PYRAMID

IIT-JEE | MEDICAL | FOUNDATION

NEET TEST PAPER

Time : 3 Hrs.   Max. Marks : 720

Important Instructions :

1.   The test is of 3 hours duration and Test Booklet contains 200 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.

2.   Use Black Ball point Pen only for writing particulars on this page/marking responses.

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

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

5.   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.

7.   Each candidate must show on demand his/her Admission Card to the Invigilator.

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

9.   Use of Electronic/Manual Calculator is prohibited.

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

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

Name of Student : _____

" We are what we repeatedly do. Excellence, therefore, is not an act but a habit .'

Aristotle - Greek philosopher (384 BC - 322 BC)

PART – I [BOTANY]

SECTION - A

1. In pea plants, yellow seeds are dominant to green. If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in F_1 generation :

(A) 50: 50   (B) 9: 1

(C) 1 : 3   (D) 3: 1

2. Identify the **wrong** statement with reference to the gene 'I' that controls ABO blood groups.

(A) A person will have only two of the three alleles.

(B) When IA and IB are present together, they express same type of sugar.

(C) Allele 'i' does not produce any sugar.

(D) The gene (I) has three alleles.

3. Which of the following pairs is **wrongly** matched?

(A) Starch synthesis in pea:Multiple alleles

(B) ABO blood grouping : Co-dominance

(C) XO type sex determination: Grasshopper

(D) T.H. Morgan : Linkage

4. Lack of independent assortment of two genes A and B in fruit fly Drosophila is due to :-

(A) Recombination

(B) Linkage

(C) Crossing over

(D) Repulsion

5. If a colour-blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour-blind is :

(A) 0.5   (B) 0.75

(C) 1   (D) 0

6. During DNA replication, Okazaki fragments are used to elongate :

(A) The leading strand towards replication fork.

(B) The lagging strand towards replication fork.

(C) The leading strand away from replication fork.

(D) The lagging strand away from the replication fork.

7. Which of the following features of genetic code does allow becteria to produce human insulin by recombinant DNA technology?

(A) Genetic code is nearly universal

(B) Genetic code is specific

(C) Genetic code is not ambiguous

(D) Genetic code is redundant

8. The first phase of translation is :

(A) Recognition of DNA molecule

(B) Aminoacylation of tRNA

(C) Recognition of an anti-codon

(D) Binding of mRNA to ribosome

9. Expressed Sequence Tags (ESTs) refers to:

(A) DNA polymorphism

(B) Novel DNA sequences

(C) Genes expressed as RNA

(D) Polypeptide expression

10. Match the following genes of the Lac operon with their respective products :

(a) i gene   (i) β-galactosidase
(b) z gene   (ii) Permease
(c) a gene   (iii) Repressor
(d) y gene   (iv) Transacetylase

Select the **correct** option:

|	(a)	(b)	(c)	(d)
(A)	(iii)	(i)	(iv)	(ii)
(B)	(iii)	(iv)	(i)	(ii)
(C)	(i)	(iii)	(ii)	(iv)
(D)	(iii)	(i)	(ii)	(iv)

11. Find odd one w.r.t. plants having green succulent stem
(A) Opuntia
(B) Euphorbia
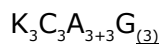(C) Citrus
(D) Both (A) & (B)

12. The site of origin of the new plantlets in potato, sugarcane and banana are
(A) Nodes
(B) Internodes
(C) Both nodes and internodes
(D) Leaf margins

13. Which of the following is incorrect w.r.t. the family, the floral diagram, of which is provided below ?
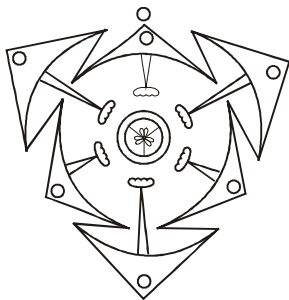
(A) The floral formula is : Br $\oplus \male$
$K_3C_3A_{3+3}G_{(3)}$
(B) The plants usually possess exalbuminous seeds
(C) Fruit is usually capsule
(D) More than one option

14. Read the following statements and select the correct ones.
(i) PS-I is involved in non-cyclic photophosphorylation only.
(ii) PS-II is involved in both cyclic and non -cyclic photophosphorylation.
(iii) Stroma lamellae membranes possess PS-I only, whereas grana lamellae membranes possess both PS-I and PS-II.
(A) (i) only
(B) (ii) only
(C) (iii) only
(D) (i), (ii) and (iii)

15. Which of the following is not an external factor influencing photosythesis?
(A) CO_2 concentration
(B) O_2 concentration
(C) Availability of water
(D) Chlorophyll concentration

16. Select the wrong statement with respect to glycolysis.
(A) It occurs outside mitochondria.
(B) It is an anaerobic phase.
(C) Glucose undergoes partial oxidation to form 2 molecules of pyruvic acid.
(D) Glucose is phosphorylated to glucose-6-phosphate by isomerase enzyme.

17. Select the wrong statement.

(A) Oxidative decarboxylation of pyruvic acid requires the presence of enzyme pyruvate dehydrogenase.

(B) All living cells whether aerobic or anaerobic, perform glycolysis.

(C) Cyanide does not stop chemiosmosls.

(D) Respiratory chain uses O_2 as final hydrogen acceptor.

18. Which one is paired incorrectly?

(A)	Auxin	Isolated from human urine
(B)	Zeatin	Isolated from corn kernels and coconut milk
(C).	Gibberellins	Isolated from fungus G. fujikori
(D)	Abscisic acid	Isolated from ripened Oranges

19. Premature leaf fall is due to deficiency of

(A) sodium

(B) potassium

(C) zinc

(D) phosphorus

20. Which is the correct order of ecological hierarchy ?

(A) Biome $\rightarrow$ Populations $\rightarrow$ Community $\rightarrow$ Organism

(B) Organism $\rightarrow$ Biome $\rightarrow$ Population $\rightarrow$ Community

(C) Population $\rightarrow$ Community $\rightarrow$ Biome $\rightarrow$ Organism

(D) Organism $\rightarrow$ Population $\rightarrow$ Community $\rightarrow$ Biome

21. In a population per capita birth rate is 0.15 and per capita death rate is 0.08 during a unit time period. What is the value of r (intrinsic rate of natural increase) for the given population?

(A) 0.23   (B) 0.07

(C) 0.05   (D) 0.25

22. In the following pie chart of global vertebrates diversity, what does A, B and C represent respectively?
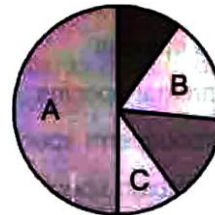
(A) Birds, Fishes, Amphibians

(B) Mammals, Reptiles, Birds

(C) Fishes, Birds, Amphibians

(D) Amphibians, Fishes, Reptiles

23. Below is the digramatic representation of response of organisms against temperature. Find out the correct match.
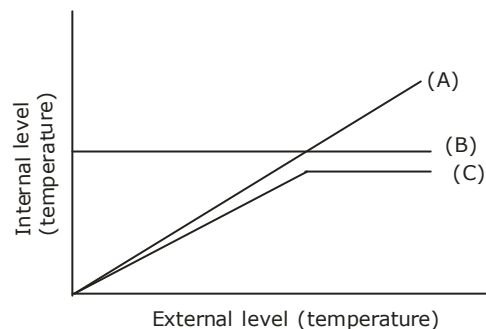
(A) A-Plants, B-birds

(B) A-Birds, B-mammals

(C) C-Mammals, B-plants

(D) A-Birds, B-Plants

24. The suffix-phyta indicates

(A) Family   (B) Order

(C) Class   (D) Division

25. Chromatophores take part in

(A) Photosynthesis   (B) Growth

(C) Movement   (D) Respiration

26. The structures that help some bacteria to attach to rocks and or host tissues are

(A) Rhizoids

(B) Fimbriae

(C) Mesosomes

(D) Holdfast

27. Cell wall is absent in

(A) Aspergillus   (B) Funaria

(C) Mycoplasma   (D) Nostoc

28. Cyrysophytes, euglenoids, dinoflagellates and slime moulds are included in the kingdom

(A) Protista   (B) Fungi

(C) Animalia   (D) Monera

29. Sexual reproduction by non-flagellated but similar in size gametes is seen in :

(A) Chlamydomonas

(B) Volvox

(C) Spirogyra

(D) Fucus

30. Heterosporous ferns include both :

(A) Lycopodium and Equisetum

(B) Selaginella and Salvinia

(C) Psilotum and phylloglossum

(D) Selaginella and Equisetum

31. The endosperm of a gymnosperm develops _____fertilization, whereas the endosperm of an angiosperm develops _____ fertilization.

