32. An increase in the concentration of the reactants of a reaction leads to change in:
   (a) activation energy
   (b) heat of reaction
   (c) threshold energy
   (d) collision frequency

34. The number of Faradays (F) required to produce 20 g of calcium from molten CaCl₂ (Atomic mass of Ca = 40 g mol⁻¹) is:
   (1) 3.87 BM
   (2) 4.90 BM
   (3) 5.92 BM
   (4) 2.84 BM

35. Which of the following is a basic amino acid?
   (1) Serine
   (2) Alanine
   (3) Lysine
   (4) Tyrosine

36. Hydrolysis of sucrose is given by the following reaction:
   \[ \text{Sucrose} + H_2O \rightarrow \text{Glucose} + \text{Fructose} \]

37. The calculated spin-only magnetic moment of Cr²⁺ ion is:
   (1) 3.87 BM
   (2) 4.90 BM
   (3) 5.92 BM
   (4) 2.84 BM

38. The number of protons, neutrons, and electrons in \( ^{17} \text{Li} \), respectively, are:
   (1) 7, 7, 10
   (2) 10, 7, 7
   (3) 7, 10, 7
   (4) 10, 7, 10

39. A molecule which does not exist.
   (1) \( \text{He}_2 \)
   (2) \( \text{Li}_2 \)
   (3) \( \text{C}_2 \)
   (4) \( \text{O}_2 \)

40. Which of the following is a cationic detergent?
   (1) Sodium lauryl sulphate
   (2) Sodium stearate
   (3) Cetyltrimethyl ammonium bromide
   (4) Sodium dodecylbenzene sulphonate

41. The following metal ion activates many enzymes by participating in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.
   (1) Iron
   (2) Copper
   (3) Calcium
   (4) Potassium

42. The calculated spin-only magnetic moment of Cr²⁺ ion is:
   (1) 3.87 BM
   (2) 4.90 BM
   (3) 5.92 BM
   (4) 2.84 BM

43. The number of protons, neutrons, and electrons in \( ^{17} \text{Li} \), respectively, are:
   (1) 7, 7, 10
   (2) 10, 7, 7
   (3) 7, 10, 7
   (4) 10, 7, 10

44. Which of the following is a cationic detergent?
   (1) Sodium lauryl sulphate
   (2) Sodium stearate
   (3) Cetyltrimethyl ammonium bromide
   (4) Sodium dodecylbenzene sulphonate
An electron is accelerated from rest through a potential difference of $V$ volt. If the de Broglie wavelength of the electron is $1.237 \times 10^{-2}$ m, the potential difference is:

1. $10\ V$
2. $10^2\ V$
3. $10^3\ V$
4. $10^4\ V$

A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale. The pitch of the screw gauge is:

1. $0.01\ mm$
2. $0.25\ mm$
3. $0.5\ mm$
4. $1.0\ mm$

The energy required to break one bond in DNA is $10^{-20}\ J$. This value in eV is nearly:

1. 6
2. 0.6
3. 0.06
4. 0.006

The color code of a resistance is given below:

Yellow, Violet, Brown, Gold

The Brewster's angle $i_B$ for an interface should be:

1. $0^\circ < i_B < 30^\circ$
2. $30^\circ < i_B < 45^\circ$
3. $45^\circ < i_B < 90^\circ$
4. $i_B = 90^\circ$

Two bodies of mass 4 kg and 6 kg are tied to the ends of a massless string. The string passes over a pulley which is frictionless (see figure). The acceleration of the system in terms of acceleration due to gravity (g) is:

$a = \left(\frac{6-4}{10}\right)$

The increase in the width of the depletion region in a p-n junction diode is due to:

1. Forward bias only
2. Reverse bias only
3. Both forward bias and reverse bias
4. Increase in forward current

The energy equivalent of 5.5 g of a substance is:

1. $4.5 \times 10^{18}\ J$
2. $4.0 \times 10^{25}\ J$
3. $1.5 \times 10^{14}\ J$
4. $0.5 \times 10^{14}\ J$
5. $4.5 \times 10^{14}\ J$

Select the correct events that occur in inspiration:

(a) Contraction of diaphragm
(b) Contraction of intercostal muscles
(c) Pulmonary volume decreases
(d) Intrapulmonary pressure increases
(e) Rest of the options are incorrect

The oxygenation activity of RuBisCO enzyme photoproduction is led to the formation of:

1. 2 molecules of 3-C compound
2. 1 molecule of 3-C compound
3. 3 molecules of 6-C compound
4. 1 molecule of 4-C compound and 1 molecule of 3-C compound

The infectious stage of Plasmodium that enters the human body is:

(a) Trophozoites
(b) Sporozoites
(c) Female gametocytes
(d) Male gametocytes

Which of the following statements about inclusion bodies is incorrect?

1. They are bound by any membrane.
2. Two of them are involved in the formation of food vacuoles.
3. They lie free in the cytoplasm.
4. They represent reserve material in the cytoplasm.

