’s constant, \( b = 2.88 \times 10^6 \text{ nmK} \). Which of the following is correct?

\( U_1 > U_2 \)  
\( U_2 > U_1 \)  
\( U_1 = 0 \)  
\( U_3 = 0 \)

18. Given the value of Rydberg constant is \( 10^7 \text{ m}^{-1} \), the wave number of the last line of the Balmer series in hydrogen spectrum will be:

\( 0.25 \times 10^7 \text{ m}^{-1} \)  
\( 2.5 \times 10^7 \text{ m}^{-1} \)  
\( 0.025 \times 10^4 \text{ m}^{-1} \)  
\( 0.5 \times 10^7 \text{ m}^{-1} \)

19. A npn transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800 \( \Omega \) is connected in the collector circuit and the voltage drop across it is 0.8 V. If the current amplification factor is 0.96 and the input resistance of the circuit is 192 \( \Omega \), the voltage gain and the power gain of the amplifier will respectively be:

\( 4, 4 \)  
\( 4, 3.69 \)  
\( 4, 3.84 \)  
\( 3.69, 3.84 \)
20. Two non-mixing liquids of densities \( p \) and \( np \) \( (n > 1) \) are put in a container. The height of each liquid is \( h \). A solid cylinder of length \( L \) and density \( d \) is put in this container. The cylinder floats with its axis vertical and length \( pL \) \( (p < 1) \) in the denser liquid. The density \( d \) is equal to:

(1) \( (2 + (n-1)p)p \)
(2) \( (1 + (n-1)p)p \)
(3) \( (1 + (n+1)p)p \)
(4) \( (2 + (n+1)p)p \)

21. If the velocity of a particle is \( v = At + Bt^2 \), where \( A \) and \( B \) are constants, then the distance travelled by it between 1s and 2s is:

(1) \( \frac{3}{2}A + \frac{7}{3}B \)
(2) \( \frac{2}{3}A + \frac{B}{3} \)
(3) \( \frac{3}{2}A + 4B \)
(4) \( 3A + 7B \)

22. A astronomical telescope has objective and eyepiece of focal lengths 40 cm and 4 cm respectively. To view an object 200 cm away from the objective, the lenses must be separated by a distance:

(1) 50.0 cm
(2) 54.0 cm
(3) 37.3 cm
(4) 46.0 cm

23. The ratio of escape velocity at earth (\( v_e \)) to the escape velocity at a planet (\( v_p \)) whose radius and mean density are twice as that of earth is:

(1) 1 : 4
(2) 1 : \( \sqrt{2} \)
(3) 1 : 2
(4) 1 : 2\( \sqrt{2} \)

24. A long straight wire of radius \( a \) carries a steady current \( I \). The current is uniformly distributed over its cross-section. The ratio of the magnetic fields \( B \) and \( B' \), at radial distances \( \frac{a}{2} \) and \( 2a \) respectively, from the axis of the wire is:

(1) 1
(2) 4
(3) \( \frac{1}{4} \)
(4) \( \frac{1}{2} \)
25. A capacitor of 2 μF is charged as shown in the diagram. When the switch S is turned to position 2, the percentage of its stored energy dissipated is:

(1) 75%
(2) 80%
(3) 0%
(4) 20%

26. When a metallic surface is illuminated with radiation of wavelength λ, the stopping potential is V. If the same surface is illuminated with radiation of wavelength 2λ, the stopping potential is $\frac{V}{4}$. The threshold wavelength for the metallic surface is:

(1) $\frac{5}{2} \lambda$
(2) 3 λ
(3) 4 λ
(4) 5 λ

27. If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is:

(1) 45°
(2) 180°
(3) 0°
(4) 90°

28. A body of mass 1 kg begins to move under the action of a time dependent force $\vec{F} = (2t \hat{i} + 3t^2 \hat{j})$ N, where $\hat{i}$ and $\hat{j}$ are unit vectors along x and y axis. What power will be developed by the force at the time t?

(1) $(2t^3 + 3t^4) W$
(2) $(2t^3 + 3t^5) W$
(3) $(2t^2 + 3t^5) W$
(4) $(2t^2 + 4t^5) W$
29. The angle of incidence for a ray of light at a refracting surface of a prism is 45°. The angle of prism is 60°. If the ray suffers minimum deviation through the prism, the angle of minimum deviation and refractive index of the material of the prism respectively, are:

(1) 45°; √2
(2) 30°; 1/√2
(3) 45°; 1/√2
(4) 30°; √2

30. A particle moves so that its position vector is given by \( \vec{r} = \cos \omega t \hat{x} + \sin \omega t \hat{y} \). Where \( \omega \) is a constant.
Which of the following is true?

(1) Velocity is perpendicular to \( \vec{r} \) and acceleration is directed towards the origin.
(2) Velocity is perpendicular to \( \vec{r} \) and acceleration is directed away from the origin.
(3) Velocity and acceleration both are perpendicular to \( \vec{r} \).
(4) Velocity and acceleration both are parallel to \( \vec{r} \).

31. Consider the junction diode as ideal. The value of current flowing through AB is:

\[ \frac{+4 \text{ V}}{A} \quad \frac{1 \text{ kΩ}}{\text{1 kΩ}} \quad \frac{-6 \text{ V}}{B} \]

(1) 10⁻¹ A
(2) 10⁻³ A
(3) 0 A
(4) 10⁻² A

32. Two identical charged spheres suspended from a common point by two massless strings of lengths \( l \), are initially at a distance \( d \) (\( d < l \)) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity \( v \). Then \( v \) varies as a function of the distance \( x \) between the spheres, as:

(1) \( v \propto x^{-1/2} \)
(2) \( v \propto x^{-1} \)
(3) \( v \propto x^1 \)
(4) \( v \propto x \)
33. A small signal voltage \( V(t) = V_0 \sin \omega t \) is applied across an ideal capacitor \( C \):
   (1) Current \( I(t) \) is in phase with voltage \( V(t) \).
   (2) Current \( I(t) \) leads voltage \( V(t) \) by 180°.
   (3) Current \( I(t) \), lags voltage \( V(t) \) by 90°.
   (4) Over a full cycle the capacitor \( C \) does not consume any energy from the voltage source.