(A) Before, before   (B) After, after

(C) After, before   (D) Before, after

32. The pyrenoids made up of

(A) Proteinaceous centre and starchy sheath

(B) Core of protein surrounded by fatty sheath

(C) Core of starch surrounded by sheath of protein

(D) Core of nucleic acid surrounded by protein sheath

33. Choose the **odd** one w.r.t. the ploidy in a typical angiosperm.

(A) Generative cell

(B) Nucellus

(C) Tube nucleus

(D) Pollen

34. Seeds of which of the given plants germinated after 10,000 years of dormancy ?

(A) Date palm

(B) Lupinus arcticus

(C) Oxalis

(D) Tomato

35. Which of the following posses sexual structure in angio sperms ?

(A) leaf

(B) root

(C) flower

(D) stern

Section B

36. Select the **correct** match.

(A)	Phenylketonuria	–	Autosomal dominant trait
(B)	Sickel cell anaemia	–	Autosomal recessive trait, chromosome-11
(C)	Thalassemia	–	X linked
(D)	Haemophilia	–	Y linked

37. The net electrical charge on DNA and histones is :
(A) Both positive
(B) Both Negative
(C) Negative and positive respectively
(D) Zero

38. How many components listed below are part of cyclic ETS?
P_{700}, P_{680}, NADP reductase, Hydrogen carrier, PS I, Water Splitting Complex, PS II
(A) Two (B) Three
(C) Five (D) Four

39. Refer the given figure, What does it represent?
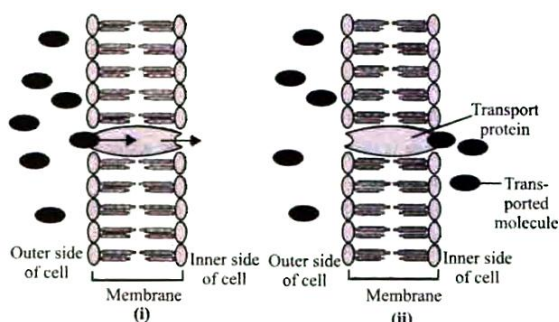
(A) Simple diffusion
(B) Facilitated diffusion
(C) Osmosis
(D) Active transport

40. The hydrostatic pressure developed inside the cell on the cell wall due to endosmosis is called
(A) osmotic potential
(B) diffusion pressure
(C) wall pressure
(D) turgor pressure.

41. Read the following statements and select the incorrect ones.
(i) The co-ordinated activities of the legume and Rhizobium bacteria depend on chemical interactions between the symbiotic partners.
(ii) Leguminous roots secrete chemical attractants that attract Rhizobium bacteria living nearby.
(iii) N, P and K usually do not get deficient in soil due to their low plant requirement
(iv) Nitrogen cycle is regular circulation of nitrogen amongst living organisms with its reservoir pool in lithosphere and cycling pool in atmosphere.
(A) (i) and (ii)
(B) (ii) and (iii)
(C) (iii) and (iv)
(D) (ii), (iii) and (iv)

42. The biomass available for consumption by the herbivores and the decomposers is called
(A) net primary productivity
(B) secondary productivity
(C) standing crop
(D) gross primary productivity.

43. The sequence of communities of primary succession in water is

(A) phytoplankton, sedges, free-floating hydrophytes, rooted hydrophytes, grasses and trees.

(B) phytoplankton, rooted hydrophytes, free-floating hydrophytes, , reed swamp, grasses and trees.

(C) free-floating hydrophytes, sedges, phytoplankton, rooted hydrophytes, grasses and trees.

(D) phytoplankton, rooted submerged hydrophytes, floating hydrophytes, reed swamp, grasses, meadow and trees.

44. Amongst the animal groups given below, which one has the highest percentage of endangered species?

(A) Insects   (B) Mammals

(C) Amphibians   (D) Reptiles

45. The historic convention on Biological Diversity held in Rio de Janeiro in 1992 is known as

(A) CITES Convention

(B) The Earth Summit

(C) G-16 Summit

(D) MAB Programme.

46. Find Incorrect statement w.r.t. catalytic converter

(A) Platinum-palladium and rhodium as catalysts

(B) Lead in petrol activates the catalysts

(C) Reduced the emission of poisonous gases

(D) CO and No_x changed to CO_2 and N_2 gas

47. Which among the following is not prokaryote ?

(A) Saccharomyces

(B) Mycobacterium

(C) Nostoc

(D) Oscillatoria

48. Age of a tree can be estimated by ?

(A) Its height and girth

(B) Biomass

(C) Number of annual rings

(D) Diameter of its heartwood

49. Lignin is a component of the secondary walls of :-

(A) Epidermis

(B) Collenchyma

(C) Sclerenchyma

(D) Parenchyma

50. The most impotant function of the trichomes is :

(A) They prevent water loss due to transpiration

(B) They prevent herbivory

(C) They are sensory structures that decipher the wind velocity and direction

(D) They play an important part in pollination of plants

PART – II [ZOOLOGY]

SECTION - A

51. A change in ovum after penetration of sperm is :-

(A) Formation of first polar body

(B) Second meiosis division starts

(C) First meiosis division starts

(D) Formation of second polar body

52. Statement True (T) or False (F):-

(i) During pregnancy all events of the menstrual cycle are not completely stop.

(ii) menstruation only occurs if the released ovum is not fertilized.

(iii) Lack of pregnancy is clear indication of pregnancy.

(iv) The cycle ends with the menstrual bleeding.

	(i)	(ii)	(iii)	(iv)
(A)	F	T	F	T
(B)	T	F	T	F
(C)	F	T	F	F
(D)	T	T	F	T

53. At the time of implantation, the human embryo is called :

(A) Gastrulla

(B) Blastocyst

(C) Zygote

(D) Morulla

54. Select the correct match of the techniques given in column I with its feature given in column II.

	Column I		Column II
a.	ICSI	I.	Artificially introduction of semen into the vegina or uterus.
b.	IUI	II.	Transfer of ovum collected from a donor into the fallopian tube where fertilization occur
c.	IUT	III.	Formation of embryo by directly injecting sperm into the ovum
d.	GIFT	IV.	Transfer of the zygote or early embryo (with upto 8 blastomeres) into a fallopian tube.
e.	ZIFT	V.	Transfer of embryo with more than 8 blastomeres into the uterus

Options :-

(A) a - V; b - IV; c - I; d - III; e - II

(B) a - I; b - II; c - III; d - IV; e - V

(C) a - III; b - V; c - II; d - IV; e - I

(D) a - III; b - I; c - V; d - II; e - IV

55. Consider the following four statements (a-d) and select the option which includes all the **correct** ones only : -

(a) B-lymphocytes mediate Cell-mediated immunity

(b) Cell mediated immune response is responsible for graft rejection

(c) Subsequent encounter with the same pathogen elicits a highly intensified anamnestic response

(d) Interferons protect non-infected cells from further Bacterial infection

Options :-

(A) Statements b, c, d

(B) Statements b, c

(C) Statements c, d

(D) Statements b, c, d

56. Leucocytes are responsible for humoral immune response ?
(A) T-lymphocytes
(B) B-lymphocytes
(C) Macrophages
(D) Neutrophils

57. At which stage of HIV infection does one usually show symptoms of AIDS :
(A) Within 15 days of sexual contact with an infected person.
(B) When the infected retro virus enters host cells.
(C) When HIV damages large number of helper T-Lymphocytes,
(D) When the viral DNA is produced by reverse transcriptase,

58. When the body is exposed to an antigen for the first time, a low intensity primary response is elicited. During this response, the antibodies mainly formed are of the class :-
(A) IgA   (B) IgE
(C) IgM   (D) IgG

59. Counter-current mechanism helps to maintain a **concentration gradient**. This **gradient** help in :
(A) easy passage of water from medulla to collecting tubule and thereby concentrating urine.
(B) easy passage of water from collecting tubule to interstitial fluid and thereby concentrating urine.
(C) easy passage of water from medullary interstitial fluid to collecting tubule and there by diluting urine.
(D) easy passage of water from collecting tubule to interstitial fluid and there by diluting urine.

