194. A respiratory gas 'X' has an insignificant role in the regulation of respiratory rhythm in humans. Identify 'X' and select the **correct** option w.r.t. it.
(1) About 20-25% of 'X' is transported by RBCs.
(2) Every 100 mL of deoxygenated blood delivers approximately 4 mL of 'X' to the alveoli.
(3) 3% of X is carried in a dissolved state through the plasma.
(4) 'X' is a harmful gas and is released only during catabolic reactions.

195. Which of the following represents a palindromic nucleotide sequence in DNA?
(1) 5'-GAATCT-3' / 3'-CTTAGA-5'
(2) 5'-GAATTC-3' / 5'-CTTAAG-3'
(3) 5'-GAATTC-3' / 3'-CTTAAG-5'
(4) 5'-GTTACA-3' / 5'-CAATGT-3'

196. The applications of biotechnology include all of the following, **except**
(1) Therapeutics
(2) Bioremediation
(3) Cancer detection using MRI
(4) Energy production

197. The proximity between the Henle's loop and vasa recta, as well as the counter current in them help in maintaining
(1) An increasing osmolarity towards the inner cortical interstitium
(2) Osmolarity from 300 mOsmolL^{-1} in the medulla to about 1200 mOsmolL^{-1} in the inner cortex
(3) Concentration gradient of medullary interstitium which is mainly caused by NaCl and urea
(4) Decreasing osmolarity towards the inner medullary interstitium

198. Choose the **incorrect** statement w.r.t. cockroaches.
(1) Their body is metamerically segmented.
(2) Their exoskeleton is composed of polymer of N-acetyl glucosamine.
(3) Their tergum and sternum are joined to each other by the arthrodial membrane.
(4) They exhibit mosaic vision with less sensitivity but more resolution.

199. **Assertion (A) :** Person with blood group 'AB' is a universal acceptor.
Reason (R) : In blood group 'AB', anti-A and anti-B antibodies are present in plasma but no antigens are present on RBCs.
In the light of above statements, choose the most appropriate answer.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

200. Select the **correct** set of homopolymers from the options given below.
(1) Inulin, cellulose, glycogen
(2) Insulin, starch, glycerol
(3) Starch, haemoglobin, lecithin
(4) Glycogen, collagen, elastin

Space for Rough Work

185. Match Column I with Column II and select the **correct** option.

Column I		Column II	
(i)	Sub phylum	(a)	Cyclostomata
(ii)	Division	(b)	Pisces
(iii)	Super class	(c)	Agnatha
(iv)	Class	(d)	Tunicata

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

SECTION - B

186. If a desired gene is ligated at the *Sal* site of pBR322 then, the recombinant host cell
(1) Loses its kanamycin resistance
(2) Loses its tetracycline resistance
(3) Becomes ampicillin sensitive
(4) Loses its chloramphenicol resistance

187. Choose the **incorrect** option w.r.t. a female cockroach.
(1) Fat body, nephrocytes and urecose glands help in excretion along with the Malpighian tubules.
(2) A pair of spermathecae is present in the 6th abdominal segment which opens into the genital chamber.
(3) The 10th segment bears a pair of jointed filamentous structures called anal cerci.
(4) Blood vessels are poorly developed and open into haemocoel.

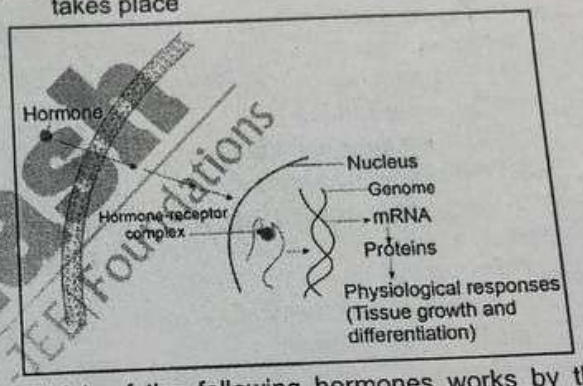
188. Uremia is a condition of malfunctioning of kidneys that leads to the accumulation of
(1) Uric acid in blood
(2) Urea in urinary bladder
(3) Urea in blood
(4) Uric acid in kidneys

189. Which of the following does not hold true for red muscle fibres?
(1) Slow rate of contraction for longer periods
(2) Have less sarcoplasmic reticulum
(3) Depend on anaerobic process for energy
(4) Have more number of mitochondria

190. For normal fertility, at least _____ million sperms out of 300 million sperms per ejaculate must have normal shape and size, and must show vigorous motility. Choose the option that **correctly** fills the blank w.r.t. human males.
(1) 72 (2) 180
(3) 120 (4) 90

191. In earthworms,
(1) The clitellum increases the effective area of absorption in intestine
(2) Four pairs of spermathecae are located in the 6th – 9th segments
(3) Intestinal caecum neutralizes humic acid present in humus
(4) Sexes are separate and cross fertilization takes place

192.



Which of the following hormones works by the mechanism illustrated in the above image?
(1) Thyroxine (2) Adrenaline
(3) Insulin (4) Somatostatin

193. Select the **incorrect** statement.
(1) Lysozymes present in saliva and tears destroy certain types of bacteria.
(2) Interferons are synthesized in response to *Mycobacterium*.
(3) Ringworms in humans is caused by fungi.
(4) Fast distribution of medicine can be achieved by injecting it into the veins.

Space for Rough Work

175. Select the **correct** option w.r.t. hormone, its source gland and function.

	Hormone	Source gland	Function
(1)	Oxytocin	Pars distalis	Contraction in myometrium of uterus
(2)	PTH	Parathyroid	Hypocalcemic hormone
(3)	TCT	Thyroid	Calcium metabolism
(4)	Thymosin	Pineal gland	Differentiation of T-lymphocytes

176. Choose the **incorrect** statement w.r.t. Amphioxus.
(1) It is an exclusively marine animal.
(2) It belongs to the subphylum Cephalochordata.
(3) Its notochord extends from head to tail region.
(4) Its notochord is present only in the larval tail.

177. In humans, pO_2 in systemic artery and pulmonary vein is respectively
(1) 40 mm Hg, 40 mm Hg
(2) 95 mm Hg, 95 mm Hg
(3) 45 mm Hg, 95 mm Hg
(4) 95 mm Hg, 40 mm Hg

178. Which of the following is **correct** regarding the menstrual cycle?
(1) The ovulatory phase is followed by the luteal phase in human females.
(2) Only LH attains a peak level in the middle of the cycle in human females.
(3) It is absent in monkeys.
(4) Progesterone surge induces ovulation in human females.