34. The magnetic susceptibility is negative for:
   (1) ferromagnetic material only
   (2) paramagnetic and ferromagnetic materials
   (3) diamagnetic material only
   (4) paramagnetic material only

35. A square loop ABCD carrying a current \( i \), is placed near and coplanar with a long straight conductor XY carrying a current \( I \), the net force on the loop will be:

   \( F = B i L \)

   (1) \( \frac{2\mu_0 iL}{3\pi} \)
   (2) \( \frac{\mu_0 iL}{2\pi} \)
   (3) \( \frac{2\mu_0 iL}{3\pi} \)
   (4) \( \frac{\mu_0 iL}{2\pi} \)

36. A uniform rope of length \( L \) and mass \( m_1 \) hangs vertically from a rigid support. A block of mass \( m_2 \) is attached to the free end of the rope. A transverse pulse of wavelength \( \lambda_1 \) is produced at the lower end of the rope. The wavelength of the pulse when it reaches the top of the rope is \( \lambda_2 \). The ratio \( \lambda_2 / \lambda_1 \) is:

   (1) \( \sqrt{\frac{m_2}{m_1}} \)
   (2) \( \sqrt{\frac{m_1 + m_2}{m_1}} \)
   (3) \( \sqrt{\frac{m_1}{m_2}} \)
   (4) \( \sqrt{\frac{m_1 + m_2}{m_2}} \)
37. When an α-particle of mass ‘m’ moving with velocity ‘v’ bombards on a heavy nucleus of charge ‘Ze’, its distance of closest approach from the nucleus depends on m as:

- (1) \( \frac{1}{m^2} \)
- (2) \( m \)
- (3) \( \frac{1}{m} \)
- (4) \( \frac{1}{\sqrt{m}} \)

38. A disk and a sphere of same radius but different masses roll off on two inclined planes of the same altitude and length. Which one of the two objects gets to the bottom of the plane first?

- (1) Both reach at the same time
- (2) Depends on their masses
- (3) Disk
- (4) Sphere

39. From a disc of radius R and mass M, a circular hole of diameter R, whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre?

- (1) \( 11 \text{MR}^2/32 \)
- (2) \( 9 \text{MR}^2/32 \)
- (3) \( 15 \text{MR}^2/32 \)
- (4) \( 13 \text{MR}^2/32 \)

40. A long solenoid has 1000 turns. When a current of 4A flows through it, the magnetic flux linked with each turn of the solenoid is \( 4 \times 10^{-3} \text{ Wb} \). The self-inductance of the solenoid is:

- (1) \( 2 \text{ H} \)
- (2) \( 1 \text{ H} \)
- (3) \( 4 \text{ H} \)
- (4) \( 3 \text{ H} \)

41. What is the minimum velocity with which a body of mass m must enter a vertical loop of radius R so that it can complete the loop?

- (1) \( \sqrt{3gR} \)
- (2) \( \sqrt{5gR} \)
- (3) \( \sqrt{gR} \)
- (4) \( \sqrt[2]{2gR} \)
42. The molecules of a given mass of a gas have r.m.s. velocity of 200 m s$^{-1}$ at 27°C and 1.0$ \times $ 10$^5$ N m$^{-2}$ pressure. When the temperature and pressure of the gas are respectively, 127°C and 0.05$ \times $ 10$^5$ N m$^{-2}$, the r.m.s. velocity of its molecules in m s$^{-1}$ is:

(1) $\frac{100\sqrt{2}}{3}$
(2) $100$
(3) $100\sqrt{2}$
(4) $\frac{400}{\sqrt{3}}$

43. The charge flowing through a resistance $R$ varies with time $t$ as $Q = at - bt^2$, where $a$ and $b$ are positive constants. The total heat produced in $R$ is:

(1) $\frac{a^3 R}{2b}$
(2) $\frac{a^3 R}{b}$
(3) $\frac{a^3 R}{6b}$
(4) $\frac{a^3 R}{3b}$

44. A refrigerator works between 4°C and 30°C. It is required to remove 600 calories of heat every second in order to keep the temperature of the refrigerated space constant. The power required is:

(1) 236.5 W
(2) 2365 W
(3) 2.365 W
(4) 23.65 W

45. A uniform circular disc of radius 50 cm at rest is free to turn about an axis which is perpendicular to its plane and passes through its centre. It is subjected to a torque which produces a constant angular acceleration of 2.0 rad s$^{-2}$. Its net acceleration in ms$^{-2}$ at the end of 2.0 s is approximately:

(1) 6.0
(2) 3.0
(3) 8.0
(4) 7.0
46. Which of the following would appear as the pioneer organisms on bare rocks?
   (1) Mosses
   (2) Green algae
   (3) Lichens
   (4) Liverworts

47. Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using one of the following options:
   (1) The above processes happen only during night time.
   (2) One process occurs during day time, and the other at night.
   (3) Both processes cannot happen simultaneously.
   (4) Both processes can happen together because the diffusion coefficient of water and CO₂ is different.

48. Lack of relaxation between successive stimuli in sustained muscle contraction is known as:
   (1) Tetanus
   (2) Tonus
   (3) Spasm
   (4) Fatigue

49. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers:
   (1) Ammonia
   (2) Methane
   (3) Nitrous oxide
   (4) Ozone

50. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature?
   (1) The names are written in Latin and are italicised
   (2) When written by hand, the names are to be underlined
   (3) Biological names can be written in any language
   (4) The first word in a biological name represents the genus name, and the second is a specific epithet
51. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in:

(1) Somaclonal variation
(2) Polyteny
(3) Aneuploidy
(4) Polyploidy

52. The two polypeptides of human insulin are linked together by:

(1) Covalent bond
(2) Disulphide bridges
(3) Hydrogen bonds
(4) Phosphodiester bond

53. Reduction in pH of blood will:

(1) decrease the affinity of hemoglobin with oxygen.
(2) release bicarbonate ions by the liver.
(3) reduce the rate of heart beat.
(4) reduce the blood supply to the brain.

54. In a chloroplast the highest number of protons are found in:

(1) Intermembrane space
(2) Antennae complex
(3) Stroma
(4) Lumen of thylakoids

55. Which type of tissue correctly matches with its location?

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transitional epithelium</td>
<td>Tip of nose</td>
</tr>
<tr>
<td>Cuboidal epithelium</td>
<td>Lining of stomach</td>
</tr>
<tr>
<td>Smooth muscle</td>
<td>Wall of intestine</td>
</tr>
<tr>
<td>Areolar tissue</td>
<td>Tendons</td>
</tr>
</tbody>
</table>

56. Which of the following pairs of hormones are not antagonistic (having opposite effects) to each other?

(1) Aldosterone - Atrial Natriuretic Factor
(2) Relaxin - Inhibin
(3) Parathormone - Calcitonin
(4) Insulin - Glucagon
57. In mammals, which blood vessel would normally carry largest amount of urea?
(1) Hepatic Vein
(2) Hepatic Portal Vein
(3) Renal Vein
(4) Dorsal Aorta

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

59. Which of the following approaches does not give the defined action of contraceptive?

<table>
<thead>
<tr>
<th>Number</th>
<th>Approach</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hormonal contraceptives</td>
<td>Prevent/retard entry of sperms, prevent ovulation and fertilization</td>
</tr>
<tr>
<td>2</td>
<td>Vasectomy</td>
<td>Prevents spermatogenesis</td>
</tr>
<tr>
<td>3</td>
<td>Barrier methods</td>
<td>Prevent fertilization</td>
</tr>
<tr>
<td>4</td>
<td>Intra-uterine devices</td>
<td>Increase phagocytosis of sperms, suppress sperm motility and fertilizing capacity of sperms</td>
</tr>
</tbody>
</table>