60. If a **person** drinks excess amount of water which decreases **osmolarity** of **blood**, then which one of the following would be released into the **blood** ?
(A) Antidiuretic hormone
(B) Renin
(C) Atrial natriuretic factor
(D) Aldosterone

61. The **H-zone** in the skeletal muscle fibre is due to
(A) Extension of myosin filaments in the central portion of the A-band
(B) The absence of myofibrils in the central portion of A-band
(C) The central gap between myosin filaments in the A-band
(D) The central gap between actin filaments extending through myosin filaments in the A-band

62. Arrange the following in the order of increasing volume ?
(A) Tidal volume
(B) Residual volume
(C) Inspiratory reserve volume
(D) Vital capacity
(A) A < B < C < D
(B) A < C < B < D
(C) A < D < C < B
(D) A < D < B < C

63. Which of the following is **correct**?

	Alveoli	Dexogy genated blood	Tissue
(A)	PO_2 = 159 mm Hg	PCO_2 = 40 mm Hg	PCO_2 = 20 mm Hg
(B)	PCO_2 = 40 mm Hg	PO_2 = 95 mm Hg	PO_2 = 40 mm Hg
(C)	PO_2 = 104 mm Hg	PCO_2 = 45 mm Hg	PCO_2 = 45 mm Hg
(D)	PO_2 = 40 mm Hg	PO_2 = 40 mm Hg	PCO_2 = 45 mm Hg

64. Which one is **not** a platyhelminthes ?

(A) Tapeworm   (B) Liver fluke

(C) Planaria   (D) Hookworm

65. Consider the following characteristic of fishes :-

(a) They have four pairs of gills which are covered by an operculum.

(b) They have air bladder which regulates buoyancy

(c) They are mostly viviparous and development is direct

(d) Their body is streamlined and covered with cycloid/ ctenoid scales

Which of the above characteristics regarding **bony fishes** are **correct** ?

(A) a, b and c   (B) c and d

(C) a, b and d   (D) b alone

66. Match the column :-

(a)	Dentalium	(i)	Brittle star
(b)	Ophiura	(ii)	Cuttle fish
(C)	Antedon	(iii)	Sea Urchin
(d)	Echinus	(iv)	Tusk shell
(e)	Sepia	(v)	Sea lily

(A) a-(iv). b-(i), c-(iv). d-(ii), e-(iii)

(B) a-(iv), b-(i), c-(v), d-(iii). e-(ii)

(C) a-(i), b-(iv), c-(v), d-(iii). e-(ii)

(D) a-(iv), b-(i), c-(iii), d-(v). e-(ii)

67. Which of the following animal is radially symmetrical but has a bilaterally symmetrical larva :

(A) Ascaris (Round worm)

(B) Nereis (Ring worm)

(C) Pila (Apple snail)

(D) Asterias (Star fish)

68. Which of the following pairs of animals comprise **'Comb jellies'** ?

(A) Balanoglossus and Saccoglossus

(B) Pleurobranchia and Ctenoplana

(C) Sea anemone and sea pen

(D) Sea lily and brittle star

69. Pick out the incorrect statement ?

(A) Myelinated nerve fibres are found in spinal and cranial nerve.

(B) Unmyelinated nerve fibre is enclosed by a schwann cell.

(C) In resting stage the axonal membrane is comparatively more permeable to potassium ion and nearly impermeable to sodium ions.

(D) Axolemma is more permeable to negatively charged protein present in the axoplasm.

70. Study the diagram of synapse :
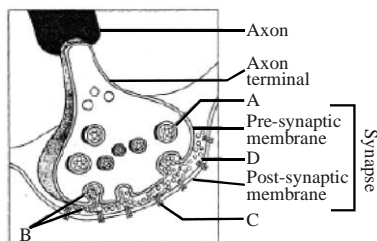
I. Which alphabet indicate the location of the receptor molecules ?

II. Which alphabet points to a synaptic vesicles

III. Which alphabet points to neurotransmitter

IV. Which alphabet points to synaptic celft

	I	II	III	IV
(A)	C	A	B	D
(B)	B	A	C	D
(C)	C	A	D	B
(D)	C	D	A	B

71. Pineal gland is not related with :

(A) Body temperature

(B) Defence capability

(C) Metabolism

(D) Kidney functions

72. How many statements are correct regarding parathyroid gland ?

(a) Four parathyroid gland present on ventral side of thyroid gland

(b) It secretes parathromone which is steroidal in nature

(c) It increase blood Ca++ level

(d) It act on bone and stimulate bone resorbtion

(A) One   (B) Two

(C) Three   (D) Four

73. **Heart failure** means :

(A) When the heart stops beating.

(B) When the heart muscle is suddenly damaged.

(C) The state of heart when it is not pumping blood effectively enough to meet the needs of the body.

(D) Deposition of cholesterol in the lumen of coronary artery.

74. Find out the **correct** statements :-

(a) During a cardiac cycle, each ventricle pumps out approximately 70 mL of blood which is called the stroke volume:

(b) The cardiac output of an athlete will be much higher than that of an ordinary man

(c) The body has no the ability to alter the stroke volume and the cardiac output

(d) The cardiac output can be defined as the volume of blood pumped out by each ventricle per minute.

(e) Volume of blood pumped by left ventricle is higher than blood pumped by right ventricle

Options :-

(A) (a),(b),(c) & (d)

(B) (a),(b) & (d)

(C) (b),(c) & (e)

(D) (a), (b),(d) & (e)

75. Eukaryotes have which type of ribosome..?
(A) 70s
(B) 80 s
(C) Both a and b
(D) 55s

76. A major site for synthesis of lipid is -
(A) RER   (B) SER
(C) Symplast   (D) Nucleoplast

77. Match the following columns.

	Column-I		Column-II
a	Golgi apparatus	1.	Conversion of lipids to carbohydrates
b	Glyoxysomes	2.	Catabolism of long chain fatty acid
c	Peroxisomes	3.	Formation of glycoproteins and glycolipids
d	Endoplasmic reticulum	4.	Synthesis of lipids
		5.	osmoregulation

Codes:

	a	b	c	d
(A)	4	5	1	2
(B)	5	4	2	3
(C)	3	1	2	4
(D)	2	3	5	1

78. Which of the following is the least likely to be involved in stabilizing the three-dimensional (3D) folding of most proteins ?
(A) Hydrogen bonds
(B) Electrostatic interaction
(C) Hydrophobic interaction (Vanderwal)
(D) Ester bonds

79. The complete disintegration of nuclear envelope in a cell cycle marks the
(A) start of prophase of mitosis
(B) start of metaphase of mitosis
(C) end of anaphase of mitosis
(D) start of telophase of mitosis

80. Crossing over is an exchange of genetic material between
(A) Homologous chromosome
(B) Heterologous chromosome
(C) Non-homologous chromosome
(D) All of these

81. Biological method of control of pests and disease relies on :
(A) Interspecific competition
(B) Intraspecific competition
(C) Natural predation
(D) Introduced chemicals

82. In a mixture, DNA fragments are separated by
(A) Polymerase chain reaction
(B) Bioprocess engineering
(C) Restriction digestion
(D) Electrophoresis

83. In Recombinant DNA technology, antibiotices are used
(A) As selectable markers
(B) To keep medium bacteria-free
(C) To detect alien DNA
(D) To impart disease-resistant to the host plant

84. First discovered restriction endonucleases that always cut DNA molecule at a particular point by recognising a specific sequence of six base pairs is
(A) Hind II
(B) EcoR I
(C) Adenosine deaminase
(D) Thermostable DNA polymerase

