EAMCET (E) – 2023

(Engineering and Agriculture Common Entrance Test)

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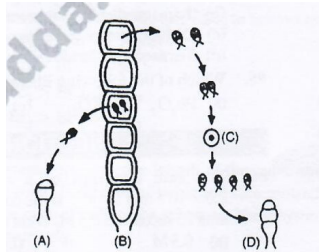
Booklet No.: 98748

MODEL TEST

CENTRE FOR EDUCATIONAL DEVELOPMENT OF MINORITIES
### OSMANIA UNIVERSITY
Minorities Welfare Department, Government of Telangana
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BOTANY:

1. Life cycle of *Ulothrix* is shown in the diagram. The correct ploidy levels at the four stages. A, B, C and D are:

    (1) A : n B : n C : 2n D : n   (2) A : n B : n C : 2n D : 2n
    (3) A : 2n B : n C : 2n D : n   (4) A : n B : n C : n D : n

2. Connecting link between glycolysis and Krebs cycle is / before entering Krebs cycle pyruvate is changed to
    (1) oxaloacetate   (2) phosphoenol pyruvate
    (3) pyruvate   (4) acetyl CoA

3. Differentiation of shoot is controlled by
    (1) high gibberellins : cytokinin ratio   (2) high auxin : cytokinin ratio
    (3) high cytokinin : auxin ratio   (4) high gibberellin : auxin ratio

4. During double fertilization in plants, one sperm fuses with the egg cell and the other sperm fuses with
    (1) synergids cell   (2) central cell   (3) antipodal cell   (4) nucellar cell

5. The diagram below is a model demonstrating the mass flow hypothesis of translocation.
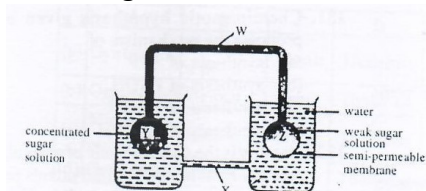
    What are the structures represented by W, X, Y and Z and what is the direction of flow of solution along W?
    Phloem xylem roots leaves direction of flow along W
    (1) W X Y Z from Z to Y   (2) W X Z Y from Y to Z
    (3) X W Z Y from Z to Y   (4) X   W Z Y from Y to Z

6. Female gametophyte of angiosperms is represented by
    (1) Ovule   (2) Megaspore mother cell
    (3) Embryo sac   (4) Nucellus

7. Today, concentration of green house gases is high because of
    (1) Use of refrigerator   (2) Increased combustion of oil and coal
    (3) Deforestation   (4) All the above

8. Cross between AaBB and aaBB will form
    (1) 1 AaBB : 1 aaBB   (2) All AaBB]
    (3) 3 AaBB : 1 aaBB   (4) 1 AaBB : 3 aaBB

9. Which of the following is the most stable ecosystem?
    (1) Forest   (2) Desert   (3) Mountain   (4) Ocean

10. Parthenocarpic tomato fruits can be produced by
    (1) treating the plants with low concentrations of gibberellic acid and auxins
    (2) raising the plants from vernalized seeds

(3) treating the plants with phenylmercuric acetate
(4) removing androecium of flowers before pollen grains are released

11. A gene pair hides the effect of another gene. The phenomenon is
(1) epistasis   (2) dominance   (3) mutation   (4) None of the above

12. What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?
(1) A polypeptide of 25 amino acids will be formed.
(2) Two polypeptides of 24 and 25 amino acids will be formed
(3) A polypeptides of 49 amino acids will be formed
(4) A polypeptide of 25 amino acids will be formed

13. The rate at which light energy is converted to the chemical energy of organic molecules in the ecosystem's is
(1) net primary productivity   (2) gross primary productivity
(3) net secondary productivity   (4) gross secondary productivity

14. Which of the following pairs of the cell structures are important for determining the movement of molecules in or out of the plant cell?
(1) Tonoplast + Vacuolar membrane   (2) Tonoplast + Cell membrane
(3) Cell wall + Cell membrane   (4) Cell wall + Tonplasts

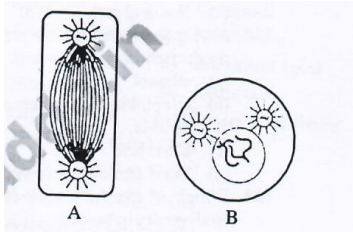15. Which stage of cell division do the following figures A and B represent respectively?

Fig. A   Fig. B
(1) Metaphase   -   Telophase
(2) Telophase   -   Metaphase
(3) Late Anaphase -   Prophase
(4) Prophase   -   Anaphase

16. Pteridophytes differ from mosses/bryophytes in possessing
(1) independent gametophyte   (2) well developed vascular system
(3) archegonia structure   (4) flagellate spermatozoids

17. Centrioles and centrosomes occur in the cells of
(1) green plants   (2) animals
(3) bacteria and cyanobacteria   (4) both (2) and (3)

18. Mycorrhiza is
(1) a symbiotic association of plant roots and certain fungi
(2) an association of algae with fungi
(3) a fungus parasitizing root system of higher plants
(4) an association of Rhizobium with the roots of leguminous plants.