60. Which one of the following characteristics is not shared by birds and mammals?
(1) Viviparity
(2) Warm blooded nature
(3) Ossified endoskeleton
(4) Breathing using lungs

57. स्तनधारियों में, कौन-सी संधिएं-वाहिका सामान्यत: सबसे अधिक यूरिया बनाकर करती है?
(1) प्रकृति - विशाल
(2) प्रकृति विशालकाल विशाल
(3) प्रकृति - विशाल
(4) प्रकृति महाप्राण

58. सही कब्ज़ा चुनिएः
(a) हीमोफिलिया लिंग-सहलन अप्रभावी रोग है।
(b) डाउन सिंड्रोम असमाप्तिता के कारण होता है।
(c) फेनिलकैटोनीया (फिनाइलकैटोनिया) एक अलिंग सूजी अप्रभावी जीन विकार है।
(d) दात कोशिका स्वतंत्रता X-सहलन अप्रभावी जीन विकार है।
(1) (a), (c) और (d) सही हैं।
(2) (a), (b) और (c) सही हैं।
(3) (a) और (d) सही हैं।
(4) (b) और (d) सही हैं।

59. निम्नलिखित उपायों में से कौन-सा उपाय किसी गर्भनिरोधक को मार्गित किया नहीं बताता?

<table>
<thead>
<tr>
<th>नंबर</th>
<th>उपाय</th>
<th>गर्भनिरोधक का प्रभाव को शेख करने हेतु उसके दर को धीरा करने हेतु, अंधोत्तर और विगतच नहीं होने देने।</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>होमोग्नी गर्भनिरोधक</td>
<td>शुक्राणों के प्रभाव को रोकने हेतु/उसके दर को धीरा करने हेतु, अंदोत्तर और विगतच नहीं होने देने।</td>
</tr>
<tr>
<td>2</td>
<td>शुक्राणु उद्धेदन</td>
<td>शुक्राणु होने नहीं होने देने।</td>
</tr>
<tr>
<td>3</td>
<td>रेड (बैरियर) विषय विभेदन वेष्क्य</td>
<td>शुक्राणुओं को अप्रभावी करने के लिए देने।</td>
</tr>
<tr>
<td>4</td>
<td>अंत: गर्भनिरोधक युक्तक्त्व</td>
<td>शुक्राणुओं को अप्रभावी करने के लिए देने।</td>
</tr>
</tbody>
</table>

60. निम्नलिखित लक्षणों में से कौन-सा एक लक्षण पक्षियों और स्तनधारियों दोनों में नहीं पाया जाता है?
(1) समृद्धप्रकारता
(2) निर्याततापी प्रकृति
(3) अस्तित्वपुरुष अंत:कंकाल
(4) फेफड़ों द्वारा श्वसन
61. Emerson's enhancement effect and Red drop have been instrumental in the discovery of:
(1) Photophosphorylation and cyclic electron transport
(2) Oxidative phosphorylation
(3) Photophosphorylation and non-cyclic electron transport
(4) Two photosystems operating simultaneously

62. In which of the following, all three are macronutrients?
(1) Molybdenum, magnesium, manganese
(2) Nitrogen, nickel, phosphorus
(3) Boron, zinc, manganese
(4) Iron, copper, molybdenum

63. Changes in GnRH pulse frequency in females is controlled by circulating levels of:
(1) progesterone only
(2) progesterone and inhibin
(3) estrogen and progesterone
(4) estrogen and inhibin

64. The coconut water from tender coconut represents:
(1) Free nuclear proembryo
(2) Free nuclear endosperm
(3) Endocarp
(4) Fleshy mesocarp

65. Which of the following guards the opening of hepatopancreatic duct into the duodenum?
(1) Pyloric sphincter
(2) Sphincter of Oddi
(3) Semilunar valve
(4) Ileocaecal valve

66. Which one of the following is the starter codon?
(1) UAA
(2) UAG
(3) AUG
(4) UGA

67. Spindle fibres attach on to:
(1) Centromere of the chromosome
(2) Kinetosome of the chromosome
(3) Telomere of the chromosome
(4) Kinetochore of the chromosome
68. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F1 plants were selfed the resulting genotypes were in the ratio of:

(1) 3:1: Tall : Dwarf
(2) 3:1: Dwarf : Tall
(3) 1:2:1: Tall homozygous : Tall heterozygous : Dwarf
(4) 1:2:1: Tall heterozygous : Tall homozygous : Dwarf

69. A typical fat molecule is made up of:

(1) One glycerol and one fatty acid molecule
(2) Three glycerol and three fatty acid molecules
(3) Three glycerol molecules and one fatty acid molecule
(4) One glycerol and three fatty acid molecules

70. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called:

(1) Strip farming
(2) Shifting agriculture
(3) Ley farming
(4) Contour farming

71. Which of the following is not a stem modification?

(1) Tendrils of cucumber
(2) Flattened structures of Opuntia
(3) Pitcher of Nepenthes
(4) Thorns of citrus

72. Which of the following features is not present in Periplaneta americana?

(1) Exoskeleton composed of N-acetylg glucosamine
(2) Metamerically segmented body
(3) Schizocoelom as body cavity
(4) Indeterminate and radial cleavage during embryonic development

73. Name the chronic respiratory disorder caused mainly by cigarette smoking:

(1) Respiratory acidosis
(2) Respiratory alkalosis
(3) Emphysema
(4) Asthma
74. Which one of the following statements is not true?
(1) Pollen grains of many species cause severe allergies.
(2) Stored pollen in liquid nitrogen can be used in the crop breeding programmes.
(3) Tapetum helps in the dehiscence of anther.
(4) Exine of pollen grains is made up of sporopollenin.

75. Which of the following is required as inducer(s) for the expression of Lac operon?
(1) lactose
(2) lactose and galactose
(3) glucose
(4) galactose

76. Mitochondria and chloroplast are:
(a) semi-autonomous organelles.
(b) formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery.
Which one of the following options is correct?
(1) (a) is true but (b) is false.
(2) Both (a) and (b) are false.
(3) Both (a) and (b) are correct.
(4) (b) is true but (a) is false.

77. It is much easier for a small animal to run uphill than for a large animal, because:
(1) Small animals have a lower O₂ requirement.
(2) The efficiency of muscles in large animals is less than in the small animals.
(3) It is easier to carry a small body weight.
(4) Smaller animals have a higher metabolic rate.