179. Select the **incorrect** match w.r.t. humans

(1)	Emerging from glomerulus	–	Afferent arteriole
(2)	Cortical nephrons	–	Comparatively more in number than juxtamedullary nephrons
(3)	Blood filtered by kidneys	–	1200 mL/min
(4)	Coiled regions of nephron	–	PCT and DCT

180. Transfer of an ovum collected from a donor into the fallopian tube of another woman who cannot produce one, but can provide suitable environment for fertilization and further development is done in the case of
(1) GIFT (2) ICSI
(3) AI (4) IUI

181. Tendons attach____and is an example of _____connective tissue. Choose the **correct** option that fills the blanks respectively.
(1) Muscles to bones ; Dense regular
(2) Bones to bones ; Dense regular
(3) Muscles to bones ; Dense irregular
(4) Muscles to muscles ; Dense regular

182. Choose the **incorrect** statement w.r.t. an electrical synapse.
(1) The membranes of pre and post synaptic neurons are in very close proximity.
(2) Electrical current cannot flow directly from one neuron to another neuron across synapses.
(3) Impulse conduction in an electrical synapse is always faster than chemical synapse.
(4) They are rare in the human system.

183. Select the **correct** match.
(1) Muscular dystrophy – Wild contractions in muscles due to low Ca^{2+} in body fluid
(2) Myasthenia gravis – Affects neuromuscular junction that leads to paralysis of skeletal muscles
(3) Gout – Degeneration of skeletal muscles
(4) Tetany – Caused due to accumulation of uric acid crystals

184. In humans, contraction of diaphragm and external inter-costal muscles
(1) Decrease the intra-pulmonary pressure
(2) Increase the intra-pulmonary pressure
(3) Decrease the pulmonary volume
(4) Cause expulsion of air from the lungs

Space for Rough Work

168. **Assertion (A) :** Post-industrialisation, the number of melanised moths increased in comparison to white-winged moths.
Reason (R) : Due to the increase in industrial smoke and soot, there was introduction of mutant species which adapted better.
In the light of above statements, select the **correct** option.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

169. Select the **correct** match.
(1) Karl Ernst von Baer – Embryos pass through the adult stages of other animals
(2) Alfred Wallace – Worked in Malay Archipelago
(3) Charles Darwin – Talked about mutations as the only mechanism of evolution
(4) Thomas Malthus – His work influenced Hugo deVries

170. Which of the following statements is **correct** w.r.t. lipids?
(1) A phospholipid called lecithin is found in the plasma membrane.
(2) Saturated fatty acids possess one or more C=C bonds.
(3) Gingelly oil has a higher melting point than fats, hence remains as oil in winters.
(4) Lipids are generally soluble in water and organic solvents.

171. Choose the **incorrect** statement w.r.t. gel electrophoresis.
(1) DNA fragments separate according to their size through the sieving effect provided by the gel matrix.
(2) Smaller fragments move farther from anode.
(3) DNA samples are loaded in the wells, close to cathode.
(4) Separated fragments of DNA can be visualized only after staining with ethidium bromide followed by exposure to UV light.

172. The sino-atrial node is called the pacemaker of human heart because
(1) It is located in the right upper corner of the right atrium
(2) It is the only nodal tissue that can generate impulses
(3) It can generate maximum number of action potentials and is responsible for initiating and maintaining the rhythmic contractile activity of heart
(4) It produces high frequency of vibrations in blood vessels

173. Select the **incorrect** match from the options given below.

	Genus	Characters	Taxon
(1)	*Obelia*	• Metagenesis • Cnidoblasts	Coelenterata
(2)	*Planaria*	• High regeneration capacity • Organ level of organisation	Platyhelminthes
(3)	*Nereis*	• Segmented worm • Closed circulatory system	Annelida
(4)	*Limulus*	• Living fossil • Chitinous endoskeleton	Arthropoda

174. Read the following statements carefully and select the **correct** option.
(1) Morphine is extracted from the leaves of *Cannabis sativa*.
(2) Chikungunya and amoebic dysentery are transmitted by the bite of an infected mosquito vector.
(3) Anti-histamine, adrenaline and steroids quickly reduce the symptoms of allergy.
(4) T-lymphocytes act like the HIV factory.

Space for Rough Work

160. Select the **incorrectly** matched pair from the options given below.

(1) Genetically engineered insulin – Prepared by Eli Lilly

(2) RNAi – Silencing of mRNA with the help of dsRNA

(3) Rosie – Transgenic sheep producing α-1-antitrypsin

(4) Golden rice – Source of vitamin 'A'

161. In the experiment performed by S.L Miller in 1953, he observed the formation of 'P'. 'P' can form a polymeric compound by the formation of _____ with each other.

Choose the option which fills the blank correctly.

(1) Glycosidic bonds
(2) Peptide bonds
(3) Phosphodiester bonds
(4) Phosphoester bonds

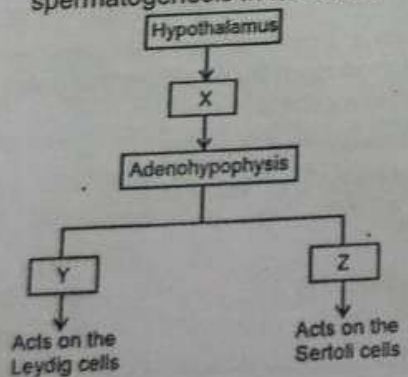
162. The parts of human female reproductive system along with a pair of mammary glands are integrated structurally and functionally to support the process of

(a) Pregnancy, parturition and child care
(b) Fusion of spermatozoa and ovum
(c) Release of secondary oocyte from primary sex organ

Select the **correct** option.

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

163. Consider the following flow chart and select the **correct** statement w.r.t. hormonal regulation of spermatogenesis in humans.



(1) 'X' is a steroidal hormone that stimulates the release of two gonadotropins.

(2) 'Z' is an amino-acid derivative that stimulates the secretion of androgens.

(3) 'Y' is a steroidal hormone that stimulates the secretion of some factors which help in the process of reductional division.

(4) 'Y' and 'Z' are trophic hormones.

164. How many of the methods given in the box below generally do(es) interfere with the sexual drive, desire and/or the sexual act of the user?

LNG-20, Vaults, Saheli, Condoms, Progestasert, Multiload-375

Select the **correct** option.

(1) Five (2) Zero
(3) Four (4) Three

165. Choose the **incorrect** statement.

(1) Myosin head contains ATPase and has ATP binding sites.

(2) Repeated contraction and relaxation of skeletal muscles may lead to fatigue.

(3) The cells of human body exhibit amoeboid, ciliary and muscular movements.

(4) Sarcomere is the anatomical unit of muscles.

166. Charas is obtained from the extract of which plant?

(1) *Erythroxylum coca*
(2) *Cannabis sativa*
(3) *Atropa belladonna*
(4) *Papaver somniferum*

167. In humans, which part of the renal tubule is responsible for the maximum reabsorption of water even in the presence of ADH?