19. *Laminaria*(kelp) and *Focus* (rock weed) are the examples of
(1) red algae   (2) brown algae   (3) green algae   (4) golden brown algae

20. The outer layer of vacuole is called
(1) cell wall   (2) tonoplast   (3) plasma layer   (4) leucoplast

21. A narrow layer of thin walled cells found between phloem/bark and wood of a dicot is
    (1) cork cambium (2) vascular cambium   (3) endodermis   (4) pericycle

22. Bulk flow of substances over the longer distances through the vascular tissue is called
    (1) simple diffusion   (2) facilitated diffusion (3) active transport
                (4) translocation

23. Which one of the following is not included under in-situ conservation?
    (1) Botanical garden   (2) Biosphere reserve (3)   National   park
                (4) Sanctuary

24. Monascus purpureus is a yeast used commercially in the production of
    (1) ethanol
    (2) streptokinase for removing clots from the blood vessels
    (3) Citric acid
    (4) blood cholesterol lowering statins

25. Which of the following is considered a hot-spot of biodiversity in India?
    (1) Indo-Gangetic Plain   (2) Eastern Ghats
    (3) Aravalli Hills   (4) Western Ghats

26. Which one of the following shows concept of species-are relationship?
    (1) The number of species in an area increases with the size of the area
    (2) Larger species require larger habitat areas than do smaller species
    (3) Most species within any given area are endemic
    (4) The larger the area, the greater the extinction rate

27. The movement of mineral ions into plant root cells as a result of diffusion is called
    (1) osmosis   (2) active absorption   (3) passive absorption(4) endocytosis

28. The rate of transpiration in plants is dependent upon
    (1) temperature and soil
    (2) light and temperature
    (3) wind, temperature and light
    (4) light, temperature, atmospheric humidity and wind

29. Stomata open and close due to
    (1) circadian rhythm   (2) genetic clock
    (3) pressure of gases inside the leaves   (4) turgor pressure of guard cells

30. The term 'keel' is used for special type of
    (1) sepals   (2) petals   (3) stamens   (4) carpels

31. Chemiosmotic hypothesis given by Peter Mitchell proposes the mechanism of
    (1) synthesis of ATP   (2) synthesis of $FADH_2$
    (3) synthesis of NADH   (4) synthesis of NADPH

32. Natality is the characteristic of a population which means
    (1) the total number of individuals present per unit area at a given time
    (2) the increase in number of individuals in a population under given environmental conditions
    (3) loss of individuals due to death in a population under given environmental conditions
    (4) the movement of individuals into and out of population

33. Which one of the following is an Indian medicinal plant?
    (1) Saccharum officinarum   (2) Rauwolfia serpentina

(3) Oryza sativa   (4) solanum melongena

34. Which of the following bacteria carry out oxygenic photosynthesis by means of a photosynthetic appraratus similar to the eukaryotes?
    (1) Purple sulphur bacteria   (2) Green sulphur bacteria
    (3) Cyanobacteria   (4) More than one option is correct

35. Which of the following is incorrect?
    (1) Iodine is needed for thyroxine formation
    (2) Calcium regulates the excitability of nerve fibres
    (3) Potassium plays an important role in the regulation of acid base balance in cell
    (4) Phosphorus helps to maintain the osmotic pressure of the body fluids

36. Choose correct option w.r.t origin and position of meristem responsible for the regeneration of parts removed by the grazing herbivores.

	Origin	Position
(1)	Secondary	Lateral
(2)	Primary	Apical
(3)	Secondary	Apical
(4)	Primary	Intercalated

37. Which one of the following option is correct?
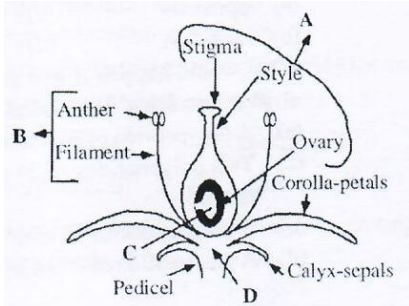
	A	B	C	D
(1)	Gynoecium	Megasporophyll	Ovule	Thalamus
(2)	Gynoecium	Stamen	Seed	Thalamus
(3)	Microsporophyll	Stamen	Ovule	Thalamus
(4)	Gynoecium	Stamen	Ovlule	Thalamus

38. Match Column-I with Column-II and select the correct option from the coded given below.

Column I	Column II
A. Disintegration of nuclear membrane	(i) Anaphase
B. Appearance of nucleolus	(ii) Porphase
C. Division of centromere	(iii) Telophase
D. Replication of DNA	(iv) S-phase

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

39. Match the following and choose the correct option

Column I	Column II
A. Ovary	I. Groundnut, mustard
B. Ovule	II. Guava, orange, mango
C. Wall of ovary	III. Pericarp
D. Fleshy fruits	IV. Seed
E. Dry fruits	V. Fruit

(1) A-V; B-IV, C-III; D-II; E-I
(2) A-I; B-II; C-III; D-IV; E-V
(3) A-I; B-III; C-II;D-IV; E-V
(4) A-V; B-IV; C-I; D-II; E-III

40. Given below are the diagrammatic representation of position of floral parts on thalamus, condition of ovary and example. Find the correctly matched combination?