78. Seed formation without fertilization in flowering plants involves the process of:
(1) Somatic hybridization
(2) Apomixis
(3) Sporulation
(4) Budding
79. The *Avena* curvature is used for bioassay of:
   (1) IAA
   (2) Ethylene
   (3) ABA
   (4) GA$_3$

80. A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilisation. In which of the following physiological groups would you assign this plant?
   (1) CAM
   (2) Nitrogen fixer
   (3) C$_3$
   (4) C$_4$

81. Which is the National Aquatic Animal of India?
   (1) Blue whale
   (2) Sea-horse
   (3) Gangetic shark
   (4) River dolphin

82. Which of the following is not a feature of the plasmids?
   (1) Transferable
   (2) Single-stranded
   (3) Independent replication
   (4) Circular structure

83. The amino acid Tryptophan is the precursor for the synthesis of:
   (1) Estrogen and Progesterone
   (2) Cortisol and Cortisone
   (3) Melatonin and Serotonin
   (4) Thyroxine and Triiodothyronine

84. Joint Forest Management Concept was introduced in India during:
   (1) 1980s
   (2) 1990s
   (3) 1960s
   (4) 1970s
85. Water soluble pigments found in plant cell vacuoles are:
   (1) Carotenoids
   (2) Anthocyanins
   (3) Xanthophylls
   (4) Chlorophylls

86. Which one of the following is a characteristic feature of cropland ecosystem?
   (1) Absence of weeds
   (2) Ecological succession
   (3) Absence of soil organisms
   (4) Least genetic diversity

87. Which of the following characteristic features always holds true for the corresponding group of animals?

| (1) Possess a mouth with an upper and a lower jaw | Chordata |
| (2) 3-chambered heart with one incompletely divided ventricle | Reptilia |
| (3) Cartilaginous endoskeleton | Chondrichthyes |
| (4) Viviparous | Mammalia |

88. The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the:
   (1) Methanogens
   (2) Eubacteria
   (3) Halophiles
   (4) Thermoacidophiles

89. Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain:
   (1) Gamma globulin
   (2) Attenuated pathogens
   (3) Activated pathogens
   (4) Harvested antibodies
90. When does the growth rate of a population following the logistic model equal zero? The logistic model is given as $\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right)$:

1. when $N/K$ equals zero.
2. when death rate is greater than birth rate.
3. when $N/K$ is exactly one.
4. when $N$ nears the carrying capacity of the habitat.

91. Which one of the following statements is wrong?

1. Uracil is a pyrimidine.
2. Glycine is a sulphur containing amino acid.
3. Sucrose is a disaccharide.
4. Cellulose is a polysaccharide.

92. The taq polymerase enzyme is obtained from:

1. *Bacillus subtilis*
2. *Pseudomonas putida*
3. *Thermus aquaticus*
4. *Thiobacillus ferrooxidans*

93. Gause's principle of competitive exclusion states that:

1. No two species can occupy the same niche indefinitely for the same limiting resources.
2. Larger organisms exclude smaller ones through competition.
3. More abundant species will exclude the less abundant species through competition.
4. Competition for the same resources excludes species having different food preferences.
94. Stems modified into flat green organs performing the functions of leaves are known as:
(1) Phylloclades
(2) Scales
(3) Cladodes
(4) Phyllodes

95. Which part of the tobacco plant is infected by *Meloidogyne incognita*?
(1) Stem
(2) Root
(3) Flower
(4) Leaf

96. Fertilization in humans is practically feasible only if:
(1) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the cervix.
(2) the sperms are transported into cervix within 48 hrs of release of ovum in uterus.
(3) the sperms are transported into vagina just after the release of ovum in fallopian tube.
(4) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the fallopian tube.

97. Which of the following statements is not true for cancer cells in relation to mutations?
(1) Mutations inactivate the cell control.
(2) Mutations inhibit production of telomerase.
(3) Mutations in proto-oncogenes accelerate the cell cycle.
(4) Mutations destroy telomerase inhibitor.

98. Which of the following structures is homologous to the wing of a bird?
(1) Hind limb of Rabbit
(2) Flipper of Whale
(3) Dorsal fin of a Shark
(4) Wing of a Moth
99. Match the terms in Column I with their description in Column II and choose the correct option:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Dominance</td>
<td>(i) Many genes govern a single character</td>
</tr>
<tr>
<td>(b) Codominance</td>
<td>(ii) In a heterozygous organism only one allele expresses itself</td>
</tr>
<tr>
<td>(c) Pleiotropy</td>
<td>(iii) In a heterozygous organism both alleles express themselves fully</td>
</tr>
<tr>
<td>(d) Polygenic</td>
<td>(iv) A single gene influences many characters</td>
</tr>
</tbody>
</table>

Code:

(a) (b) (c) (d)

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

100. Which of the following is wrongly matched in the given table?

<table>
<thead>
<tr>
<th>Microbe</th>
<th>Product</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptococcus</td>
<td>Streptokinase</td>
<td>removal of clot from blood vessel</td>
</tr>
<tr>
<td>Clostridium</td>
<td>Lipase</td>
<td>removal of oil stains</td>
</tr>
<tr>
<td>Trichoderma</td>
<td>Cyclosporin A</td>
<td>immunosuppressive drug</td>
</tr>
<tr>
<td>Monascus</td>
<td>Statins</td>
<td>lowering of blood cholesterol</td>
</tr>
</tbody>
</table>

101. Select the incorrect statement:

(1) LH and FSH decrease gradually during the follicular phase.
(2) LH triggers secretion of androgens from the Leydig cells.
(3) FSH stimulates the sertoli cells which help in spermiogenesis.
(4) LH triggers ovulation in ovary.

101. गलत कथन को सुनिते:

(1) LH और FSH पुरुष-अवस्था के दौरान धीरे-धीरे घटता जाता है।
(2) LH लीडिंग कोशिकाओं से एंड्रोजन के स्वाभिः को प्रेरित करता है।
(3) FSH सेटोली कोशिकाओं को उद्मित करता है जो शुक्रापुष्पण में सहायता करता है।
(4) LH अंडाशय में अंडोस्लेज को प्रेरित करता है।
102. Which of the following is a restriction endonuclease?

(1) DNase I
(2) RNase
(3) Hind II
(4) Protease

103. Microtubules are the constituents of:

(1) Centrioles, Spindle fibres and Chromatin
(2) Centrosome, Nucleosome and Centrioles
(3) Cilia, Flagella and Peroxisomes
(4) Spindle fibres, Centrioles and Cilia

104. Select the correct statement:

(1) *Sequoia* is one of the tallest trees
(2) The leaves of gymnosperms are not well adapted to extremes of climate
(3) Gymnosperms are both homosporous and heterosporous
(4) *Salvinia, Ginkgo* and *Pinus* all are gymnosperms

105. In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self-cells, then it leads to:

(1) Auto-immune disease
(2) Active immunity
(3) Allergic response
(4) Graft rejection

106. In a testcross involving F₁ dihybrid flies, more parental-type offspring were produced than the recombinant-type offspring. This indicates:

(1) The two genes are linked and present on the same chromosome.
(2) Both of the characters are controlled by more than one gene.
(3) The two genes are located on two different chromosomes.
(4) Chromosomes failed to separate during meiosis.
107. Which of the following statements is not correct?