(1) PCT
(2) DCT
(3) Ascending limb of loop of Henle
(4) Descending limb of loop of Henle

Space for Rough Work

149. Vernalization stimulate flowering in
(1) Annual plants only
(2) Both annual and biennial plants
(3) Only monocot plants
(4) Only perennial plants

150. At two celled stage of pollen grain, the vegetative cell differs from generative cell, as the former is
(1) Spindle shape with dense cytoplasm
(2) Bigger in size with scanty food reserve
(3) With abundant food reserve and irregularly shaped nucleus
(4) Spherical shape with spherical nucleus

ZOOLOGY

SECTION-A

151. The anterior most part of *Balanoglossus* is
(1) Proboscis (2) Collar
(3) Trunk (4) Stomochord

152. *Bufo* and *Calotes* are similar to *Pterophyllum* and *Aptenodytes* in having
(1) Cartilaginous endoskeleton
(2) Tympanum
(3) Indirect development
(4) Pharyngeal gill slits at some stage of life

153. In frogs, digestion of food takes place by the action of ____ and ____ secreted from the walls of the stomach.
Select the **correct** option that fills the blanks respectively.
(1) HCl ; gastric juices
(2) Bile ; HCl
(3) Bile ; pancreatic juices
(4) Chyme ; HCl

154. Comprehend the given statements.
Statement A : In frogs, a triangular structure which joins the right atrium of heart is called the sinus venosus.
Statement B : The colour of the ventral side of the body of *Rana tigrina* is generally olive green with dark irregular spots.
Select the **correct** option.
(1) Both statements A and B are correct
(2) Both statements A and B are incorrect
(3) Only statement A is correct
(4) Only statement B is correct

155. Which of the following hormones produces anti-inflammatory reactions and suppresses the immune response?
(1) Cortisol
(2) Catecholamines
(3) PTH
(4) ADH

156. In a monomeric antibody molecule, how many intrachain disulphide bonds are present in light chains and heavy chains respectively?
(1) 10, 2 (2) 8, 4
(3) 4, 8 (4) 12, 4

157. In rDNA technology, rDNA means
(1) DNA with a piece of RNA
(2) DNA with a piece of foreign DNA
(3) DNA which takes part in recombination
(4) DNA not associated with any foreign gene

158. Adenosine deaminase deficiency may be cured permanently by
(1) Administering adenosine deaminase promoters in the blood of patient
(2) Introducing bone marrow cells in the patient
(3) Isolating gene from marrow cells producing ADA and introducing those genes into cells at early embryonic stage
(4) Enzyme replacement therapy

159. Choose the **odd** one w.r.t. nucleosides.
(1) Adenosine
(2) Cytosine
(3) Guanosine
(4) Thymidine

Space for Rough Work

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ZOOLOGY

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(4) Enzyme replacement therapy

159. Choose the **odd** one w.r.t. nucleosides.
(1) Adenosine
(2) Cytosine
(3) Guanosine
(4) Thymidine

Space for Rough Work

SECTION - B

136. Match the following columns and choose the **correct** option.

Column-I		Column-II	
A	Prop root	(i)	Maize
B	Storage root	(ii)	Banyan tree
C	Stilt root	(iii)	*Rhizophora*
D	Respiratory root	(iv)	Carrot

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

137. Which of the following cell organelle/structures lacks nucleic acid?
(1) Nucleus (2) Plastid
(3) Ribosome (4) Golgi apparatus

138. How many chromosomes and chromatids respectively will be there in each daughter cell after meiosis II of a meiocyte that had 15 bivalents in prophase I?
(1) 15, 30 (2) 15, 15
(3) 30, 15 (4) 30, 30

139. Bacteria that respire only anaerobically, are called
(1) Facultative aerobes
(2) Facultative anaerobes
(3) Obligate aerobes
(4) Obligate anaerobes

140. Select the **odd** one w.r.t. tissues of bark.
(1) Phellogen (2) Primary cortex
(3) Primary xylem (4) Primary phloem

141. In the following features how many is/are **true** for *Ulothrix*?
a. Presence of chlorophyll *a* and chlorophyll *b*
b. Food storage in the form of starch
c. Presence of algin in cell wall
d. Non-flagellated and similar sized fusing gametes
(1) Four (2) Three
(3) Two (4) One

142. The fruit of mango is
(1) True fruit (2) Pseudocarpic fruit
(3) Parthenocarpic fruit (4) Composite fruit

143. Bulliform cells in upper epidermis of some grasses are
(1) Smaller than other epidermal cells
(2) Empty and colourless
(3) Green coloured
(4) Photosynthetic

144. Identify the **incorrect** statement w.r.t. structure of nucleic acid.
(1) In RNA every nucleotide residue has an additional-OH group present at 2' position in the ribose sugar
(2) Number of phosphodiester bonds is 11 in a linear DNA molecule that is 12 base pairs long
(3) Thymine is present in DNA
(4) A + G/ T + C = 1 for dsDNA

145. Read the following statements and select the **correct** option.
Assertion (A): Predators in nature are 'prudent'.
Reason (R): If a predator is too efficient and overexploits its prey, then the prey might become extinct.
(1) Only (A) is true
(2) Only (R) is true
(3) Both (A) and (R) are true and (R) is the correct explanation of (A)
(4) Both (A) and (R) are true but (R) is not the correct explanation of (A)

146. A woman who is carrier of haemophilia marries a normal man. What is the percentage of getting haemophilic progeny?
(1) 50% (2) 75%
(3) 25% (4) 100%

147. 5.8S rRNA is synthesised by
(1) RNA polymerase I (2) DNA polymerase I
(3) RNA polymerase II (4) DNA polymerase II

148. For complete oxidation of fats, RQ value is less than 1 because
(1) Fatty acids are converted to proteins
(2) Fats are converted to sugars
(3) Oxygen consumption is high as compared to CO_2 released
(4) Oxygen consumption is low as compared to CO_2 released

Space for Rough Work

123. In a transcription unit, the terminator is located towards
(1) 3' end of template strand
(2) 3' end of coding strand
(3) 5' end of coding strand
(4) 5' end of the sense strand

124. Read the following statements and choose the **correct** option.
Statement A : Baculoviruses are pathogens that attack insects and other arthropods.
Statement B : Symbiotic fungi *Trichoderma* are very common in the root ecosystems.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both the statements are correct
(4) Both the statements are incorrect

125. Which of the following molecules will act as a precursor of the PGR that is responsible for increase in the yield of sugarcane
(1) Adenine (2) Violaxanthin
(3) Acetyl CoA (4) Tryptophan

126. Which of the following statements is **incorrect**?
(1) Nearly all plants are conformers
(2) Heat loss or heat gain is a function of surface area
(3) Small animals have a smaller surface area relative to their volume
(4) Thermoregulation is energetically expensive for many organisms

127. In vertebrates, which of the following taxa has highest number of species?
(1) Fishes (2) Birds
(3) Amphibians (4) Reptiles

128. The pyramid of number is upright in
(1) A tree and pond ecosystem
(2) Aquatic ecosystem only
(3) Tree and grassland ecosystem
(4) Grassland and pond ecosystem

129. Select the **wrongly** matched pair.
(1) *Lac* operon – Inducible operon
(2) Regulator gene – Non-constitutive expression
(3) Promoter gene – Site for RNA polymerase attachment
(4) *Lac* y gene – Responsible for permease synthesis