ZOOLOGY:

41. The enzyme used for joining two DNA fragments is called:
(1) ligase
(2) restriction endonuclease
(3) DNA polymerase
(4) gyrase

42. The linking of antibiotic resistance gene with the plasmid vector became possible with
(1) DNA ligase
(2) Endonucleases
(3) DNA polymerase
(4) Exonucleases

43. Gel electrophoresis is used for
(1) cutting of DNA into gragments
(2) separation of DNA fragments according to their size
(3) construction of recombinant DNA by joining with cloning vectors
(4) isolation of DNA molecule

44. DNA or RNA segment tagged with a radioactive molecule is called
(1) Vector
(2) Probe
(3) Clone
(4) Plasmid

45. Which ion is essential for muscle contraction?
(1) Na^+
(2) K^{++}
(3) Ca^{2+}
(4) Cl^-

46. Which one of the following organs in the human body is most affected due to shortage of oxygen?
(1) Intestine
(2) Skin
(3) Kidney
(4) Brain

47. A cricket player is fast chasing a ball in the field. Which one of the following groups of bones is directly contributing in this movement?
(1) Femur, malleus, tibia, metatarsals
(2) Pelvis, ulna, patella, tarsals
(3) Sternum, femur, tibia, fibula
(4) Tarsals, femur, metatarsals, tibia

48. In the chemistry of vision in mammals, the photosensitive substance is called
(1) sclerotin
(2) retinol
(3) rhodopsin
(4) melanin

49. Vaccine against polio viruses is an example of
(1) auto-immunization
(2) passive immunization

(3) active immunization   (4) simple immunization

50. Egg is liberated from ovary in
   (1) secondary oocyte stage   (2) primary oocyte stage
   (3) oogonial stage   (4) mature ovum stage

51. Animals that can tolerate a narrow range of salinity are
   (1) stenohaline   (2) euryhaline   (3) anadromous   (4) catadromous

52. The most important component of the oral contraceptive pills is
   (1) progesterone   (2) growth hormone   (3) thyroxine   (4) luteinzing hormone

53. Foetal ejection reflex in human female is induced by
   (1) release oxytocin from pituitary   (2) fully developed foetus and placenta
   (3) differentiation of mammary glands   (4) pressure exerted by amniotic fluid

54. In human female the blastocyst
   (1) Forms placenta even before implantation
   (2) Gets implanted into uterus 3 days after ovulation
   (3) Gets nutrition from uterine endometrial secretion only after implantation
   (4) Gets implanted in endometrium by the trophoblast cells

55. Which one of the following is an exotic Indian fisth?
   (1) Catla catla   (2) Heteropneustes fossilis
   (3) Cyprinus carpio   (4) Labeo rohita

56. Which of the following primate is the closest relative of humans?
   (1) Rhesus monkey   (2) Orangutan
   (3) Gorilla   (4) Gibbon

57. What was the most significant trend in evolution of modern man (Homo sapiens) from his ancestors?
   (1) Upright posture   (2) Shortening of jaws
   (3) Binocular vision   (4) Increasing brain capacity

58. Classification of Porifera is based on
   (1) branching   (2) spicules   (3) reproduction   (4) symmetry

59. The kind of epithelium which forms the inner walls of blood vessels is]
   (1) cuboidal epithelium   (2) columnar epithelium
   (3) ciliated columnar epithelium   (4) squamous epithelium

60. Myoglobin is present in
   (1) all muscle fibres   (2) white muscle fibres only
   (3) red muscle fibres only   (4) both white and red muscle fibres

61. Man, in the life cycle of Plasmodium, is
   (1) primary host   b) secondary host   (3) intermediate host (4) none of these

62. The most active phagocytic white blood cells are
   (1) neutrophils and eosinophils   (2) neutrophils and eosinophils
   (3) lymphocytes and macrophages   (4) eosinophils and lymphocytes

63. Human insulin is being commercially produced from a transgenic species of
   (1) Escherichia   (2) Mycobacterium   (3) Rhizobium   (4) Saccharomyces

64. Obstacle to large scale transplantation of organs is
    (1) insufficiency of organ donors
    (2) immunological rejection of foreign bodies
    (3) religious or ethnic considerations
    (4) lack of effective surgical techniques

65. Dolly sheep was obtained by –
    (1) cloning the udder cell (somatic cell) fused with enucleated oocyte
    (2) Cloning of gametes
    (3) Tissue culture
    (4) None of the above