(1) Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil.

(2) Some reptiles have also been reported as pollinators in some plant species.

(3) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.

(4) Insects that consume pollen or nectar without bringing about pollination are called pollen/nectar robbers.

108. Asthma may be attributed to:

(1) inflammation of the trachea

(2) accumulation of fluid in the lungs

(3) bacterial infection of the lungs

(4) allergic reaction of the mast cells in the lungs

109. In context of Amniocentesis, which of the following statement is incorrect?

(1) It can be used for detection of Down syndrome.

(2) It can be used for detection of Cleft palate.

(3) It is usually done when a woman is between 14 - 16 weeks pregnant.

(4) It is used for prenatal sex determination.

110. Specialised epidermal cells surrounding the guard cells are called:

(1) Bulliform cells

(2) Lenticels

(3) Complementary cells

(4) Subsidiary cells

111. Which of the following is the most important cause of animals and plants being driven to extinction?

(1) Habitat loss and fragmentation

(2) Co-extinctions

(3) Over-exploitation

(4) Alien species invasion
112. Analogous structures are a result of:
(1) Shared ancestry
(2) Stabilizing selection
(3) Divergent evolution
(4) Convergent evolution

113. Which of the following most appropriately describes haemophilia?
(1) Chromosomal disorder
(2) Dominant gene disorder
(3) Recessive gene disorder
(4) X-linked recessive gene disorder

114. Cotyledon of maize grain is called:
(1) coleoptile
(2) scutellum
(3) plumule
(4) coleorhiza

115. The term ecosystem was coined by:
(1) E. Haeckel
(2) E. Warming
(3) E.P. Odum
(4) A.G. Tansley

116. Which of the following features is not present in the Phylum - Arthropoda?
(1) Parapodia
(2) Jointed appendages
(3) Chitinous exoskeleton
(4) Metameric segmentation

117. Which one of the following cell organelles is enclosed by a single membrane?
(1) Lysosomes
(2) Nuclei
(3) Mitochondria
(4) Chloroplasts

118. Which of the following is not a characteristic feature during mitosis in somatic cells?
(1) Chromosome movement
(2) Synapsis
(3) Spindle fibres
(4) Disappearance of nucleolus
119. A river with an inflow of domestic sewage rich in organic waste may result in:
(1) An increased production of fish due to biodegradable nutrients.
(2) Death of fish due to lack of oxygen.
(3) Drying of the river very soon due to algal bloom.
(4) Increased population of aquatic food web organisms.

120. Which of the following is not required for any of the techniques of DNA fingerprinting available at present?
(1) Restriction enzymes
(2) DNA-DNA hybridization
(3) Polymerase chain reaction
(4) Zinc finger analysis

121. In meiosis crossing over is initiated at:
(1) Zygote
(2) Diplotene
(3) Pachytene
(4) Leptotene

122. Which one of the following statements is wrong?
(1) Eubacteria are also called false bacteria.
(2) Phycomycetes are also called algal fungi.
(3) Cyanobacteria are also called blue-green algae.
(4) Golden algae are also called desmids.

123. Blood pressure in the pulmonary artery is:
(1) more than that in the pulmonary vein.
(2) less than that in the venae cavae.
(3) same as that in the aorta.
(4) more than that in the carotid.

124. Which of the following statements is wrong for viroids?
(1) They cause infections
(2) Their RNA is of high molecular weight
(3) They lack a protein coat
(4) They are smaller than viruses
125. Photosensitive compound in human eye is made up of:

(1) Opsin and Retinol
(2) Transducin and Retinene
(3) Guanosine and Retinol
(4) Opsin and Retinal

126. One of the major components of cell wall of most fungi is:

(1) Cellulose
(2) Hemicellulose
(3) Chitin
(4) Peptidoglycan

127. Following are the two statements regarding the origin of life:

(a) The earliest organisms that appeared on the earth were non-green and presumably anaerobes.

(b) The first autotrophic organisms were the chemoaotrophs that never released oxygen.

Of the above statements which one of the following options is correct?

(1) Both (a) and (b) are correct.
(2) Both (a) and (b) are false.
(3) (a) is correct but (b) is false.
(4) (b) is correct but (a) is false.

128. Chrysophytes, Euglenoids, Dinoflagellates and slime moulds are included in the kingdom:

(1) Fungi
(2) Animalia
(3) Monera
(4) Protista

129. Tricarpellary, syncarpous gynoecium is found in flowers of:

(1) Fabaceae
(2) Poaceae
(3) Liliaceae
(4) Solanaceae

130. A complex of ribosomes attached to a single strand of RNA is known as:

(1) Polypeptide
(2) Okazaki fragment
(3) Polysome
(4) Polymer
131. In the stomach, gastric acid is secreted by the:
(1) peptic cells
(2) acidic cells
(3) gastrin secreting cells
(4) parietal cells

132. Identify the correct statement on ‘inhibin’:
(1) Is produced by granulose cells in ovary and inhibits the secretion of LH.
(2) Is produced by nurse cells in testes and inhibits the secretion of LH.
(3) Inhibits the secretion of LH, FSH and Prolactin.
(4) Is produced by granulose cells in ovary and inhibits the secretion of FSH.

133. The standard petal of a papilionaceous corolla is also called:
(1) Vexillum
(2) Corona
(3) Carina
(4) Pappus

134. In bryophytes and pteridophytes, transport of male gametes requires:
(1) Birds
(2) Water
(3) Wind
(4) Insects

135. Proximal end of the filament of stamen is attached to:
(1) Placenta
(2) Thalamus or petal
(3) Anther
(4) Connective

136. Which of the following statements about the composition of the vapour over an ideal 1:1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at 25°C. (Given, Vapour Pressure Data at 25°C, benzene = 12.8 kPa, toluene = 3.85 kPa)
(1) The vapour will contain equal amounts of benzene and toluene.
(2) Not enough information is given to make a prediction.
(3) The vapour will contain a higher percentage of benzene.
(4) The vapour will contain a higher percentage of toluene.
137. Match the compounds given in column I with the hybridisation and shape given in column II and mark the correct option.

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) XeF₆</td>
<td>(i) distorted octahedral</td>
</tr>
<tr>
<td>(b) XeO₃</td>
<td>(ii) square planar</td>
</tr>
<tr>
<td>(c) XeOF₄</td>
<td>(iii) pyramidal</td>
</tr>
<tr>
<td>(d) XeF₄</td>
<td>(iv) square pyramidal</td>
</tr>
</tbody>
</table>

Code:

(a) (b) (c) (d)

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

138. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane, is:

(1) The eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain.
(2) The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain.
(3) The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain.
(4) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain.