130. Stem modifies to perform photosynthesis in
(1) Potato (2) Ginger
(3) Zamikand (4) *Opuntia*

131. During meiotic division, the enzyme recombinase participates in
(1) S-phase of interphase for DNA replication
(2) Prophase for condensation of chromosomes
(3) Prophase II for crossing over
(4) Prophase I for exchange of genetic material between two homologous chromosomes

132. **Statement-A :** Light rarely becomes a limiting factor for plants growing in dense forests.
Statement-B : The current concentration of CO_2 in the atmosphere is limiting for C_3 plants.
In the light of above statement(s) choose the **correct** option.
(1) Both statements A and B are correct
(2) Both statements A and B are incorrect
(3) Statement A is correct but statement B is incorrect
(4) Statement A is incorrect but statement B is correct

133. How many different types of gametes are formed by a parent having genotype AaBbCc?
(1) 2 (2) 4
(3) 8 (4) 16

134. In the five kingdom classification, *Chlamydomonas* and *Chlorella are* placed in kingdom
(1) Protista (2) Fungi
(3) Monera (4) Plantae

135. Read the following statements of assertion (A) and reason (R) and select the **correct** option.
Assertion (A) : In ABO blood grouping there are more than two alleles governing the same character.
Reason (R) : In humans, all the alleles of a single gene is found in an individual but not in a population.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

Space for Rough Work

113. 5′ – C A T A G G C T T – 3′ is the sequence of one of the strand of DNA. What will be the most appropriate sequence for its complementary strand?
(1) 5′ – G T A T C C G A A – 3′
(2) 3′ – T T G C C T A T G – 5′
(3) 5′ – A T G C C T A T G – 3′
(4) 3′ – G T A T C C G A A – 5′

114. Which of the following statements are **correct** w.r.t. eukaryotic flagella?
(a) They have 9+2 arrangement of microtubules.
(b) They are membrane bound extensions of the plasma membrane.
(c) They are surrounded by amorphous pericentriolar material.
(d) They have a cartwheel appearance in their cross-section.
(1) (a) and (c) (2) (c) and (d)
(3) (a) and (b) (4) (b) and (c)

115. Prophase I of meiosis differs from prophase of mitosis as in the former stage
(1) Condensation of chromatin takes place
(2) DNA replication takes place
(3) Pairing of homologous chromosome occurs
(4) Nuclear membrane disappears

116. Match the following columns and select the **correct** option.

	Column-I		Column-II
a.	*Penicillium*	(i)	Hyphae are septate
b.	*Colletotrichum*	(ii)	Sexual reproduction is absent
c.	*Albugo*	(iii)	Often employed in experimental genetics
d.	*Neurospora*	(iv)	Parasitic fungi on mustard

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

117. Select the **wrong** statement w.r.t. flowering plants.
(1) Megaspore mother cell is a large cell containing dense cytoplasm and a prominent nucleus
(2) Usually chalazal megaspore remains functional
(3) Megaspore mother cell is generally formed in the chalazal region of the nucellus
(4) Majority of flowering plants have monosporic embryo sac

118. As compared to dicot leaf, the monocot leaf has
(1) Conjoint and open vascular bundles
(2) Radial vascular bundles
(3) Different sized vascular bundles due to presence of parallel venation
(4) Undifferentiated mesophyll

119. Select the **odd** one w.r.t. '*ex situ*' conservation strategies.
(1) Zoological parks (2) Seed banks
(3) Wildlife safari parks (4) Wildlife sanctuaries

120. Select the **correct** sequence of events occur during DNA fingerprinting.
(1) Blotting → DNA digestion into fragments → Isolation of DNA → Electrophoresis → Autoradiography
(2) Isolation of DNA → DNA digestion into fragments → Electrophoresis → Blotting → Autoradiography
(3) Autoradiography → DNA digestion into fragments → Blotting → Electrophoresis
(4) DNA digestion into fragments → DNA isolation → Autoradiography → Blotting → Electrophoresis

121. The ratio of total number of phenotypes and genotypes for ABO blood group system in human population is
(1) 2 : 3 (2) 3 : 2
(3) 3 : 1 (4) 2 : 1

122. When a single gene product produces more than one effect this phenomenon is called
(1) Polyploidy (2) Pleiotropy
(3) Multiple allelism (4) Epistasis

Space for Rough Work

93. Given below are two statements. One is labelled as Assertion (A) and the other is labelled as Reason (R)

Assertion (A): pK_a value of methanamine is less than that of aniline

Reason (R): Aromatic amines are less basic than ammonia.

In the light of above statements, choose the **correct** option.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true and (R) is false

(4) (A) is false and (R) is true

94. The group reagent used in laboratory for the precipitation of metal ions of group V in qualitative analysis of cations is

(1) H_2S + dilute HCl

(2) Dilute HCl

(3) $NH_4OH + NH_4Cl$

(4) $(NH_4)_2CO_3 + NH_4OH$

95. Under isothermal condition, a gas at 27°C expands from 0.1 L to 2.1 L against a constant external pressure of 5 bar. The work done by the gas is

(Given that 1 L bar = 100 J)

(1) −105 J (2) −200 J

(3) −1000 J (4) −1050 J

96. For reaction

$(NH_4)_2Cr_2O_7(s) \longrightarrow N_2(g) + Cr_2O_3(s) + 4H_2O(g)$.

Difference of ΔH and ΔU at 47°C is

(1) 500 R (2) 15 R

(3) 1500 R (4) 1600 R

97. Solubility of AgCl in 0.1 M $CaCl_2$ solution will be (K_{sp} of AgCl = 1.8×10^{-10})

(1) 1.8×10^{-10} M (2) 9×10^{-10} M

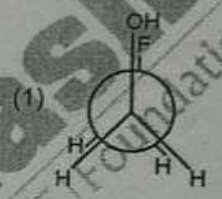
(3) 1.8×10^{-9} M (4) 9×10^{-9} M

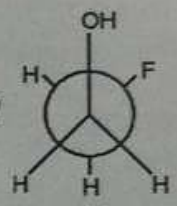
98. 90% of a first order reaction was completed in 100 minutes. The time required for the 99.9% reaction to complete is

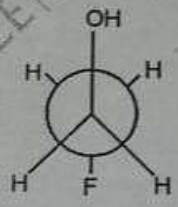
(1) 100 minutes (2) 200 minutes

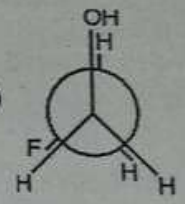
(3) 300 minutes (4) 400 minutes

99. Select the most stable conformer of $CH_2(OH)CH_2(F)$

(1) 

(2) 

(3) 

(4) 