66. Which one of the following correctly represents the normal adult human dental formula?
    (1) $\frac{3}{3},\frac{1}{1},\frac{3}{2},\frac{1}{1}$
    (2) $\frac{2}{2},\frac{1}{1},\frac{3}{2},\frac{3}{3}$
    (3) $\frac{2}{2},\frac{1}{1},\frac{2}{2},\frac{3}{3}$
    (4) $\frac{3}{3},\frac{1}{1},\frac{3}{3},\frac{3}{3}$

67. Toxic substances are detoxified in human body in
    (1) Kidney
    (2) lungs
    (3) liver
    (4) stomach

68. Choose the correct option with appropriate medium of circulation and transport against each animal.

Column A	Column B
A. Hydra	I. Water surrounding the body
B. Octopus	II. Haemolymph
C. Prawn	III. Blood

    (1) A-(iii)
    (2) B-(iii)
    (3) B-(ii)
    (4) C-(i)

69. Dark purplish gland lying on the left side of abdomen is called:
    (1) liver
    9B0 spleen
    (3) gall bladder
    (4) appendix

70. Which cells do not form layer and remain structurally separate?
    (1) Epithelial cells
    (2) Muscle cells
    (3) Nerve cells
    (4) Gland cells

71. In an egg, the type of cleavage is determined by
    (1) shape and size of the sperm
    (2) size and location of the nucleus
    (3) amount and distribution of York
    (4) number of egg membranes

72. Select the option including all sexually transmitted diseases.
    (1) Gonorrhea, Malaria, Genital herpes
    (2) AIDS, Malaria, Filaria
    (3) Cancer, AIDS, Syphilis
    (4) Gonorrhea, Syphilis, Genital herpes

73. The stage transferred into the uterus after induced fertilization of ova in the laboratory is
    (1) Zygote
    (2) Embryo at 4 blastomere stage
    (3) Embryo at 2 blastomere stage
    (4) Morula

74. The incorrect statement with regard to Haemophilia is :
    (1) It is a recessive disease
    (2) It is a dominant disease
    (3) A single protein involved in the clotting of blood is affected
    (4) It is a sex-linked disease

75. Thorn of Bougainvillea and tendril of cucurbita are example of
    (1) analogous organs
    (2) homologous organs
    (3) vestigial organs
    (4) retrogressive evolution

76. Which of the following changes occur in diaphragm and intercostals muscles when expiration of air takes place?
(1) External intercostals muscles relax and diaphragm contracts
(2) External intercostals muscles contract and diaphragm relaxes
(3) External intercostals muscles and diaphragm relax
(4) External intercostals muscles and diaphragm contract

77. Match the bones of column A with their corresponding number in column B.

	Column A		Column B
A.	True ribs	I.	14
B.	Cervical vertebrae	II.	7
C.	Cranium bones	III.	8
D.	Vertebrochondral ribs	IV.	6

(1) A-II; B-III; C-I; D-IV (2) A-I; B-II; C-III; D-;IV
(3) A-II; B-III; C-IV; D-III (4) A-I; B-III; C-II; D-IV

78. Match the disease in Column I with the appropriate items (pathogen / prevention / treatment) in column II.

	Column A		Column B
A.	Amoebiasis	I.	Treponema pallidum
B.	Diptheria	II.	Use only sterilized food and water
C.	Chloera	III.	DPT Vaccine
D.	Syphilis	IV.	Use oral rehydration therapy

(1) A-II; B-III; C-IV; D-I (2) A-I; B-II; C-III; D-IV
(3) A-II; B-IV; C-I; D-III (4) A-II; B-I; C-III; D-IV

79. Match the source gland with respective hormone as well as the function correctly.

	Source gland	Hormone	Function
(1)	Anterior pituitary	Oxytocin	Contraction of uterus muscles during child birth
(2)	Posterior pituitary	Vasopressin	Stimulates reabsorption ofwater in the distal tubules in the nephron
(3)	Corpus luteum	Estrogen	Supports pregnancy
(4)	Thyroid	Thyroxine	Regulated blood calcium level

80. The following graph of relative concentrations of the four hormones present in the blood plasma of a woman during her menstrual cycle. Identify the hormones.
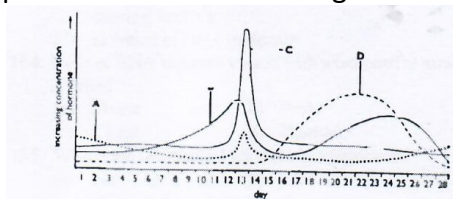
	A	B	C	D
(1)	FSH	Progesterone	LH	Oestrogen
(2)	LH	Progesterone	FSH	Oestrogen
(3)	FSH	Oestrogen	LH	Progesterone
(4)	LH	Oestrogen	FSH	Progesterone

PHYSICS:

81. The dimensions of a × b in the relation $E = \dfrac{b - x^2}{at}$, where E is the energy, x is the displacement and t is time are