139. Fog is a colloidal solution of:

(1) Solid in gas
(2) Gas in gas
(3) Liquid in gas
(4) Gas in liquid
140. Match items of Column I with the items of Column II and assign the correct code:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Cyanide process</td>
<td>(i) Ultrapure Ge</td>
</tr>
<tr>
<td>(b) Froth floatation process</td>
<td>(ii) Dressing of ZnS</td>
</tr>
<tr>
<td>(c) Electrolytic reduction</td>
<td>(iii) Extraction of Al</td>
</tr>
<tr>
<td>(d) Zone refining</td>
<td>(iv) Extraction of Au</td>
</tr>
<tr>
<td>(e)</td>
<td>(v) Purification of Ni</td>
</tr>
</tbody>
</table>

Code:

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

141. Which is the correct statement for the given acids?

1. Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid.
2. Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid.
3. Both are diprotic acids.
4. Both are triprotic acids.

142. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is:

1. \( \Delta H < 0 \) and \( \Delta S > 0 \)
2. \( \Delta H < 0 \) and \( \Delta S < 0 \)
3. \( \Delta H > 0 \) and \( \Delta S = 0 \)
4. \( \Delta H > 0 \) and \( \Delta S < 0 \)

143. Which one of the following statements is correct when \( SO_2 \) is passed through acidified \( K_2Cr_2O_7 \) solution?

1. \( SO_2 \) is reduced.
2. Green \( Cr_2(SO_4)_3 \) is formed.
3. The solution turns blue.
4. The solution is decolourized.

144. The correct statement regarding RNA and DNA, respectively is:

1. The sugar component in RNA is arabinose and the sugar component in DNA is ribose.
2. The sugar component in RNA is 2′-deoxyribose and the sugar component in DNA is arabinose.
3. The sugar component in RNA is arabinose and the sugar component in DNA is 2′-deoxyribose.
4. The sugar component in RNA is ribose and the sugar component in DNA is 2′-deoxyribose.

145. Which of the following statements is correct when \( SO_2 \) is passed through acidified \( K_2Cr_2O_7 \) solution?

1. \( SO_2 \) is reduced.
2. Green \( Cr_2(SO_4)_3 \) is formed.
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1. The sugar component in RNA is arabinose and the sugar component in DNA is ribose.
2. The sugar component in RNA is 2′-deoxyribose and the sugar component in DNA is arabinose.
3. The sugar component in RNA is arabinose and the sugar component in DNA is 2′-deoxyribose.
4. The sugar component in RNA is ribose and the sugar component in DNA is 2′-deoxyribose.
145. Which of the following reagents would distinguish cis-cyclopenta-1,2-diol from the trans-isomer?

(1) MnO₂
(2) Aluminium isopropoxide
(3) Acetone
(4) Ozone

146. The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon is:

(1) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carboxylation.
(2) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism.
(3) a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.
(4) a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.

147. At 100°C the vapour pressure of a solution of 6.5 g of a solute in 100 g water is 732 mm. If Kₚ = 0.52, the boiling point of this solution will be:

(1) 102°C
(2) 103°C
(3) 101°C
(4) 100°C

148. Consider the nitration of benzene using mixed conc. H₂SO₄ and HNO₃. If a large amount of KHSO₄ is added to the mixture, the rate of nitration will be:

(1) unchanged
(2) doubled
(3) faster
(4) slower

149. The pressure of H₂ required to make the potential of H₂-elektrode zero in pure water at 298 K is:

(1) 10⁻¹⁰ atm
(2) 10⁻⁴ atm
(3) 10⁻¹⁴ atm
(4) 10⁻¹² atm
150. The correct statement regarding the basicity of arylamines is:

(1) Arylamines are generally more basic than alkylamines because of aryl group.
(2) Arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is sp-hybridized.
(3) Arylamines are generally less basic than alkylamines because the nitrogen lone-pair electrons are delocalized by interaction with the aromatic ring π electron system.
(4) Arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalized by interaction with the aromatic ring π electron system.

151. In a protein molecule various amino acids are linked together by:

(1) peptide bond
(2) dative bond
(3) α - glycosidic bond
(4) β - glycosidic bond

152. Consider the molecules CH₄, NH₃ and H₂O. Which of the given statements is false?

(1) The H – O – H bond angle in H₂O is smaller than the H – N – H bond angle in NH₃.
(2) The H – C – H bond angle in CH₄ is larger than the H – N – H bond angle in NH₃.
(3) The H – C – H bond angle in CH₄, the H – N – H bond angle in NH₃, and the H – O – H bond angle in H₂O are all greater than 90°.
(4) The H – O – H bond angle in H₂O is larger than the H – C – H bond angle in CH₄.

153. Which of the following statements is false?

(1) Ca²⁺ ions are not important in maintaining the regular beating of the heart.
(2) Mg²⁺ ions are important in the green parts of plants.
(3) Mg²⁺ ions form a complex with ATP.
(4) Ca²⁺ ions are important in blood clotting.

154. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?

(1) Br₂ > I₂ > F₂ > Cl₂
(2) F₂ > Cl₂ > Br₂ > I₂
(3) I₂ > Br₂ > Cl₂ > F₂
(4) Cl₂ > Br₂ > F₂ > I₂

150. ऐरिलऐमीन के शारा का के लिये यही कथन है :

(1) ऐरिल समूह के कारण ऐरिलऐमीन सामान्यतः ऐलिकलऐमीन से ज्यादा शारीरी है।
(2) ऐरिलऐमीन सामान्यतः ऐलिकलऐमीन से ज्यादा शारीरी है क्योंकि ऐरिलऐमीन में नाइट्रोजन परमाणु sp-संकरकर है।
(3) ऐरिलऐमीन सामान्यतः ऐलिकलऐमीन से कम शारीरी होती है क्योंकि नाइट्रोजन के एकाकी गुम इलेक्ट्रॉन प्रोटोनिक वाल्य के π – इलेक्ट्रॉन के साथ विस्थापित होते हैं।
(4) ऐरिलऐमीन सामान्यतः ऐलिकलऐमीन से ज्यादा शारीरी होती है क्योंकि नाइट्रोजन के एकाकी गुम इलेक्ट्रॉन प्रोटोनिक वाल्य के π – इलेक्ट्रॉन के साथ विस्थापित नहीं होते हैं।

151. प्रोटीन अणु में विभिन्न ऐमीनो अणु एक दूसरे से जुड़े रहते हैं:

(1) पेपटाइड आबंध के द्वारा
(2) वार आबंध के द्वारा
(3) α- ग्लाइकोसिकलिक आबंध के द्वारा
(4) β- ग्लाइकोसिकलिक आबंध के द्वारा

152. CH₄, NH₃ और H₂O अणुओं के लिये नीचे दिये गये कथनों में से कौन सा असत्य है?

(1) H₂O में हॉय वार-कोण, NH₃ में हॉय-न वार-कोण से कम है।
(2) CH₄ में हॉय-स वार-कोण, NH₃ में हॉय-न वार-कोण से अधिक है।
(3) CH₄ में हॉय-स-च वार-कोण, NH₃ में हॉय-न वार-कोण तथा H₂O में हॉय-स-च वार-कोण सभी में 90° से अधिक है।
(4) H₂O में हॉय-वार-कोण, CH₄ में हॉय-स-च वार-कोण से अधिक है।

153. निम्नलिखित में से कौन सा कठिन असत्य है?