85. Bt cotton variety that was developed by the introduction of toxin gene *Bacillus thuringiensis* (Bt) is resistant to :
(A) Fungal diseases
(B) Plant nematodes
(C) Insect predators
(D) Insect pests

86. Parents of a four year old child are advised by doctor to give him more meat, lentils, milk and eggs in diet as he is suffering probably from
(A) Kwashiorkor   (B) Marasmus
(C) Anaemia   (D) Rickets

87. Gastric secretion is stopped by hormone
(A) enterogastrone
(B) gastrin
(C) pancreozymin
(D) cholecystokinin

88. Which of the following are the placental hormone-
(a) hCG   (b) hPL
(c) Estrogen   (d) Relaxin
(e) Progesterone (f) FSH
(g) LH
(A) a,b, c, d, e, f, g
(B) a, b, c, e
(C) a, b, c, e, f
(D) a, b, c, d, e

89. Leghorn is an improved breed of :
(A) Chicken   (B) Cattle
(C) Fish   (D) Honey bee

90. The extinct human ancestor, who ate only fruits and hunted with stone weapons was-
(A) Ramapithecus
(B) Australopithecus
(C) Dryopithecus
(D) Homo erectus

91. In a population with two alleles for a gene locus (A and a) , the allele frequency of A is 0.7. What would be the frequency of heterozygotes if the population is in Hardy-Weinbrium equilibrium-

(A) 0.49   (B) 0.42

(C) 0.21   (D) 0.09

92. Earth originated before :-

(A) 5.6 billion years

(B) 4.0 billion years

(C) 4600 million years

(D) None

93. Read the following (a-d) statements :-

a. Connective tissue are most abundant and widely distributed in the body of complex animals

b. They are named connective tissues because of their special function of linking and supporting other tissues/organs of the body

c. They range from soft connective tissues to specialised types, which include cartilage, bone, adipose and blood

d. The cells of connective tissue secrete modified polysaccharides, which accumulate between cells and fibres and act as matrix

How many of the following statements are correct ?

(A) Four   (B) Three

(C) Two   (D) One

94. Which of the following is **incorrect** statement for the **simple columnar epithelium** ?

(A) It is composed of a single layer of tall and slender cells

(B) Their nuclei are located at the base

(C) Free surface may have microvilli

(D) They are found in the walls of blood vessels and air sac of lungs

95. Which of the following fishes is also known as **"Great white shark"** ?

(A) Pristis   (B) Trygon

(C) Clarias   (D) Carcharodon

96. Find out the incorrect statements :

(A) Hormone always produces their effect by binding with specific proteins located on cell membrane or inside the cell.

(B) Receptors are specific for a particular hormone molecule.

(C) Hormones act with membrane bound receptors and then enters into cell to bind with secondary messenger.

(D) Protein hormone produce secondary messengers inside the target cell.

97. Choose the incorrect pair.

(A) Histones — Basic proteins

(B) Centromere— Primary constriction

(C) Kinetochore—Disc-shaped structure

(D) None of the above

98. Transverse binary fission occurs in :

(A) *Euglena*   (B) *Amoeba*

(C) *Hydra*   (D) *Paramecium*

99. Match the following columns and select the **correct** options.

	Column-I		Column-II
(a)	Bt cotton	(i)	Gene therapy
(b)	Adenosine deaminase deficiency	(ii)	Cellular defence
(c)	RNAi	(iii)	Detection of HIV infection
(d)	PCR	(iv)	*Bacillus thuringiensis*

	(a)	**(b)**	**(c)**	**(d)**
(A)	(iii)	(ii)	(i)	(iv)
(B)	(ii)	(iii	(iv)	(i)
(C)	(i)	(ii)	(iii)	(iv)
(D)	(iv)	(i)	(ii)	(iii)

100. Progeny of a cross made between two pure parents show increased vigour and productivity. This is due to :

(A) Selection vigour

(B) Hybridisation

(C) Hybrid vigour

(D) Mutation

PART - III [PHYSICS]

SECTION-A

101. The velocity v of a moving particle varies with displacement as $x = \sqrt{v+1}$, the acceleration of the particle at x = 5 unit will be-

(A) $\sqrt{6}$ unit   (B) 24 unit

(C) 240 unit   (D) 25 unit

102. A bus appears to go with a speed of 25 km/hr to a car driver, driving at the rate 7 km/hr northwards. If the bus actually travels in east direction, its speed is -

(A) 24 km/h   (B) 23 km/h

(C) 26 km/h   (D) 30 km/h

103. A hunter aims his gun and fires a bullet directly at a monkey on a tree. At the instant bullet leaves the gun, monkey drops, the bullet:

(A) hits the monkey

(B) mises to hit the monkey

(C) cannot be said

(D) None of these

104. The velocity of end 'A' of rigid rod placed between two smooth vertical walls moves with velocity 'u' along vertical direction. Find out the velocity of end 'B' of that rod, rod always remains in constant with the vertical walls.

(A) u tan 2θ   (B) u cot θ

(C) u tan θ   (D) 2u tan θ
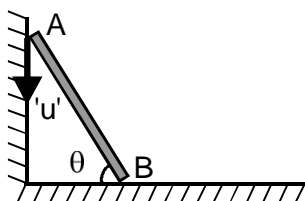
105. For the arrangement shown in the figure the tension in the string is [Given: $\tan^{-1}(0.8) = 39°$].
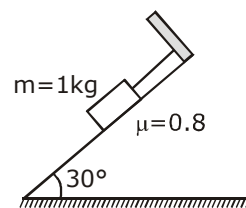
(A) 6 N   (B) 6.4 N

(C) 0.4 N   (D) zero

106. Work done by force of friction :

(A) can be positive

(B) can be negative

(C) can be zero

(D) any of these

107. A toy car of mass 5 kg moves up a ramp under the influence of force F plotted against displacement x. The maximum height attained is given by

(A) y_{max} = 20 m   (B) y_{max} = 15 m
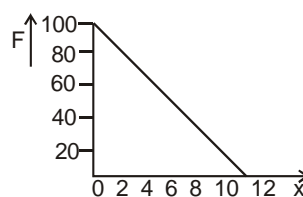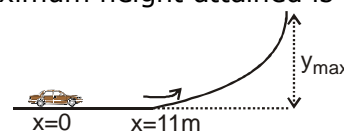
(C) y_{max} = 11 m   (D) y_{max} = 5 m

108. An open pipe is suddenly closed at one end with the result that the frequency of third harmonic of the closed pipe is found to be higher by 100 Hz than the fundamental frequency of the open pipe. The fundamental frequency of the open pipe is

(A) 200 Hz

(B) 300 Hz

(C) 240 Hz

(D) 480 Hz

109. Two waves of same frequency and of intensity I_0 and $9I_0$ produces interference. If at a certain point the resultant intensity is $7I_0$ then the minimum phase difference between the two sound waves will be-

(A) 90º   (B) 100º

(C) 120º   (D) 110º

110. In the figure given the position-time graph of a particle of mass 0.1 kg is shown. The impulse at $t = 2$ s is :
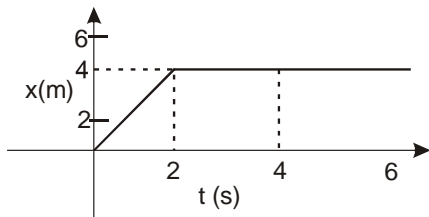
(A) 0.2 kg m s^{-1} (B) – 0.2 kg m s^{-1}

(C) 0.1 kg m s^{-1} (D) – 0.4 kg m s^{-1}

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

(A) $W_B > W_A > W_C$ (B) $W_A > W_B > W_C$

(C) $W_C > W_B > W_A$ (D) $W_A > W_C > W_B$

112. From a disc of a 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?

(A) 15 MR^2/32   (B) 13 MR^2/32

(C) 11 MR^2/32   (D) 9 MR^2/32

113. Dependence of intensity of gravitational field (E) of earth with distance (r) from centre of earth is correctly represented by :-
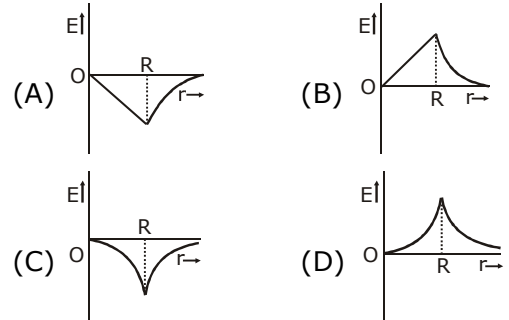
114. A planet moving along an elliptical orbit is closest to the sun at a distance r_1 and farthest away at a distance of r_2. If v_1 and v_2 are the linear velocities at these points respectively, then the ration v_1/v_2 is :-

(A) $(r_1/r_2)^2$ (B) (r_2/r_1)

(C) $(r_2/r_1)^2$ (D) (r_1/r_2)

115. A wire elongates by ℓ mm when a load W is hanged from it. If the wire goes over a pulley and two weights W each are hung at the two ends, the elongation of the wire will be (in mm)

(A) ℓ (B) 2ℓ

(C) zero   (D) $\ell/2$

116. If M_1 gm of a substance with specific gravity S_1 is mixed with M_2 gm of a substance with specific gravity S_2 and then the substances are used to make an alloy. What will be the specific gravity of the alloy ?