(1) ML^2T (2) $M^{-1}L^2T$ (3) ML^2T^{-2} (4) MLT^{-2}

82. A particle starting with certain initial velocity and uniform acceleration covers a distance of 12m in first 3 seconds and a distance of 30m in next 3 seconds. The initial velocity of the particle is

    (1) 3 ms^{-1} (2) 2.5 ms^{-1} (3) 2 ms^{-1} (4) 1 ms^{-1}

83. A particle undergoes simple harmonic motion having time period T. The time taken in 3/8th oscillation is

    (1) $\dfrac{3}{8}T$ (2) $\dfrac{5}{8}T$ (3) $\dfrac{5}{12}T$ (4) $\dfrac{7}{12}T$

84. When current in a coil changes from 5 A to 2 A in 0.1 s, average voltage of 50 V is produced. The self – inductance of the coil is

    (1) 6 H   (2) 0.67H   (3) 3 H   (4) 1.67 H

85. The given electrical network is equivalent to:

    (1) OR gate   (2) NOR gate   (3) NOT gate   (4) AND gate

86. The work function of aluminum is 4.2 eV. If two photons each of energy 3.5 eV strike an electron of aluminum, then emission of electron will
    (1) depend upon the density of the surface   (2) possible
    (3) not possible   (4) none of these

87. A doubly ionized Li atom is excited from its ground state $(n=1)$ to $n=3$ state. The wavelengths of the spectral lines are given by $\lambda_{32}, \lambda_{31}$ and λ_{21}. The ration $\lambda_{32}/\lambda_{31}$ and $\lambda_{21}/\lambda_{31}$ are, respectively

    (1) 8.1, 0.67   (2) 8.1, 1.2   (3) 6.4, 1.2   (4) 6.4, 0.67

88. Two wires A and B of the same material, having radii in the ration 1:2 and carry currents in the ration 4:1. The ratio of drift speed of electrons in A and B is

    (1) 16:1   (2) 1:16   (3) 1:4   (4) 4:1

89. A bullet of mass 5g, travelling with a speed of 210 m/s, strikes a fixed wooden target. One half of its kinetics energy is converted into heat in the bullet while the other half is converted into heat in the wood. The rise of temperature of the bullet if the specific heat of its material is 0.030 cal/(g-C°) (1 cal = 4.2 × 10⁷ergs) close to:

    (1) 87.5°C   (2) 83.3°C   (3) 119.2°C   (4) 38.4°C

90. An object undergoing SHM takes 0.5 s to travel from one point of zero velocity to the next such point. The distance between those points is 50cm. The period, frequency and amplitude of the motion is

    (1) 1s, 1Hz, 25cm   (2) 2s,1Hz, 50cm   (3) 1s,2Hz, 25cm   (4) 2s,2Hz, 50cm

91. ABC is an equilateral triangle. Charges +q are placed at each corner as shown in fig. the electric intensity at centre O will be
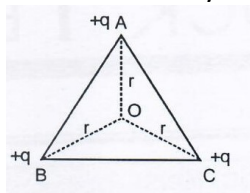
    (1) $\dfrac{1}{4\pi\in_o}\dfrac{q}{r}$ (2) $\dfrac{1}{4\pi\in_o}\dfrac{q}{r^2}$ (3) $\dfrac{1}{4\pi\in_o}\dfrac{3q}{r^2}$ (4) zero

92. 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?
(1) 0.01%   (2) 0.1%   (3) 1%   (4) 10%

93. A rough vertical board has an acceleration a along the horizontal so that a block of mass M pressing against it does not fall. The coefficient of friction between block and the board is
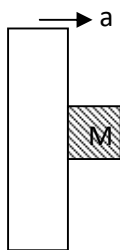
(1) $> \dfrac{a}{g}$ (2) $> \dfrac{g}{a}$ (3) $= \dfrac{a}{g}$ (4) $> \dfrac{g}{a}$

94. Plates of area A are arranged as shown. The distance between each plate is d, the net capacitance is
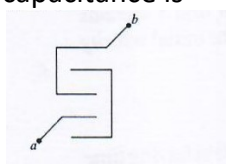
(1) $\dfrac{\varepsilon_0 A}{d}$ (2) $\dfrac{7\varepsilon_0 A}{d}$ (3) $\dfrac{6\varepsilon_0 A}{d}$ (4) $\dfrac{5\varepsilon_0 A}{d}$

95. A plane wave of wavelength 6250 A is incident normally on a slit of width 2×10^{-2} cm. The width of the principal maximum on a screen distant 50cm will be
(1) 312.5×10^{-3} cm   (2) 312.5×10^{-6} m   (3) 312.5×10^{-3} m   (4) 312.5×10^{-6} cm