(1) Ca²⁺ आयन हड़प्पा गति को नियंत्रित रखने में महत्त्वपूर्ण नहीं है।
(2) Mg²⁺ आयन पौधों के हड़प्पा युग के लिये महत्त्वपूर्ण है।
(3) Mg²⁺ आयन ए.टी.पी. के साथ संबंधित नहीं हैं।
(4) Ca²⁺ आयन रक्त को जमाने के लिये महत्त्वपूर्ण है।

154. निम्नलिखित में से कौन रूप हॉलस्जन अणुओं की आबंध विश्लेषण ए-वैल्की के लिये सही है?

(1) Br₂ > I₂ > F₂ > Cl₂
(2) F₂ > Cl₂ > Br₂ > I₂
(3) I₂ > Br₂ > Cl₂ > F₂
(4) Cl₂ > Br₂ > F₂ > I₂
155. The rate of a first-order reaction is 0.04 mol l⁻¹ s⁻¹ at 10 seconds and 0.03 mol l⁻¹ s⁻¹ at 20 seconds after initiation of the reaction. The half-life period of the reaction is:

(1) 44.1 s  
(2) 54.1 s  
(3) 24.1 s  
(4) 34.1 s

156. Which one given below is a non-reducing sugar?

(1) Glucose  
(2) Sucrose  
(3) Maltose  
(4) Lactose

157. Which one of the following characteristics is associated with adsorption?

(1) ΔG and ΔH are negative but ΔS is positive  
(2) ΔG and ΔS are negative but ΔH is positive  
(3) ΔG is negative but ΔH and ΔS are positive  
(4) ΔG, ΔH and ΔS all are negative

158. Two electrons occupying the same orbital are distinguished by:

(1) Azimuthal quantum number  
(2) Spin quantum number  
(3) Principal quantum number  
(4) Magnetic quantum number

159. Lithium has a bcc structure. Its density is 530 kg m⁻³ and its atomic mass is 6.94 g mol⁻¹. Calculate the edge length of a unit cell of lithium metal. \( (N_A = 6.02 \times 10^{23} \text{ mol}^{-1}) \)

(1) 527 pm  
(2) 264 pm  
(3) 154 pm  
(4) 352 pm

160. The pair of electron in the given carbanion, \( \text{CH}_3\text{C}≡\text{C}^\ominus \), is present in which of the following orbitals?

(1) sp²  
(2) sp  
(3) 2p  
(4) sp³

161. The product obtained as a result of a reaction of nitrogen with CaC₂ is:

(1) CaCN₃  
(2) Ca₂CN  
(3) Ca(CN)₂  
(4) CaCN
162. In the reaction
\[ H - C = CH \rightarrow (1) NaNH_2/\text{liq.NH}_3 \rightarrow X \rightarrow (2) \text{CH}_3\text{CH}_2\text{Br} \rightarrow Y, \]
\[ X \text{ and } Y \text{ are:} \]
(1) \( X = 2\text{-Butyne} ; Y = 2\text{-Hexyne} \)
(2) \( X = 1\text{-Butyne} ; Y = 2\text{-Hexyne} \)
(3) \( X = 1\text{-Butyne} ; Y = 3\text{-Hexyne} \)
(4) \( X = 2\text{-Butyne} ; Y = 3\text{-Hexyne} \)

163. MY and NY3, two nearly insoluble salts, have the same \( K_p \) values of \( 6.2 \times 10^{-13} \) at room temperature. Which statement would be true in regard to MY and NY3?
(1) The salts MY and NY3 are more soluble in 0.5 M KY than in pure water.
(2) The addition of the salt of KY to solution of MY and NY3 will have no effect on their solubilities.
(3) The molar solubilities of MY and NY3 in water are identical.
(4) The molar solubility of MY in water is less than that of NY3.

164. When copper is heated with conc. HNO3 it produces:
(1) \( \text{Cu(NO}_3\text{)}_2, \text{NO} \text{ and } \text{NO}_2 \)
(2) \( \text{Cu(NO}_3\text{)}_2 \text{ and } \text{N}_2\text{O}_4 \)
(3) \( \text{Cu(NO}_3\text{)}_2 \text{ and } \text{NO}_2 \)
(4) \( \text{Cu(NO}_3\text{)}_2 \text{ and } \text{NO} \)

165. The product formed by the reaction of an aldehyde with a primary amine is:
(1) Carboxylic acid
(2) Aromatic acid
(3) Schiff base
(4) Ketone

166. The addition of a catalyst during a chemical reaction alters which of the following quantities?
(1) Enthalpy
(2) Activation energy
(3) Entropy
(4) Internal energy

167. Predict the correct order among the following:
(1) bond pair - bond pair > lone pair - bond pair > lone pair - lone pair
(2) lone pair - bond pair > bond pair - bond pair > lone pair - lone pair
(3) lone pair - lone pair > lone pair - bond pair > bond pair - bond pair
(4) lone pair - lone pair > bond pair - bond pair > lone pair - bond pair
168. Consider the following liquid - vapour equilibrium.

Liquid $\rightleftharpoons$ Vapour

Which of the following relations is correct?

\[
\frac{d \ln P}{dT^2} = -\frac{\Delta H_v}{T^2}
\]

(1) \[\frac{d \ln P}{dT^2} = -\frac{\Delta H_v}{T^2}\]

(2) \[\frac{d \ln P}{dT} = \frac{\Delta H_v}{RT}\]

(3) \[\frac{d \ln G}{dT^2} = -\frac{\Delta H_v}{RT}\]

(4) \[\frac{d \ln P}{dT} = -\frac{\Delta H_v}{RT}\]

169. Which of the following biphenyls is optically active?

(1)

\[
\begin{array}{c}
\text{CH}_3 \\
\text{Br}
\end{array}
\]

(2)

\[
\begin{array}{c}
\text{Br} \\
\text{CH}_3
\end{array}
\]

(3)

\[
\begin{array}{c}
\text{O}_2\text{N} \\
\text{Br}
\end{array}
\]

(4)

\[
\begin{array}{c}
\text{I} \\
\text{I}
\end{array}
\]

170. Which of the following statements about hydrogen is incorrect?

(1) Hydronium ion, $\text{H}_3\text{O}^+$ exists freely in solution.