(A) $(M_1 + M_2)/S_1S_2$

(B) $(M_1 + M_2)/(M_1/S_1 + M_2/S_2)$

(C) $(M_1/S_1) + (M_1/S_2)/(M_1 + M_2)$

(D) $(M_1/S_1) + (M_2/S_2)/(M_1M_2)$

117. A man of weight 40 kg floats on water in a lake. His apparent weight is
(A) 40 kg (B) 35 kg
(C) zero (D) 20 kg

118. A metallic bar is heated from 0°C to 100°C. The coefficient of linear expansion is 10^{-5} K^{-1}. What will be the percentage increase in length–
(A) 0.01% (B) 0.1%
(C) 1% (D) 10%

119. A proton (mass $= 1.67 \times 10^{-27}$ kg and charge $= 1.6 \times 10^{-19}$ C) enters perpendicular to a magnetic field of intensity 2 weber/m^2 with a velocity 3.4×10^7 m/sec. The acceleration of the proton should be
(A) 6.5×10^{15} m/sec^2
(B) 6.5×10^{13} m/sec^2
(C) 6.5×10^{11} m/sec^2
(D) 6.5×10^9 m/sec^2

120. A proton and an α – particle enter a uniform magnetic field perpendicularly with the same speed. If proton takes 25 μ sec to make 5 revolutions, then the periodic time for the α – particle would be
(A) $50\,\mu$ sec (B) $25\,\mu$ sec
(C) $10\,\mu$ sec (D) $5\,\mu$ sec

121. The time period of oscillation of a bar magnet suspended horizontally along the magnetic meridian is T_0. If this magnet is replaced by another magnet of the same size and pole strength but with double the mass, the new time period will be
(A) $\dfrac{T_0}{2}$ (B) $\dfrac{T_0}{\sqrt{2}}$
(C) $\sqrt{2}T_0$ (D) $2T_0$

122. Temperature above which a ferromagnetic substance becomes paramagnetic is called
(A) Critical temperature
(B) Boyle's temperature
(C) Debye's temperature
(D) Curie temperature

123. The only property possessed by ferromagnetic substance is
(A) Hysteresis
(B) Susceptibility
(C) Directional property
(D) Attracting magnetic substances

124. A solenoid has 2000 turns wound over a length of 0.30 metre. The area of its cross-section is 1.2×10^{-3} m^2. Around its central section, a coil of 300 turns is wound. If an initial current of 2 A in the solenoid is reversed in 0.25 sec, then the e.m.f. induced in the coil is
(A) 6×10^{-4} V (B) 4.8×10^{-3} V
(C) 6×10^{-2} V (D) 48 mV

125. In a transformer, the coefficient of mutual inductance between the primary and the secondary coil is 0.2 henry. When the current changes by 5 ampere/second in the primary, the induced e.m.f. in the secondary will be
(A) 5 V (B) 1 V
(C) 25 V (D) 10 V

126. In an LR-circuit, the inductive reactance is equal to the resistance R of the circuit. An e.m.f. $E = E_0 \cos(\omega t)$ applied to the circuit. The power consumed in the circuit is
(A) $\dfrac{E_0^2}{R}$ (B) $\dfrac{E_0^2}{2R}$
(C) $\dfrac{E_0^2}{4R}$ (D) $\dfrac{E_0^2}{8R}$

127. A constant voltage at different frequencies is applied across a capacitance C as shown in the figure. Which of the following graphs

Signal Generator
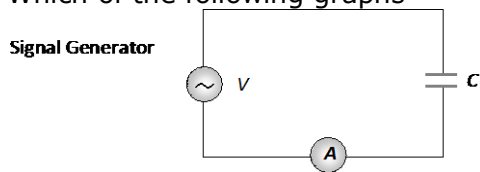
Correctly depicts the variation of current with frequency ?

(A)

(B)

(C)

(D)
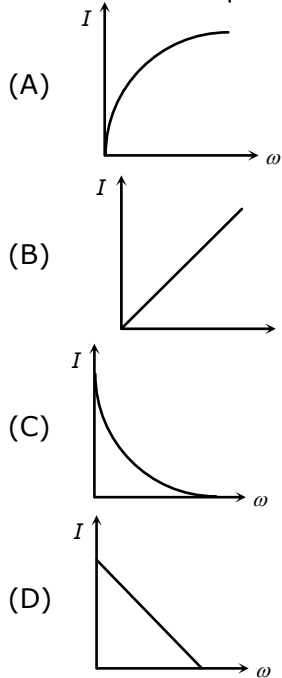
128. If an electron and a photon propagate in the form of waves having the same wavelength, it implies that they have the same
(A) Energy
(B) Momentum
(C) Velocity
(D) Angular momentum

129. A parallel plate capacitor with air between the plates has a capacitance of 9 pF. The separation between its plates is d. The space between the plates is now filled with two dielectrics. One of the dielectrics has dielectric constant $k_1 = 3$ and thickness d/3 while the other one has dielectric constant $k_2 = 6$ and thickness 2d/3. Capacitance of the capacitor is now:
(A) 20.25 pF   (B) 1.8 pF
(C) 45 pF   (D) 40.5 pF

130. If eight similar charge drops combine to form a bigger drop, then the ratio of capacitance of bigger drop to that of smaller drop will be:
(A) 2:1   (B) 8:1
(C) 4:1   (D) 16:1

131. Point charges $q_1 = 2\mu C$ $q_2 = -1\mu C$ are kept at points x = 0 and x = 6 respectively. Electric potential will be zero at the points:
(A) x=1 and x=5   (B) x=2 and x=9
(C) x=4 and x=12   (D) x=−2 and x=2

132. A resistor R is connected across a battery of emf 12V. It observed that terminal potential difference is 9 V and the power delivered to resistor is 18W. Internal resistance of the battery 'r' and the resistance R are respectively:
(A) 2 Ω, 5 Ω   (B) 1.8 Ω, 3.2 Ω
(C) 1.6 Ω,5.6 Ω   (D) 1.5 Ω, 4.5 Ω

133. If the acceleration due to gravity is 10 ms^{-2} and the units of length and time are changed to kilometre and hour, respectively, the numerical value of the acceleration is :
(A) 360000   (B) 72000
(C) 36000   (D) 129600

134. A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be
(A) −10 cm   (B) −15 cm
(C) −20 cm   (D) −30 cm

135. A convex lens of focal length f will form a magnified real image of an object if the object is placed
(A) anywhere beyond 2f
(B) anywhere beyond f
(C) between f and 2f
(D) between lens and f

SECTION-B

136. The equation of a simple harmonic wave is given by $y = 3 \sin \frac{\pi}{2} (50t - x)$

where x and y are in meters and t is in seconds. The ratio of maximum particle velocity to the wave velocity is

(A) $\frac{3}{2}\pi$ (B) 3π

(C) $\frac{2}{3}\pi$ (D) 2π

137. A vibrating tuning fork of frequency n is placed near the open end of a long cylindrical tube.
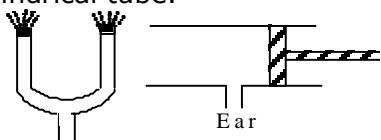
The tube has a side opening and is also fitted with a movable reflecting piston. As the piston is moved through 8.75 cm, the intensity of sound changes from a maximum to minimum. If the speed of sound is 350 metre per second, then n is –