Dissolution of the synaptonemal complex occurs during:

1. Pachytene
2. Zygotene
3. Diplotene
4. Leptotene
5. Raytene have:

(a) Inferior ovary
(b) Superior ovary
(c) Hypogynous ovary
(d) Half inferior ovary
120. Which is the important site of formation of glycoprotein and glycolipids in eukaryotic cells?
(a) Endoplasmic reticulum
(b) Peroxisomes
(c) Golgi bodies
(d) Polysomes

121. In light reaction, photolysis of water facilitates the transfer of electrons from:
(1) PS-II to Cytochrome $b_{6}$ complex
(2) Cytochrome $b_{6}$ complex to PS-I
(3) PS-I to NADP$^{+}$
(4) PS-I to ATP synthase

122. Match the following concerning essential elements and their functions in plants:
- Iron (a) Photosynthesis
- Zinc (b) Pollen germination
- Manganese (c) Required for chlorophyll biosynthesis
- Molybdenum (d) IAA biosynthesis
Select the correct match:
(a) Iron (i) Photosynthesis
(b) Zinc (ii) Pollen germination
(c) Manganese (iii) Required for chlorophyll biosynthesis
(d) Molybdenum (iv) IAA biosynthesis

123. Which of the following would help in prevention of stress?
(a) More water reabsorption due to undersecretion of ADH
(b) Reabsorption of water from renal tubules due to reabsorption of water
(c) Atrial natriuretic factor causes vasoconstriction
(d) Decrease in secretory thirst

124. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask:
- CH$_{4}$, H$_{2}$, NH$_{3}$ and water vapor at 800°C
- CH$_{3}$H$_{2}$, NH$_{3}$ and water vapor at 800°C
- CH$_{2}$H$_{4}$, NH$_{3}$ and water vapor at 800°C
- CH$_{2}$H$_{2}$, NH$_{3}$ and water vapor at 600°C
- CH$_{3}$H$_{2}$, NH$_{3}$ and water vapor at 600°C

125. Identify the basic amino acid from the following:
- Tryptophane
- Glutamic Acid
- Lysine
- Valine

126. The process of growth is maximum during:
- (1) Log phase
- (2) Exponential phase
- (3) Stem segment
- (4) Dormancy

127. Presence of which of the following conditions in urine are indicative of Diabetes Mellitus?
- Uremia and Ketoacids
- Uremia and Renal Calculi
- Ketoneuria and Glyceruria
- Renal calculi and Hypoglycaemia

128. Select the correct match:
- (1) Haeomobiline - Y linked
- (2) Peroxidase - Autosomal dominant trait
- (3) Sickle cell anemia - Autosomal recessive trait, chromosome 11
- (4) Thalassemia - X linked

129. Strobilus or cones are found in:
- (1) Conia
- (2) Pterio
- (3) Moechiais
- (4) Equistum

130. Identify the wrong statement in reference to the gene T that controls SBO:
- (1) No gene $X$ can serve as an allele.
- (2) A person may have two of the three alleles.
- (3) All three alleles can be present together; they express the typical sugar.
- (4) Allele $T$ does not produce any sugar.

131. Identify the correct statement with reference to human digestive system:
- (1) Oesophagus opens into small intestine.
- (2) Serosa is the innermost layer of the alimentary canal.
- (3) Ileum is a highly coiled part.
- (4) Vermiform appendix arises from duodenum.

132. Which of the following would help in prevention of stress?
- More water reabsorption due to undersecretion of ADH
- Reabsorption of water from renal tubules due to reabsorption of water
- Atrial natriuretic factor causes vasoconstriction
- Decrease in secretory thirst

133. Match the following columns and select the correct option:
- Column I
  - (a) Broton
  - (b) Aldehyde
  - (c) Enzyme
d  - (d) Gas exchange

- Column II
  - (i) Genetic engineering
  - (ii) Gene therapy
  - (iii) Carnitine deacylation deficiency
  - (iv) Diplococcus

134. Which of the following is not an inhibitory substance governing seed dormancy?
- Gibberelic acid
- Abscisic acid
- Thamic acid
- Pomegranate acid

135. Match the following columns and select the correct option:
- Column - I
  - (a) Bacillus thuringiensis
  - (b) Salmonella
  - (c) Ralstonia
  - (d) Eucalyptus
d  - (i) Insecticide
  - (ii) Gene therapy
  - (iii) Resistance
  - (iv) Secretion

- Column - II
  - (i) Insecticide
  - (ii) Gene therapy
  - (iii) Resistance
  - (iv) Secretion

136. The sequence that controls the copy number of the linked DNA in the vector is termed:
- Selectable marker
- Ori site
- Palindromic sequence
- Recognition site

137. Snow blindness in Antarctic region:
- Freezing of fluids in the eyes
- Inflammation of cornea due to UV-B radiation
- High reflection of light from snow
- Damage to retina caused by infrared

138. According to Robert May, the global species diversity is about:
- 1.5 million
- 20 million
- 60 million
- 7 million

139. By which method was a new breed ‘Hasdale?’ sheep formed by using Bikanderi ewes and Maraines rams?
- Out crossing
- Inbreeding
- Cross breeding
- Mutational breeding

140. Which of the following regions of the globe exhibits highest species diversity?
- Western Ghats of India
- Madagascar
- Himalayas
- Amazon forests