100. The number of mole(s) of acidified $FeSO_4$ which can be completely oxidised by one mole of $KMnO_4$ is

(1) $\frac{1}{5}$ (2) 5

(3) $\frac{2}{5}$ (4) $\frac{5}{2}$

Space for Rough Work

80. Maximum number of atoms are present in
(1) 2 g Fe atoms (2) 2 g H_2O molecules
(3) 16 g of CH_4 (4) 10 g of H_2

81. Paramagnetic species among the following is
(1) N_2^+ (2) O_2^{2-}
(3) C_2 (4) F_2

82. Consider the following statements
(a) Interstitial compounds retain metallic conductivity
(b) CrO is a basic oxide
(c) Brass is an alloy of copper and tin
The **correct** statements are
(1) (a) and (b) only (2) (b) and (c) only
(3) (a) and (c) only (4) (a), (b) and (c)

83. Maximum number of orbitals for which 'n + l = 5' is
(1) 1 (2) 4
(3) 9 (4) 16

84. The compound that forms red coloured complex when reacts with ceric ammonium nitrate is
(1) $C_6H_5NH_2$ (2) $NH_2 - NH_2$
(3) $C_6H_5NO_2$ (4) C_2H_5OH

85. Minimum oxidising power among the following will be of
(1) HClO (2) $HClO_2$
(3) $HClO_3$ (4) $HClO_4$

SECTION - B

86. If $K_4[Fe(CN)_6]$ ionized to 10% then total moles of particles obtained, per mole of $K_4[Fe(CN)_6]$ is
(1) 1.2 (2) 1.6
(3) 1.4 (4) 2.4

87. On electrolysis of conc. H_2SO_4 solution, product obtained at anode is
(1) $H_2(g)$ (2) $SO_2(g)$
(3) $H_2S_2O_8$. (4) H_2O

88. Consider the following statements
(i) Ostwald's process is used for the manufacture of nitric acid
(ii) In gaseous state, HNO_3 exists as a planar molecule
(iii) Concentrated nitric acid oxidises iodine into iodic acid and releases NO_2 gas
Choose the **correct** statement(s)
(1) (i) and (ii) only (2) (i) only
(3) (i) and (iii) only (4) All (i), (ii) and (iii)

89. The pair of essential amino acids is
(1) Glutamine and Proline
(2) Histidine and Lysine
(3) Alanine and Tyrosine
(4) Serine and Cysteine

90. Match the following columns and choose the **correct** option.

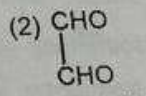
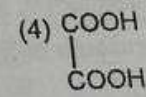
	Column-I		Column-II
a.	$Cu_2[Fe(CN)_6]$	(i)	Blood red
b.	$Al(OH)_3$	(ii)	Deep blue
c.	$[Cu(NH_3)_4]SO_4$	(iii)	Chocolate Brown
d.	$[Fe(SCN)]^{2+}$	(iv)	White

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

91. Consider the following reaction sequence

$$CaC_2 \xrightarrow{H_2O} A \xrightarrow[873\ K]{\text{red hot Fe tube}}$$

$$B \xrightarrow[(ii)\ Zn/H_2O]{(i)\ O_3} C$$

product C is
(1) HCHO (2) 
(3) CH_3COOH (4) 

92. **Correct** order of ionic radii of the given ions is
(1) $Eu^{3+} > Dy^{3+} > Pr^{3+}$
(2) $Dy^{3+} > Pr^{3+} > Eu^{3+}$
(3) $Dy^{3+} > Eu^{3+} > Pr^{3+}$
(4) $Pr^{3+} > Eu^{3+} > Dy^{3+}$

Space for Rough Work

70. Given below are the two statements

Statement I: Calcium phosphide on reaction with water gives phosphine gas.

Statement II: The solution of PH_3 in water decomposes in presence of light giving red phosphorus and H_2.

In light of above statements, choose the **correct** answer.

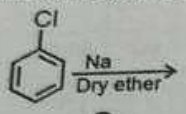
(1) Statement I is correct but Statement II is incorrect

(2) Both Statement I and Statement II are correct

(3) Statement I is incorrect but statement II is correct

(4) Both Statement I and Statement II are incorrect

71. In which of the given reactions, a new C — C bond formation does not take place?

(1) 

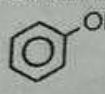
(2) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow{\text{dil. NaOH}}$

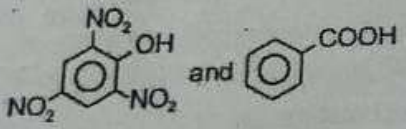
(3) $CH_3MgBr \xrightarrow[(ii)\ H_3O^+]{(i)\ CH_3CH_2CHO}$

(4) $CH_3CH_2CH_2MgBr \xrightarrow{H_2O}$

. Sodium bicarbonate test is used to distinguish

(1) CH_3CH_2OH and $CH_3CH_2CH_2OH$

(2) CH_3CH_2OH and 

(3) 

(4) HCOOH and CH_3CH_2CHO

The solution which shows positive deviation from Raoult's law is

1) Benzene + Toluene

2) n-hexane + n-heptane

3) Acetone + Ethanol

) Chloroethane + Bromoethane

74. Sodium phenoxide undergoes electrophilic substitution reaction with carbon dioxide to form salicylic acid. This reaction is known as

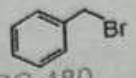
(1) Rosenmund reduction

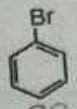
(2) Kolbe's reaction

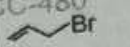
(3) Finkelstein reaction

(4) HVZ-reaction

75. Which among the following reacts at fastest rate by S_N1 mechanism?

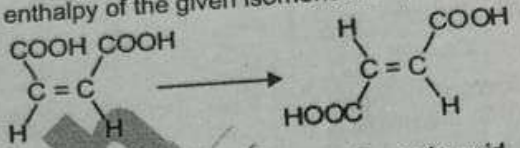
(1) 

(2) 

(3) 

(4) 

76. The standard enthalpies of combustion of fumaric acid and maleic acid are –1336.0 kJ mol^{-1} and –1359.2 kJ/mol, respectively. What will be the enthalpy of the given isomerisation process?



Maleic acid Fumaric acid

(1) Zero (2) +23.2 kJ/mol

(3) –23.2 kJ/mol (4) +46.4 kJ/mol

77. The most common oxidation states of Ni and Ti respectively are

(1) +4 and +3 (2) +2 and +4

(3) +2 and +2 (4) +3 and +4

78. pH of which of the following aqueous solutions depends on concentration of the salt?