(A) 500 Hz   (B) 1000 Hz
(C) 2000 Hz   (D) 4000 Hz

138. If an observer is moving with uniform velocity v to wards a stationary source of frequency n, and if the velocity of sound in the medium is V, then the apparent change in the frequency of the sound, heard by the observer, is -

(A) $\frac{vn}{V-v}$ (B) $\frac{vn}{V}$

(C) $\frac{Vn}{V-v}$ (D) $\left(\frac{V+v}{v}\right)n$

139. An ideal gas expanding such that PT^2 = constant. the coefficient of volume expansion of the gas is–

(A) $\frac{1}{T}$ (B) $\frac{2}{T}$

(C) $\frac{3}{T}$ (D) $\frac{4}{T}$

140. There is a black spot on a body. If the body is heated and carried in dark room then it glows more. This can be explained on the basis of
(A) Newton's law of colling
(B) Wein's law
(C) Kirchoff's law
(D) Stefan's law

141. An object is cooled from 75ºC to 65ºC in 2 minutes in a room at 30ºC. The time taken to cool another object from 55ºC to 45ºC in the same room in minutes is
(A) 4   (B) 5
(C) 6   (D) 7

142. If specific heat of a substance is infinite, it means-
(A) Heat is given out
(B) Heat is taken in
(C) No change in temperature takes place whether heat is taken in or given out
(D) All of the above

143. A radio transmitter operates at a frequency of 880 kHz and a power of 10 kW. The number of photons emitted per second are

(A) 1.72×10^{31} (B) 1327×10^{34}

(C) 13.27×10^{34} (D) 0.075×10^{-34}

144. In the following reaction the value of 'X' is $_7N^{14} + _2He^4 \rightarrow X + _1H^1$

(A) $_8N^{17}$ (B) $_8O^{17}$

(C) $_7O^{16}$ (D) $_7N^{16}$

145. The nuclear reaction $^2H + ^2H \rightarrow ^4He$ (mass of deuteron = 2.0141 a.m.u. and mass of He = 4.0024 a.m.u.) is
(A) Fusion reaction releasing 24 MeV energy
(B) Fusion reaction absorbing 24 MeV energy
(C) Fission reaction releasing 0.0258 MeV energy
(D) Fission reaction absorbing 0.0258 MeV energy

146. What will be the input of A and B for the Boolean expression $\overline{(A+B)} \cdot \overline{(A.B)} = 1$

(A) 0, 0   (B) 0, 1

(C) 1, 0   (D) 1, 1

147. In the diagram, the input is across the terminals A and C and the output is across the terminals B and D, then the output is
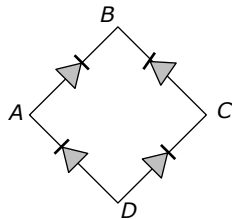
(A) Zero

(B) Same as input

(C) Full wave rectifier

(D) Half wave rectifier

148. Find colour of rings having resistance $1000 \pm 100\Omega$

(A) Brown, Black, Black, Silver

(B) Brown, Black, Red, Gold

(C) Brown, Black, Red, Silver

(D) Brown, Black, Black, Gold

149. When an unpolarized light of intensity I_0 is incident on a polarizing sheet, the intensity of the light which does not get transmitted is

(A) $\frac{1}{2}I_0$ (B) $\frac{1}{4}I_0$

(C) zero   (D) I_0

150. Young's double slit experiment is carried out by using green, red and bluelight, one color at a time. The fringe widths recorded are β_G, β_R and β_B respectively. Then

(A) $\beta_G > \beta_B > \beta_R$ (B) $\beta_B > \beta_G > \beta_R$

(C) $\beta_R > \beta_B > \beta_G$ (D) $\beta_R > \beta_G > \beta_B$

PART - IV [CHEMISTRY]

SECTION_A

151. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from :
(A) zero to +1 and zero to –5
(B) zero to –1 and zero to +5
(C) zero to –1 and zero to +3
(D) zero to +1 and zero to –3

152. Given:

$NH_{3(g)} + 3Cl_{2(g)} \rightleftharpoons NCl_{3(g)}, +3HCl_{(g)}; -\Delta H_1$

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}; -\Delta H_2$

$H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}; \Delta H_3$

The heat of formation of $NCl_{3(g)}$ in terms of $\Delta H_1, \Delta H_2$ and ΔH_3 is :

(A) $\Delta H_f = -\Delta H_1 - \dfrac{\Delta H_2}{2} - \dfrac{3}{2}\Delta H_3$

(B) $\Delta H_f = \Delta H_1 + \dfrac{\Delta H_2}{2} - \dfrac{3}{2}\Delta H_3$

(C) $\Delta H_f = \Delta H_1 - \dfrac{\Delta H_2}{2} - \dfrac{3}{2}\Delta H_3$

(D) None of the above

153. The equilibrium constant for,

$N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ is K, the equilibrium constant for

$1/2\ N_{2(g)} + 1/2\ O_{2(g)} \rightleftharpoons NO_{(g)}$ will be :
(A) 1/2 K   (B) K
(C) K^2 (D) $K^{1/2}$

154. Which of the following salts will give highest pH in water
(A) Na_2CO_3 (B) $CuSO_4$
(C) KCl   (D) NaCl

155. What is the mole fraction of the solute in a 1.0 m aqueous solution?
(A) 1.770   (B) 0.0354
(C) 0.0177   (D) 0.177

156. During the adsorption of krypton on activated charcoal at low temperature, ...
(A) $\Delta H > 0$ and $\Delta S < 0$
(B) $\Delta H < 0$ and $\Delta S < 0$
(C) $\Delta H > 0$ and $\Delta S > 0$
(D) $\Delta H < 0$ and $\Delta S > 0$

157. Volume of 0.1 M NaOH needed for the neutralization of 20mL of 0.05 M oxalic acid is :
(A) 10 mL   (B) 15 mL
(C) 20 mL   (D) 30 mL

158. The number of unit cells in 58.5 g of NaCl is nearly:
(A) 6×10^{20} (B) 3×10^{22}
(C) 1.5×10^{23} (D) 0.5×10^{24}

159. At 25ºC, the highest osmotic pressure is exhibited by 0.1M solution of :
(A) $CaCl_2$ (B) KCl
(C) glucose   (D) urea

160. What volume of 0.2 M $KMnO_4$ is required to react with 1.58 g of hypo solution ($Na_2S_2O_3$) in acidic medium ?
(A) 20 mL   (B) 10 mL
(C) 16.6 mL   (D) 50 mL

161. The total spin and magnetic moment for the atom with atomic number 24 are :
(A) $\pm 3, \sqrt{24}$ BM   (B) $\pm 1, \sqrt{15}$ BM
(C) $\pm 1, \sqrt{35}$ BM   (D) $\pm 3, \sqrt{48}$ BM

162. A gas in open container is heated from 27ºC to 127ºC, the fraction of the original amount of the gas escaped from the container will be :-
(A) $\dfrac{3}{4}$ (B) $\dfrac{1}{2}$
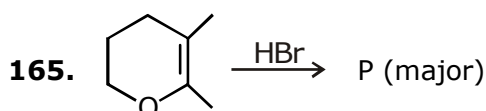(C) $\dfrac{1}{4}$ (D) $\dfrac{1}{8}$

163.

$$R-\overset{\overset{\displaystyle O}{\|}}{C}-Cl \xrightarrow{2NH_3} NH_4Cl + (X)$$

$$\xrightarrow[\Delta]{P_4O_{10}} (Y) \xrightarrow[(ii)H_2O/H^+]{(i)\ DIBAL-H} (Z)$$
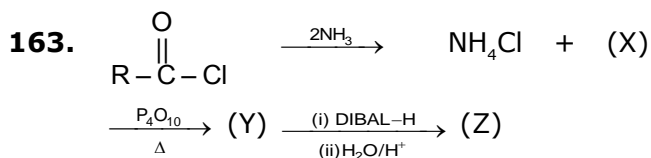
The compound (Z) is :