(2) Dihydrogen does not act as a reducing agent.

(3) Hydrogen has three isotopes of which tritium is the most common.

(4) Hydrogen never acts as cation in ionic salts.
171. The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are:

1. \([\text{Xe}]4f^{6}5d^{1}6s^{2}, [\text{Xe}]4f^{7}5d^{1}6s^{2}\) and \([\text{Xe}]4f^{5}5d^{1}6s^{2}\)
2. \([\text{Xe}]4f^{7}6s^{2}, [\text{Xe}]4f^{7}5d^{1}6s^{2}\) and \([\text{Xe}]4f^{9}6s^{2}\)
3. \([\text{Xe}]4f^{7}6s^{2}, [\text{Xe}]4f^{8}6s^{2}\) and \([\text{Xe}]4f^{8}5d^{1}6s^{2}\)
4. \([\text{Xe}]4f^{5}5d^{1}6s^{2}, [\text{Xe}]4f^{7}5d^{1}6s^{2}\) and \([\text{Xe}]4f^{9}6s^{2}\)

172. The reaction

\[
\text{CH}_3\text{CH}_2\text{OH} + \text{NaOH} \rightarrow \text{CH}_3\text{CH}_2\text{ONa} + \text{H}_2\text{O} + \text{Me}_2
\]

can be classified as:

1. Dehydration reaction
2. Williamson alcohol synthesis reaction
3. Williamson ether synthesis reaction
4. Alcohol formation reaction

173. For the following reactions:

(a) \(\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{KOH} \rightarrow \text{CH}_3\text{CH} = \text{CH}_2 + \text{KBr} + \text{H}_2\text{O}\)
(b) \(\text{CH}_3\text{CH} = \text{CH}_2 + \text{KOH} \rightarrow \text{CH}_3\text{CH} = \text{CH}_2 + \text{KOH} + \text{KBr}\)
(c) \(\text{Br} + \text{Br}_2 \rightarrow \text{Br}_3\)

Which of the following statements is correct?

1. (a) is elimination, (b) and (c) are substitution reactions.
2. (a) is substitution, (b) and (c) are addition reactions.
3. (a) and (b) are elimination reactions and (c) is addition reaction.
4. (a) is elimination, (b) is substitution and (c) is addition reaction.

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

1. \(\text{I} < \text{Br} < \text{Cl} < \text{F}\) (increasing electron gain enthalpy)
2. \(\text{Li} < \text{Na} < \text{K} < \text{Rb}\) (increasing metallic radius)
3. \(\text{Al}^{3+} < \text{Mg}^{2+} < \text{Na}^+ < \text{F}^-\) (increasing ionic size)
4. \(\text{B} < \text{C} < \text{N} < \text{O}\) (increasing first ionisation enthalpy)
175. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape?

(1) 3/8  
(2) 1/2  
(3) 1/8  
(4) 1/4

176. Among the following, the correct order of acidity is:

(1) $\text{HClO}_2 < \text{HClO} < \text{HClO}_3 < \text{HClO}_4$  
(2) $\text{HClO}_4 < \text{HClO}_2 < \text{HClO} < \text{HClO}_3$  
(3) $\text{HClO}_3 < \text{HClO}_4 < \text{HClO}_2 < \text{HClO}$  
(4) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$

177. Which of the following is an analgesic?

(1) Streptomycin  
(2) Chloromycetin  
(3) Novalgin  
(4) Penicillin

178. Natural rubber has:

(1) Alternate cis- and trans-configuration  
(2) Random cis- and trans-configuration  
(3) All cis-configuration  
(4) All trans-configuration

179. The ionic radii of $A^+$ and $B^-$ ions are $0.98 \times 10^{-10}$ m and $1.81 \times 10^{-10}$ m. The coordination number of each ion in $AB$ is:

(1) 8  
(2) 2  
(3) 6  
(4) 4

180. Which of the following has longest C–O bond length? (Free C–O bond length in CO is 1.128 Å.)

(1) $[\text{Fe(CO)}_4]^2-$  
(2) $[\text{Mn(CO)}_6]^+$  
(3) Ni(CO)$_4$  
(4) [Co(CO)$_4$]$^-$
**Read carefully the following instructions:**

<table>
<thead>
<tr>
<th>Instructions</th>
<th>निर्देशांकित निर्देश ध्यान से पढ़ें:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Each candidate must show on demand his/her Admit Card to the Invigilator.</td>
<td></td>
</tr>
<tr>
<td>2. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>4. Use of Electronic/Manual Calculator is prohibited.</td>
<td></td>
</tr>
<tr>
<td>5. The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.</td>
<td></td>
</tr>
<tr>
<td>6. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.</td>
<td></td>
</tr>
<tr>
<td>7. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.</td>
<td></td>
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</tbody>
</table>

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<tr>
<th>Instructions</th>
<th>1. पूछे जाने पर प्रत्येक परीक्षार्थी, निरीक्षक को अपना प्रवेश-कार्ड दिखाएं।</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. अधिकार या निरीक्षक को विशेष अनुमति के बिना कोई परीक्षार्थी अपना स्थान न हो दें।</td>
<td></td>
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<tr>
<td>3. कार्यरत निरीक्षक को अपना उत्तर पत्र दिए बिना एवं उपस्थिति-पत्र के द्वारा हस्ताक्षर किए बिना कोई परीक्षार्थी परीक्षा होने नहीं छोड़ पाएंगे। यदि किसी परीक्षार्थी ने दूसरी बार उपस्थिति-पत्र के द्वारा हस्ताक्षर नहीं किए तो यह माना जाएगा कि उसने उत्तर पत्र नहीं लिए है और यह अनुचित साधन का मामला माना जाएगा।</td>
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<td>4. इलेक्ट्रॉनिक/हस्ताक्षरण परिकल्पना का उपयोग वर्जित है।</td>
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<tr>
<td>5. परीक्षा-हॉल में आचरण के लिए परीक्षार्थी बोर्ड के नियमों एवं विनियमों द्वारा निर्दिष्ट हैं। अनुचित साधन के सभी मामलों का, फैसला बोर्ड के नियमों एवं विनियमों के अनुसार होगा।</td>
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<td>6. किसी हालत में परीक्षा पुरस्कार और उत्तर पत्र का कोई भाग अलग न करें।</td>
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<tr>
<td>7. परीक्षा पुरस्कार / उत्तर पत्र में दिए गए परीक्षा पुरस्कार संबंध में परीक्षार्थी सदैव तरीके से उपस्थिति-पत्र में लिखें।</td>
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