(1) NaCl (2) CH_3COONH_4

(3) NH_4CN (4) CH_3COONa

79. In the following gaseous phase first order reaction

$A(g) \longrightarrow B(g) + C(g)$

Initial pressure observed was 200 mm Hg and after 20 minutes, it changed to 300 mm Hg. The rate constant for the reaction is

(1) 0.035 min^{-1} (2) 0.055 min^{-1}

(3) 0.693 min^{-1} (4) 0.115 min^{-1}

Space for Rough Work

61. Major product obtained in the given reaction is

$CH_3-CH=CH_2 \xrightarrow[(ii)\ H_2O_2/OH^-]{(i)\ B_2H_6/THF}$

(1) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

(2) $CH_3-CH_2-CH_2OH$

(3) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2OH$

(4) $CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$

62. Choose the **incorrect** match with respect to the product formed during the reaction of carbonyl compound with the given reagent

	Product	Reagent
(1)	Cyanohydrin	HCN
(2)	Acetal	NH_3
(3)	Schiff's base	RNH_2
(4)	Oxime	NH_2OH

63. **Correct** order of first ionisation enthalpy of the given elements is

(1) Si > Ge > Pb > Sn (2) Ge > Si > Pb > Sn

(3) Si > Ge > Sn > Pb (4) Si > Pb > Ge > Sn

64. Given below are the two statements

Statement I: Thiamine is water soluble vitamin.

Statement II: Deficiency of thiamine causes Beri Beri.

In light of the above statements, choose the **correct** answer.

(1) Statement I is correct but statement II is incorrect

(2) Statement I is incorrect but statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

65. The possible reaction taking place at cathode during corrosion of iron is

(1) $Fe^{2+} + 2e^- \rightarrow Fe$

(2) $O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(l)$

(3) $H_2O(l) + e^- \rightarrow 1/2\ H_2(g) + OH^-(aq)$

(4) $O_2 + 2H^+(aq) + 4e^- \rightarrow 2OH^-(aq)$

66. The **incorrect** statement about Kolbe's electrolysis of sodium acetate is

(1) Product obtained at cathode is hydrogen

(2) Both ethane and carbon dioxide are obtained at anode

(3) At anode, acetate ion is first converted to acetate free radical

(4) The solution obtained after electrolysis is acidic

67. Match the structures in column-I with xenon compounds given in column-II and assign the **correct** code.

CC-480 CC-480

	Column-I		Column-II
a.	Trigonal pyramidal	(i)	XeF_2
b.	Square pyramidal	(ii)	XeF_6
c.	Linear	(iii)	XeO_3
d.	Distorted octahedral	(iv)	$XeOF_4$

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

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

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

(4) a(ii), b(iii), c(i), d(iv)

68. Consider the following statements

(a) Melting point of NH_3 is greater than SbH_3

(b) PH_3 is more basic than AsH_3

(c) Standard enthalpy of formation of PH_3 is positive while that of AsH_3 is negative

The **correct** statements are

(1) (a) and (b) only (2) (b) and (c) only

(3) (a) and (c) only (4) (a), (b) and (c)

69. Which among the following is a paramagnetic complex?

(1) $[Ni(CO)_4]$ (2) $[Ni(CN)_4]^{2-}$

(3) $[NiCl_4]^{2-}$ (4) $[PtCl_4]^{2-}$

Space for Rough Work

CHEMISTRY

SECTION-A

51. Mass of 0.1 mol of diatomic (X_2) species is 16 g. Gram atomic mass of X is
(1) 50 g (2) 80 g
(3) 100 g (4) 160 g

52. Correct order of wavelength of given electromagnetic radiations is
(1) UV > Microwaves > Visible > Radio waves
(2) UV > Microwaves > Radio waves > Visible
(3) Radio waves > Microwaves > UV > Visible
(4) Radio waves > Microwaves > Visible > UV

53. Angular momentum of an electron present in 4th orbit of hydrogen atom is
(1) $\frac{h}{\pi}$ (2) $\frac{h}{2\pi}$
(3) $\frac{2h}{\pi}$ (4) $\frac{h}{4\pi}$

54. Consider the following statements.
Statement I: Principal quantum number determines the size of the orbital.
Statement II: One of the possible value of m_l for valence electron of calcium is –1.
In the light of above statements, choose the **correct** option.
(1) Both statement I and statement II are correct
(2) Both statement I and statement II are incorrect
(3) Statement I is correct but statement II is incorrect
(4) Statement I is incorrect but statement II is correct

55. Match the oxides given in column I with its property given in column II

	Column I		Column II
(a)	NO	(i)	Acidic
(b)	Cl_2O_7	(ii)	Basic
(c)	CaO	(iii)	Amphoteric
(d)	Al_2O_3	(iv)	Neutral

Choose the **correct** match
(1) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
(2) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)
(3) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
(4) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

56. Choose the **incorrect** statement
(1) Benzaldehyde on reaction with acetophenone with dilute alkali at 293 K gives benzalacetophenone as major product.
(2) Formaldehyde do not undergo aldol condensation reaction
(3) Benzoic acid does not undergo Friedel-Crafts reaction
(4) When formaldehyde reacts with I_2 + NaOH, it forms a yellow precipitate

57. Reactive intermediate formed during the formation of salicylaldehyde in Reimer-Tiemann reaction is
(1) $\overset{\ominus}{C}HCl_2$ (2) $\overset{\oplus}{C}Cl_3$
(3) $:CCl_2$ (4) $:CHCl_2$

58. 'O – O' bond length is maximum in
(1) O_2^- (2) O_2
(3) O_2^+ (4) O_2^{2-}

59. Consider the following statements
(a) The basic structural unit of silicates is SiO_4^{4-}
(b) Cement is an example of man-made silicate
(c) ZSM-5 is used to convert alcohols directly into gasoline
The **correct** statements are
(1) (a) and (b) only (2) (b) and (c) only
(3) (a) and (c) only (4) (a), (b) and (c)

60. All of the following complexes have central metal ion d^2sp^3 hybridised, **except**
(1) $[Co(en)_3]Cl_3$ (2) $K_3[Co(ox)_3]$
(3) $[Co(H_2O)_6]Br_3$ (4) $K_3[CoF_6]$

Space for Rough Work

40. For the astronomical telescope, four lenses of focal length 10 cm, –10 cm, 100 cm and –100 cm are available. The focal length of objective lens for maximum magnification should be
(1) 10 cm (2) – 10 cm
(3) 100 cm (4) – 100 cm

41. The deflection in a galvanometer of resistance 60 Ω, decreases from 20 mA to 4 mA by a shunt of resistance
(1) 30 Ω (2) 20 Ω
(3) 15 Ω (4) 12 Ω

42. If a parent nucleus ${}_{Z}X^{A}$ emits two β positive particles, then for daughter nucleus, atomic number is
(1) Z (2) $Z-2$
(3) $Z+1$ (4) $Z+2$

43. In uniform circular motion, which of the following statements is incorrect?
(1) Change in magnitude of acceleration is zero
(2) Magnitude of change in velocity is non-zero
(3) Change in magnitude of velocity is zero
(4) Magnitude of change in linear momentum is zero

44. The equation of a wave pulse travelling along x-axis is given by $y = \frac{30}{2+(x-20t)^2}$, x and y are in metre and t is in second. The amplitude of the wave pulse is
(1) 5 m (2) 20 m
(3) 15 m (4) 30 m