(A) R–COOH   (B) R–CH$_2$–OH

(C) R–C≡N   (D) RCHO

164. (A) $\xrightarrow{Cl_2 h\nu}$ (B) $\xrightarrow{aq.KOH}$ (C)
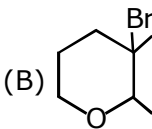
$\xrightarrow{[O]}$
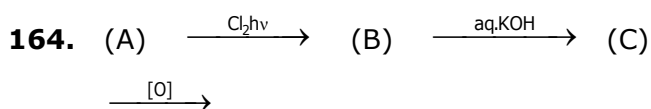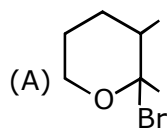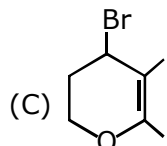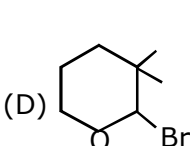
CH$_3$CHO, Identify A, B & C –

(A) Ethylalcohol, Ethyl chloride & Ethane

(B) Ethane, Ethylchloride & Ethyl alcohol

(C) Propane Propylchloride & Propyl alcohol

(D) None of these

165.

$\xrightarrow{HBr}$ P (major)

P should be

166.

$$CH_3-\overset{\overset{\displaystyle ||}{}}{\underset{O}{C}}-CH_3 \xrightarrow[NaOH]{I_2} (A) \xrightarrow{AgPowder}$$

(B) $\xrightarrow[Hg^{++}]{H_2SO_4}$ (C).
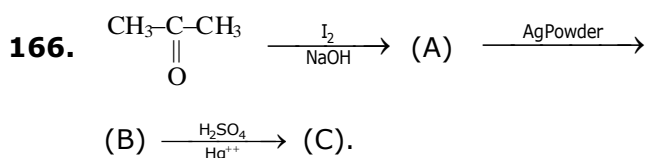
Product A, B & C are -

(A) Iodoform, Acetylene & Acetaldehyde

(B) Tri. iodomethane, Ethyne & Acetone

(C) Iodoform, Ethene & Ethylene glycol

(D) Ethene, iodoform & Ethylhydrogen sulphate

167. The correct stability order for the following species is :

(I)   (II)
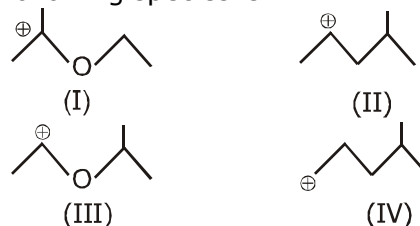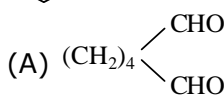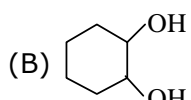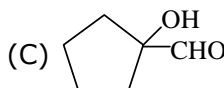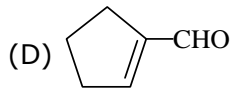
(III)   (IV)

(A) (II) > (IV) > (I) > (III)

(B) (I) > (II) > (III) > (IV)

(C) (II) > (I) > (IV) > (III)

(D) (I) > (III) > (II) > (IV)

168. $C_6H_5COCl \xrightarrow[H_2]{Pd-BaSO_4}$ Intermediate

$\xrightarrow{Oxidation}$ Intermediate $\xrightarrow[Dry\,Distillation]{Ca-salt}$ A
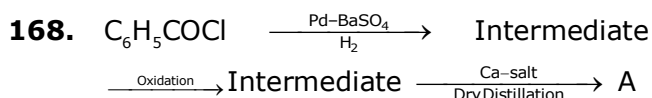
Compound (A) in above reaction sequence is–

(A) Benzophenone   (B) Benzaldehyde

(C) Acetophenone   (D) Benzoquinone

169.

 $\xrightarrow[(CH_3)_2S]{O_3}$ A $\xrightarrow[\Delta]{\overset{\ominus}{O}H}$ B; 'B' is –
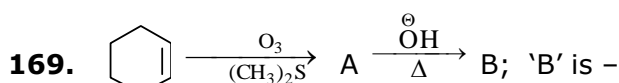
(A) $(CH_2)_4\Big\langle{\overset{\displaystyle CHO}{\underset{\displaystyle CHO}{}}}$ (B)

(C)   (D)

170. The major product of the following reaction is :

 $\xrightarrow[(ii)alc.KOH,\Delta]{(i)HBr}$

(A)   (B)

(C)   (D)
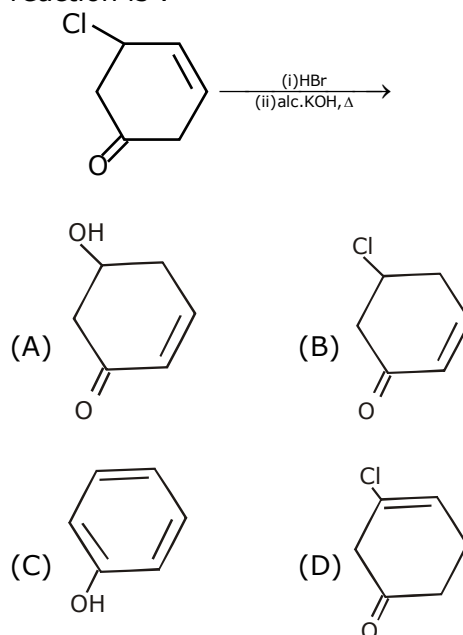
171. Arrange the followings in increasing order of boiling point.

Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

(A) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol

(B) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

(C) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol
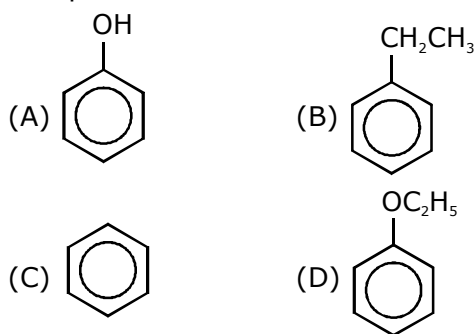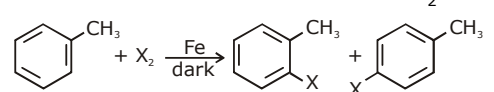
(D) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

172. $PhCHO + \xrightarrow[\text{(ii)CH}_3\text{COONa}]{\text{(i)(CH}_3\text{CO)}_2\text{O}} A \xrightarrow{\text{HBr}} B$
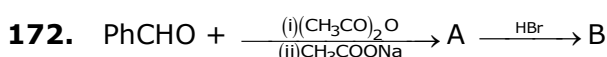
The product B is :

(A) $PhCH = CHCH_2Br$

(B) $\underset{\underset{Br}{|}}{PhCH} - CH_2 - COOH$

(C) $PhCH_2\ CH(Br)\ COOH$

(D) $PhCH = CH - COBr$

173. $CH_3CN \xrightarrow{H_3O^+} \xrightarrow{LiAlH_4} \xrightarrow{C_6H_5-MgBr} A$

Compound 'A' is :

(A) OH (benzene ring with OH)

(B) (benzene ring with CH_2CH_3)

(C) (benzene ring)

(D) (benzene ring with OC_2H_5)

174. Which of the following is halogen exchange reaction ?

(A) $RX + NaI \rightarrow RI + NaX$

(B) $\overset{\diagdown}{\underset{\diagup}{C}}=\overset{\diagup}{\underset{\diagdown}{C} }+ HX \longrightarrow \overset{\diagdown}{C}-\overset{\diagup}{\underset{\underset{H\ \ X}{|\ \ |}}{C}}$

(C) $R{-}OH + HX \xrightarrow{ZnCl_2} R{-}X + H_2O$

(D) (toluene) $+ X_2 \xrightarrow[\text{dark}]{\text{Fe}}$ (o-substituted) $+$ (p-substituted)