96. The heat radiated per unit area in 1 hour by a furnace whose temperature is 3000 K is $(\sigma = 5.7 \times 10^{-8} W\, m^{-2} K^{-4})$
(1) 1.7×10^{10} J   (2) 1.1×10^{12} J   (3) 2.8×10^{8} J   (4) 4.6×10^{6} J Two isolated conducting spheres S$_1$ and S$_2$ of radius $\dfrac{2}{3}R$ and $\dfrac{1}{3}R$ have 12 μC and -3 μC charges, respectively, and are at a large distance from each other. They are now connected by a conducting wire. A long time after this is done the charges on S$_1$ and S$_2$ are respectively:
(1) 4.5 μC on both   (2) +4.5 μC and -4.5 μC   (3) 3 μC and 6 μC   (4) 6 μC and 3 μC

98. A gun fires two bullets at 60° and 30° with horizontal. The bullets strike at some horizontal distance. The ratio of maximum height for the two bullets is in the ratio of
(1) 2:1   (2) 3:1   (3) 4:1   (4) 1:1

99. A generator has an e.m.f. of 440 Volt and internal resistance of 400b Ohm. Its terminals are connected to a load of 4000 Ohm the voltage across the load is
(1) 220 Volt   (2) 440 Volt   (3) 200 Volt   (4) 400 Volt

100. Electric field inside a copper wire of length 10 meters, resistance 2 Ohm connected to a 10 volt battery is
(1) 1 Vm^{-1} (2) 0.5 Vm^{-1} (3) 10 Vm^{-1} (4) 5 Vm^{-1}

101. A large number of liquid drops each of radius γ coalesce to from a single drop of radius R. The energy released in the process is converted into kinetic energy of the big drop so formed. The speed of the big drop is (given, surface tension of liquid T, density r)
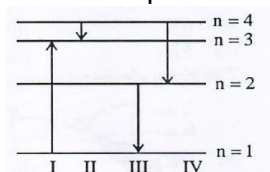(1) $\sqrt{\dfrac{T}{\rho}\left(\dfrac{1}{r}-\dfrac{1}{R}\right)}$ (2) $\sqrt{\dfrac{2T}{\rho}\left(\dfrac{1}{r}-\dfrac{1}{R}\right)}$ (3) $\sqrt{\dfrac{4T}{\rho}\left(\dfrac{1}{r}-\dfrac{1}{R}\right)}$ (4) $\sqrt{\dfrac{6T}{\rho}\left(\dfrac{1}{r}-\dfrac{1}{R}\right)}$

102. The path difference between the two waves: $y_1 = a_1 \sin\left(\omega t - \dfrac{2\pi x}{\lambda}\right)$ and

$y_2 = a_2 \sin\left(\omega t - \dfrac{2\pi x}{\lambda} + \phi\right)$ will be

(1) $\dfrac{2\pi}{\lambda}\phi$ (2) $\dfrac{2\pi}{\lambda}\left(\phi - \dfrac{\pi}{2}\right)$ (3) $\dfrac{\lambda}{2\pi}\phi$ (4) $\dfrac{2\pi}{\lambda}\left(\phi + \dfrac{\pi}{2}\right)$

103. The diagram shows the energy levels for an electron in a certain atom. Which transition shown represents the emission of a photon with the most energy?

(1) IV (2) III (3) II (4) I

104. A body of mass 10 kg and velocity 10 m/s collides with a stationary body of mass 5 kg. After collision both bodies stick to each other, velocity of the bodies after collision will be

(1) $\dfrac{3}{10}\, m/s$ (2) $\dfrac{18}{3}\, m/s$ (3) $\dfrac{9}{20}\, m/s$ (4) $\dfrac{20}{3}\, m/s$

105. Two particles of mass m_1 and m_2 $(m_1 > m_2)$ attract each other with a force inversely proportional to the square of the distance between them. If the particles are initially held at rest and then released, the centre of mass will

(1) move towards m_1 (2) move towards m_2
(3) remain at rest   (4) Nothing can be said

106. The r.m.s velocity of oxygen molecule at 16°C is 474 m/sec. The r.m.s velocity in m/s of hydrogen molecule at 127°C is

(1) 1603 (2) 1896 (3) 2230.59 (4) 2730

107. The oscillating electric and magnetic field vectors of electromagnetic wave are oriented along
(1) the same direction and in phase
(2) the same direction but have a phase difference of 90°
(3) mutually perpendicular directions and are in same phase
(4) mutually perpendicular directions but has a phase difference of 90°

108. At 0°K which of the following properties of a gas will be zero?
(1) kinetic energy (2) potential energy (3) vibrational energy (4) density

109. A uniform rod of mass m, length ℓ , area of cross-section A has Young's modulus Y. If it is hanged vertically, elongation under its own weight will be

(1) $\dfrac{mg\ell}{2AY}$ (2) $\dfrac{2mg\ell}{AY}$ (3) $\dfrac{mg\ell}{AY}$ (4) $\dfrac{mgY}{A\ell}$

110. If two soap bubbles of different radii are connected by a tube. Then
(1) air flows from the smaller bubble to the bigger bubble
(2) air flows from bigger bubble to the smaller bubble till the sizes are interchanged
(3) air flows from the bigger bubble to the smaller bubble till the sizes become equal
(4) there is no flow of air.