45. Pure silicon at 300 K has equal electron (n_e) and hole (n_h) concentration of $1.5 \times 10^{16}\ m^{-3}$. Doping by indium increases n_h to $4.5 \times 10^{22}\ m^{-3}$. The value of n_e in the doped silicon is
(1) $5 \times 10^{9}\ m^{-3}$ (2) $2.25 \times 10^{11}\ m^{-3}$
(3) $9 \times 10^{5}\ m^{-3}$ (4) $3 \times 10^{19}\ m^{-3}$

46. A wire with mass per unit length $2 \times 10^{-3}\ kg\ m^{-1}$ is under a tension of 80 N. The speed of transverse wave in the wire will be
(1) 100 m/s (2) 200 m/s
(3) 320 m/s (4) 250 m/s

47. Match the columns and tick the correct option.

Column-I		Column-II	
A.	Moment of inertia of a ring (M, R) about its axis	(P)	$\frac{MR^2}{2}$
B.	Moment of inertia of a solid cylinder (M, R) about its axis	(Q)	$\frac{5}{3}MR^2$
C.	Moment of inertia of hollow sphere (M, R) about any tangent	(R)	MR^2
D.	Moment of inertia of solid sphere (M, R) about its diameter	(S)	$\frac{2}{5}MR^2$

(1) A(R); B(P); C(S); D(Q)
(2) A(P); B(Q); C(R); D(S)
(3) A(P); B(R); C(Q); D(S)
(4) A(R); B(P); C(Q); D(S)

48. If a wire of length 50 cm, which moves with a velocity of 6 m/s at right angles to a uniform magnetic field develops 16 V emf across its ends, then value of magnetic field is
(1) 5.33 T (2) 4.84 T
(3) 8.12 T (4) 7.98 T

49. Two projectiles are projected at 37° and 53° with the horizontal with the same speed. The ratio of the horizontal range attained by the two projectiles respectively is
(1) 1 : 2 (2) 3 : 4
(3) 4 : 3 (4) 1 : 1

50. Position of a particle with time varies as $x = A\sin(Bt + C)$. The SI unit of $\frac{AB}{C}$ is
(1) kg/s (2) m s
(3) m/s (4) m/s^2

Space for Rough Work

29. The output of an AND gate is connected to both the inputs of NOR gate. The combination will act as a
(1) NOT gate (2) AND gate
(3) NOR gate (4) NAND gate

30. Two particles each of mass 'm' move in a circle of radius '$2r$' under the action of their mutual gravitational attraction. The speed of each particle will be
(1) $\sqrt{\frac{Gm}{r}}$ (2) $\frac{1}{2}\sqrt{\frac{Gm}{r}}$
(3) $\frac{1}{2}\sqrt{\frac{Gm}{2r}}$ (4) $\sqrt{\frac{Gm}{2r}}$

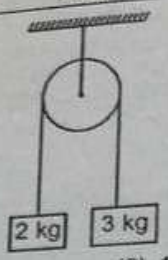
31. Electric field due to a short dipole on its axis depends on distance r from the dipole as
(1) r^2 (2) $\frac{1}{r^3}$
(3) r (4) $\frac{1}{r^2}$

32. A parallel plate capacitor with a dielectric between the plates is charged completely and then battery is disconnected. If the dielectric is pulled out, then
(1) Charge stored in the capacitor will decrease
(2) Potential difference between the plates will decrease
(3) Capacitance will increase
(4) Energy stored in the capacitor will increase

33. A slit of width d is illuminated by a light of wavelength ($\lambda = 6000$ Å). If the first minima falls at $\theta = 30°$, then value of d will be
(1) 1.2 μm (2) 6×10^{-4} mm
(3) 3250 Å (4) 12×10^{-4} m

34. In a certain vernier callipers, 25 divisions on vernier scale have same length as 24 divisions on main scale. One division on main scale is 1 mm long. The least count of the instrument is
(1) 0.04 mm (2) 0.01 mm
(3) 0.02 mm (4) 0.08 mm

35. In the given system of masses, the net work done by the tension in the string during the fourth second, after the system is released from rest, will be ($g = 10$ m/s^2)



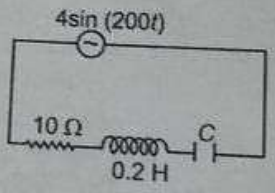
(1) 40 J (2) 100 J
(3) Zero (4) 150 J

SECTION - B

36. Rate of emission of a black body at 546°C is E. Then the rate of emission of radiation of same body at 0°C will be
(1) $81E$ (2) $3E$
(3) $\frac{E}{3}$ (4) $\frac{E}{81}$

37. Consider the following two statements:
(a) Electrostatic field is always conservative in nature.
(b) In electromagnetic waves, the phase difference between oscillating electric and magnetic fields is 90°.
The **correct** statement(s) is/are
(1) Only (a) (2) Only (b)
(3) Both (a) and (b) (4) Neither (a) nor (b)

38. The power factor of the circuit shown in the figure is $\frac{1}{\sqrt{2}}$. The capacitive reactance of the circuit is

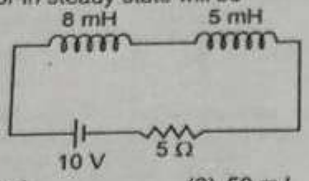


(1) 30 Ω (2) 50 Ω
(3) 40 Ω (4) Either (1) or (2)

39. Photons of wavelength 660 nm are emitted from a 60 watt lamp. What is the number of photons emitted per second?
(1) 2×10^{16} (2) 2×10^{28}
(3) 2×10^{20} (4) 2×10^{22}

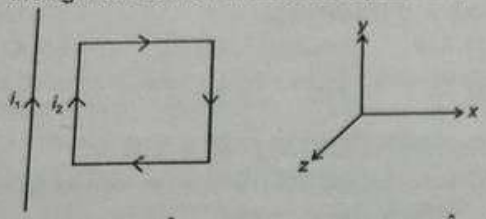
Space for Rough Work

17. In the given circuit, the energy stored in the 5 mH inductor in steady state will be



(1) 26 mJ (2) 50 mJ
(3) 20 mJ (4) 10 mJ

18. A square loop of conducting wire has current flowing through it. A long straight current carrying wire is placed in the plane of the loop as shown in the figure. The net force on the square loop will be



(1) Towards $+\hat{i}$ (2) Towards $+\hat{k}$
(3) Towards $-\hat{i}$ (4) Towards $-\hat{j}$

19. A particle is executing simple harmonic motion such that its displacement from mean position is x [$x <$ amplitude]. The total mechanical energy of the particle is proportional to
(1) x (2) x^2
(3) $\sqrt{x}$ (4) x^0

20. If same kinetic energy is provided to electron, proton, neutron and α-particle, then the particle with the maximum de-Broglie wavelength will be
(1) Electron (2) Proton
(3) Neutron (4) α-particle

21. The frequency of the first line of Lyman series in hydrogen atom is f. The frequency of the corresponding line emitted by a doubly ionised lithium atom will be
(1) $\frac{f}{9}$ (2) $9f$
(3) $27f$ (4) $\frac{f}{3}$