175. Which of following has two π-bonds ?

(A) B_2 (B) O_2

(C) C_2 (D) None

176. The isoelectronic set of ions is :

(A) F^-, Li^+, Na^+ and Mg^{2+}

(B) Li^+, Na^+, O^{2-} and F^-

(C) N^{3-}, Li^+, Mg^{2+} and O^{2-}

(D) N^{3-}, O^{2-}, F^- and Na^+

177. Match the refining methods (Column I) With metals (Column II).

Column I (Refining methods)	Column II (Metals)
(I) Liquation	(a) Zr
(II) Zone Refining	(b) Ni
(III) Mond process	(c) Sn
(IV) Van Arkel Method	(d) Ga

(A) (I)–(b); (II)–(d); (III)–(a); (IV)–(c)

(B) (I)–(c); (II)–(d); (III)–(b); (IV)–(a)

(C) (I)–(b); (II)–(c); (III)–(d); (IV)–(a)

(D) (I)–(c); (II)–(a); (III)–(b); (IV)–(d)

178. The Graph between $|\Psi|^2$ and r(radial distance) is shown below. This represents :
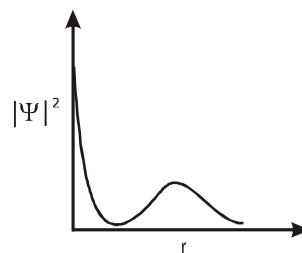
(A) 2p orbital   (B) 2s orbital

(C) 3s orbital   (D) 1s orbital

179. The alloy used in the construction of aircrafts is :

(A) Mg – Zn   (B) Mg – Al

(C) Mg – Mn   (D) Mg – Sn

180. Consider the hydrated ions of Ti^{2+}, V^{2+}, Ti^{3+} and Sc^{3+}. The correct order of their spin-only magnetic moments is :

(A) $Sc^{3+} < Ti^{3+} < V^{2+} < Ti^{2+}$

(B) $Ti^{3+} < Ti^{2+} < Sc^{3+} < V^{2+}$

(C) $V^{2+} < Ti^{2+} < Ti^{3+} < Sc^{3+}$

(D) $Sc^{3+} < Ti^{3+} < Ti^{2+} < V^{2+}$

181. The species that can have a trans-isomer is :
(en = ethane-1,2-diamine, ox = oxalate)
(A) $[Zn(en)Cl_2]$ (B) $[Pt(en)_2Cl_2]^{2+}$
(C) $[Pt(en)Cl_2]$ (D) $[Cr(en)_2(ox)]^+$

182. The correct statements among (a) to (d) are :
(a) Saline hydrides produce H_2 gas when reacted with H_2O
(b) reaction of $LiAlH_4$ with BF_3 leads to B_2H_6
(c) PH_3 and CH_4 are electron - rich and electron - precise hydrides, respectively.
(d) HF and CH_4 are called as molecular hydrides.
(A) (a), (c) and (d) only
(B) (a), (b), (c) and (d)
(C) (c) and (d) only
(D) (a), (b) and (c) only

183. The noble gas that does NOT occur in the atmosphere is :
(A) Kr   (B) Ra   (C) He   (D) Ne

184. The correct order of the first ionization enthalpies is :
(A) Mn < Ti < Zn < Ni
(B) Ti < Mn < Ni < Zn
(C) Ti < Mn < Zn < Ni
(D) Zn < Ni < Mn < Ti

185. A hydrated solid X on heating initially gives a monohydrated compound Y. Y upon heating above 373 K leads to an anhydrous white powder Z. X and Z, respectively, are:
(A) Baking soda and soda ash
(B) Baking soda and dead burnt plaster
(C) Washing soda and dead burnt plaster
(D) Washing soda and soda ash

SECTION_B

186. The γ–form of iron has fcc structure (edge length 386 pm) and β-form has bcc structure (edge length 290 pm). The ratio of density in γ-form and β-form is –
(A) 0.84   (B) 1.02
(C) 1.57   (D) 0.6344

187. Which condition is not satisfied by ideal solution ?
(A) $\Delta_{mix}V=0$
(B) $\Delta_{mix}S=0$
(C) Obeyance to raoult's law
(D) $\Delta_{mix}H=0$

188. What volume of 0.1 N $FeSO_4$ can be Reduced by a current of 2 ampere for 1 hours ?
(A) 0.746 L   (B) 7.46 L
(C) 1.482 L   (D) 0.373 L

189. A person requires 2870 kcal of energy to lead normal daily life. If heat of combustion of cane sugar is –1349 kcal, then his daily consumption of sugar is :
(A) 728 g   (B) 0.728 g
(C) 342 g   (D) 0.342 g

190. For an elementary chemical reaction, $A \longrightarrow B$, the rate of reaction doubles when the concentration of A is increased four times. The order for this reaction is with respect to A is :
(A) 2   (B) 1
(C) 1/2   (D) Zero

191. Decreasing –I effect of given groups is :
(i) –CN   (ii) – NO_2
(iii) –NH_2 (iv) –F
(A) iii > ii > i > iv   (B) ii > iii > iv > i
(C) iii > ii > iv > i   (D) ii > i > iv > iii

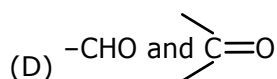**192.** Number of structurally isomeric ethers with molecular formula $C_5H_{12}O$.

(A) 4   (B) 5   (C) 6   (D) 7

193. Tautomerism is not shown by :

(A) CH = CH – OH

(B) O == O

(C)

(D)
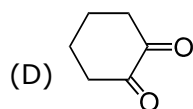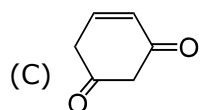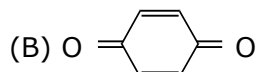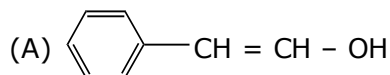
194. The two functional groups present in monosaccharides are :

(A) –OH and –CHO

(B) –OH and –COOH

(C) –CHO and –COOH

(D) –CHO and $\overset{}{\underset{}{C}}$=O

195. Which of the following is not a broad spectrum antibiotic ?

(A) Tetracycline

(B) Chloromycetin

(C) Penicillin

(D) None of these

196. The basic structural unit of feldspar, zeolites, mica, and asbestos is :

(A) SiO_2

(B) $-\!\!\!\left(\!\!\begin{array}{c} R \\ | \\ Si - O \\ | \\ R \end{array}\!\!\right)_{\!n}\!\!-$ (R = Me)

(C) $(SiO_4)^{4-}$

(D) $(SiO_3)^{2-}$
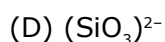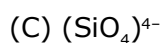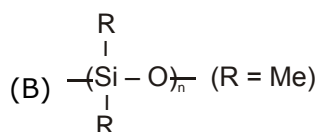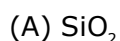
197. Complete removal of both the axial ligands (along the z-axis) from an octahedral complex leads to which of the following splitting patterns ? (relative orbital energies not on scale).

(A) E

(B) E

(C) E

(D) E
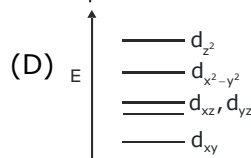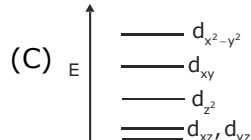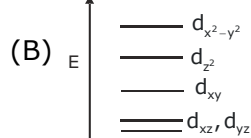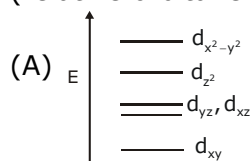
198. The metal that gives hydrogen gas upon treatment with both acid as well as base is:

(A) magnesium   (B) zinc

(C) iron   (D) mercury

199. An organic compound 'A' is oxidized with Na_2O_2 followed by boiling with HNO_3. The resultant solution is then treated with ammonium molybdate to yield a yellow precipitate.
Based on above observation, the element present in the given compound is:

(A) Fluorine   (B) Phosphorus

(C) Sulphur   (D) Nitrogen

200. The correct sequence of thermal stability of the following carbonates is:

(A) $MgCO_3 < SrCO_3 < CaCO_3 < BaCO_3$

(B) $BaCO_3 < SrCO_3 < CaCO_3 < MgCO_3$

(C) $MgCO_3 < CaCO_3 < SrCO_3 < BaCO_3$

(D) $BaCO_3 < CaCO_3 < SrCO_3 < MgCO_3$