111. In a transistor
(1) both emitter and collector have same length
(2) length of emitter is greater than that of collector
(3) length of collector is greater than that of emitter

(4) any one of emitter and collector can have greater length

112. A brass scale of a barometer gives correct reading at 0°C. α_{Brass}= 0.00002/°C. the barometer reads 75 cm at 27°C. The atmospheric pressure at 0°C is
    (1) 74.20cm   (2) 74.62cm   (3) 74.92cm   (4) 75.04cm

113. The total length of a sonometer wire between fixed ends is 110cm. Two bridges are placed to divide the length of wire in ratio 6 : 3 : 2. The tension in the wire is 400 N and the mass per unit length is 0.01 kg/m. What is the minimum common frequency with which three parts can vibrate?
    (1) 1100 Hz   (2) 1000 Hz   (3) 166 Hz   (4) 100 Hz

114. For the velocity time graph shown in the figure below the distance covered by the body in the last two seconds of its motion is what fraction of the total distance travelled by it in all the seven seconds?
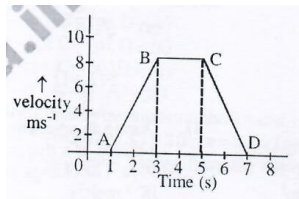
    (1) $\dfrac{1}{2}$ (2) $\dfrac{1}{4}$ (3) $\dfrac{2}{3}$ (4) $\dfrac{1}{3}$

115. A 25 cm long solenoid has radius 2 cm and 500 total number of turns. It carries a current of 15A. If it is equivalent to a magnet of the same size and magnetization $\vec{M}$ (magnetic moment/volume), the $\left|\vec{M}\right|$ is
    (1) 3000π Am^{-1} (2) 3πAm^{-1} (3) 3000 Am^{-1} (4) 300 Am^{-1}

116. A stone is thrown with a velocity u making an angle θ with the horizontal. The horizontal distance covered by its fall to ground is maximum when the angel θ is equal to
    (1) 0°   (2) 30°   (3) 45°   (4) 90°

117. The figure shown the path of a positively charged particle 1 through a rectangular region of uniform electric field as shown in the figure. What is the direction of electric field and the direction of particles 2, 3 and 4?
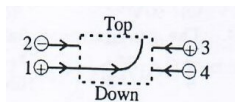

    (1) Top, down, top, down   (2) Top, down, down, top
    (3) Down, top, top, down   (4) Down, top, down, down

118. A circular disc A of radius r is made from an iron plate of thickness t and another circular disc B of radius 4r is made from an iron plate of thickness t/4. The relation between the moments of inertia I_A and I_B is
    (1) $I_A > I_B$ (2) $I_A = I_B$
    (3) $I_A < I_B$ (4) depends on the actual values of t and r

119. The threshold frequency for a photosensitive metal is 3.3×10^{14} Hz. If light of frequency 8.2×10^{14} Hz is incident on this metal, the cut-off voltage for the photoelectric emission is nearly
    (1) 2V   (2) 3V   (3) 5V   (4) 1 V

120. A light ray falls on a rentangular glass slab as shown. The index of refracrtion of the glass, if total internal reflection is to occur at the vertical face, is
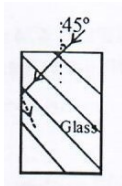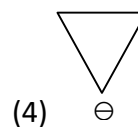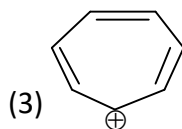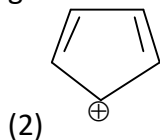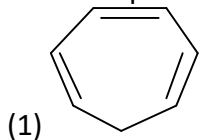
(1) $\sqrt{\dfrac{3}{2}}$ (2) $\dfrac{(\sqrt{3}+1)}{2}$ (3) $\dfrac{(\sqrt{2}+1)}{2}$ (4) $\dfrac{\sqrt{5}}{2}$

CHEMISTRY:

121. Which compound amongst the following is not an aromatic compound?

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

122. Identify the incorrect statement from the following
    (1) Li is the strongest reducing agent among the alkali metal
    (2) Alkali metals react with water to form their hydroxides
    (3) The oxidation number of K in KO_2 is +4
    (4) I.E of alkali metal decreases from top to bottom in one group

123. Which statement regarding polymer is not correct?
    (1) Thermosetting polymers are reusable
    (2) Elastomers have polymers chains held together by weak intermolecular process
    (3) Fibres possess high tensile strength
    (4) Thermoplastic polymers are capable of repeatedly softening and hardening with heat changes

124. $RMgX + CO_2 \xrightarrow[\text{ether}]{\text{dry}} Y \xrightarrow{H_3O^{\oplus}} RCOOH$
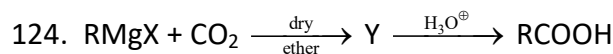
    (1) $(RCOO)_2Mg$ (2) $RCOO^{\ominus}Mg^{\oplus}X$ (3) $R_2CO^{\ominus}Mg^{\oplus}X$ (4) $RCOO^{\ominus}X^{\oplus}$