22. The radii of curvature of a biconvex lens are 10 cm and 15 cm. If the refractive index of lens is $\frac{3}{2}$, then the power of the lens is
(1) 1.25 D (2) 1.67 D
(3) 3.2 D (4) 8.33 D

23. The binding energies of nuclei A and B are K_1 and K_2 respectively. Four nuclei of A fuse together to give one nuclei of B and energy released is Q. The correct relation of Q with K_1 and K_2 will be
(1) $Q = K_1 - K_2$ (2) $Q = 4K_1 - K_2$
(3) $Q = K_2 - K_1$ (4) $Q = K_2 - 4K_1$

24. A light of wavelength 5000 Å is incident on a metallic surface of work function 2 eV. The maximum kinetic energy of photoelectrons emitted will be nearly
(1) 4.48 eV (2) 2 eV
(3) 0.48 eV (4) 2.28 eV

25. Barrier voltage of a p-n junction diode depends on
(1) Temperature
(2) Doping density
(3) Semiconductor material
(4) All of these

26. The dimensional formula for a force couple is
(1) $[ML^3T^{-2}]$ (2) $[MLT^{-3}]$
(3) $[ML^2T^{-2}]$ (4) $[ML^{-1}T^{-1}]$

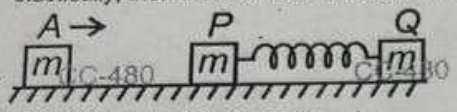
27. In an adiabatic process, if pressure of a gas is proportional to the square of its absolute temperature, then the ratio of molar specific heat at constant volume to that at constant pressure is
(1) $\frac{1}{2}$ (2) $\frac{3}{2}$
(3) $\frac{2}{3}$ (4) 2

28. A point charge of 1 μC is placed at a point $A(1, 0, 0)$ m and another identical charge is placed at $B(0, 0, 1)$ m. The force between them is
(1) 18×10^{-3} N (2) 4.5×10^{-3} N
(3) 6×10^{-3} N (4) 9×10^{-3} N

Space for Rough Work

7. A circuit consisting of a resistance and an inductance coil in series is connected with alternating voltage of 20 V. If the voltage across the resistance is 12 V, then voltage across the coil is
(1) 8 V (2) 20 V
(3) 16 V (4) 6 V

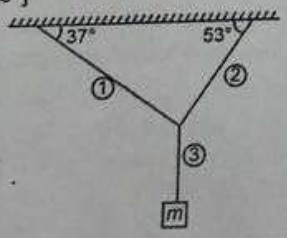
8. Two identical blocks P and Q each of mass m are connected with a light spring and are kept initially at rest on a smooth surface. A third identical block moving towards positive x-axis strikes block P elastically, then the centre of mass of P and Q



(1) Will move towards $+x$ axis only
(2) Will move towards $-x$ axis only
(3) Will oscillate
(4) Will remain at rest

9. **Assertion (A) :** The focal length of a lens changes when red light is replaced by blue light.
Reason (R) : Refractive index of lens depends on the wavelength of light used.
(1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(2) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
(3) Assertion is true but Reason is false
(4) Both Assertion and Reason are false

10. A block of mass 10 kg is hung with the help of light strings as shown. The tension in string ① is [Use $g = 10\ m/s^2$]



(1) 80 N (2) 60 N
(3) 30 N (4) 42 N

11. A small pencil is placed in front of a concave mirror of radius of curvature 20 cm. If the image of the pencil formed by the mirror is inverted, then the distance of the pencil from the mirror may be equal to
(1) 20 cm (2) 12 cm
(3) 8 cm (4) Both (1) and (2)

12. The magnetic flux linked with a coil is given by the equation $\phi = 3t^2 + 4t + 1$, where ϕ is in Wb and t is in second. The induced emf in the coil at $t = 2$ s will be
(1) 16 V (2) 4 V
(3) 8 V (4) Zero

13. When two resistors are connected in parallel, their effective resistance is equal to $\frac{10}{7}\Omega$. If one of the resistors is 2 Ω, then resistance of the other resistor is
(1) 3 Ω (2) 5 Ω
(3) $\frac{4}{7}\Omega$ (4) $\frac{8}{7}\Omega$

14. For an ideal gas of diatomic molecules (symbols have their usual meanings)
(1) $C_V = \frac{3}{2}R$ (2) $C_V = \frac{5}{2}R$
(3) $C_P = \frac{5}{2}R$ (4) $C_P = 3R$

15. Consider the following statements:
(a) Gravitational potential energy of a two point mass system is negative
(b) In the case of a spherical shell, the plot between gravitation potential and distance from the centre of the shell is continuous
(c) Gravitational field intensity due to earth increases with increase in altitude
The correct statement(s) is/are
(1) (a) and (b) only (2) (b) and (c) only
(3) (a) and (c) only (4) (a), (b) and (c)

16. Two wires of the same material and same cross section are stretched by the same force. If their lengths are in the ratio 3 : 4 respectively, then their elongations are in the ratio
(1) 3 : 4 (2) 4 : 3
(3) 9 : 16 (4) 2 : 3

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22/04/2024

Phase-I
CODE-A

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FINAL TEST SERIES for NEET-2024

Test-10

Time : 3 Hrs. 20 Mins.

MM : 720

Complete Syllabus of class XI & XII

Instructions :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

Choose the correct answer:

SECTION-A

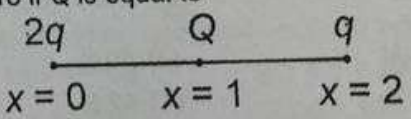
1. The ratio of the magnitude of instantaneous velocity and instantaneous speed of a particle is always
   (1) Less than one (2) Greater than one
   (3) Equal to one (4) Zero

2. In a thermodynamic process, 120 J of heat is added to a gas and work done by the gas is 70 J. The change in internal energy of the gas in the process is
   (1) 190 J (2) – 50 J
   (3) 50 J (4) –70 J

3. A particle is moving along x-axis under the influence of a variable force given by $F = \frac{3}{x^2}$, where x is in metre and F is in newton. The work done in displacing the particle from $x = 1$ m to $x = 3$ m is
   (1) 2 J (2) 4 J
   (3) $\frac{2}{3}$ J (4) $\frac{4}{3}$ J

4. Water is flowing through a horizontal tube of non-uniform cross-section. At the point of smallest cross-section in the tube, the water will have
   (1) Maximum speed and maximum pressure
   (2) Maximum speed and minimum pressure
   (3) Minimum speed and maximum pressure
   (4) Minimum speed and minimum pressure

5. Three charges are placed in a straight line as shown in the figure. The resultant force on q will be zero if Q is equal to



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

6. A parallel plate capacitor has a capacitance 80 μF in air and 140 μF when immersed in oil. The dielectric constant of the oil is
   (1) 1.5 (2) 1.45
   (3) 2.25 (4) 1.75