125. **Assertion (A):** ICl is more radioactive than I_2.
    Reason (R): ICl bond is weaker than I-I bond
    (1) (A) is not correct but (R) is correct
    (2) Both (A) and (R) are correct and (R) is the correct explanation of (A)
    (3) Both (A) and (R) are correct and (R) is the incorrect explanation of (A)
    (4) (A) is correct but (R) is incorrect

126. Identify the incorrect statement from the following
    (1) The shapes of *dxy, dyz* and *dzx* orbitals are similar to each other and dx^2y^2, dz^2 are similar to each other
    (2) All the 5*d* orbitals are different in size when compared to respective 4*d* orbitals
    (3) All the 4*d* orbitals have shapes similar to respective 3*d* orbitals
    (4) In an atom all the five 3*d* orbitals are equal in energy in free state

127. The IUPAC name of an element with atomic number 119 is
    (1) Ununoctium   (2) Ununennium   (3) Unnilennium   (4) Unununnium

128. In one molar solution that contains 0.5 mole of salute, there is
    (1) 1000g of solvent   (2) 500 ml of solvent   (3) 500g of solvent   (4) 100 ml of solvent

129. Match List – I with List – II

List – I (Drug class)	List – II (Drug molecule)
1) Antacids	(i) Salvarsan
2) Anti histamines	(ii) Morphine
3) Analgesics	(iii) Cimetidine
4) Anti microbial	(iv) Seldane

Choose the correct answer.

(1) 1-iv, 2-iii, 3-i, 4-iii   (2) 1-iii, 2-ii, 3-iv, 4-i   (3) 1-iii, 2-iv, 3-ii, 4-i   (4) 1-I, 2-iv, 3-ii, 4-iii

130. Choose the correct statement
(1) Both diamond and graphite are used as dry lubricants
(2) Diamond and graphite have two dimensional networks
(3) Diamond is covalent and graphite is ionic
(4) Diamond is sp^3 hybridized and graphite is sp^2 hybridized

131. Which amongst the following is incorrect statement?
(1) O_2^+ ion is diamagnetic
(2) The basic order of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1
(3) C_2 molecule has four electrons in its degenerate π molecular orbitals
(4) H_2^+ ion has one electron

132. Given below are two statements.
I: The acidic strength of monosubstituted nitrophenol is higher than phenol because of electron withdrawing nitro group
II: *o*-nitro phenol, *m*-nitro phenol and *p*-nitro phenol will have same acidic strength as they have same acidic strength as they have one nitro group attached to the phenolic ring
(1) **I** is incorrect but **II** is correct   (2) Both **I** and **II** are correct
(3) Both **I** and **II** are incorrect   (4) **I** is correct but **II** is incorrect

133. The incorrect statement regarding enzymes is
(1) Enzymes are very specific for a particular reaction and substrate
(2) Enzymes are biocatalyst
(3) Like chemical catalyst enzymes reduce the activation energy of bioprocess
(4) Enzymes are polysaccharides

134. The incorrect statement regarding chirality is
(1) A racemic mixture shows zero optical rotation
(2) SN^1 reaction yields 1 : 1 mixture of both enantiomers
(3) The product obtained by SN^2 reactions of haloalkane having chirality at reactive site shows invention of configuration

135. Given below are two statements
I: In the coagulation of a negative sol, the flocculating power of the three given ions is in the order $Al^{3+} > Ba^{2+} > Na^+$.
II: In the coagulation of a positive sol, the flocculating power of the three given salts is in the order $NaCl > Na_2SO_4 > Na_3PO_4$
(1) **I** is incorrect but **II** is correct   (2) Both **I** and **II** are correct
(3) Both **I** and **II** are incorrect   (4) **I** is correct but **II** is incorrect

136. Match

List – I	List – II
(a) Li	(i) Absorbent for CO_2
(b) Na	(ii) Electrochemical cells
(c) KOH	(iii) Coolant in fast breeder reactions
(d) CS	(iv) Photo electric cell

Choose the correct answer.

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

137. At 298K, the standard electrode potential of Cu^+ / Cu, Zn^+ / Zn, Fe^+ / Fe and Ag^+ / Ag are 0.34V, −0.76V, −0.44V and +0.80V respectively on the basis of SEP, predicts which cannot occur
(1) $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4$
(2) $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$
(3) $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$
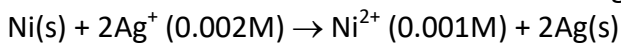(4) $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$
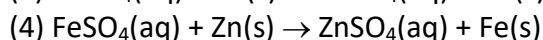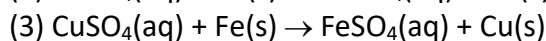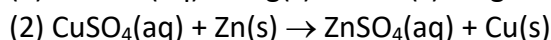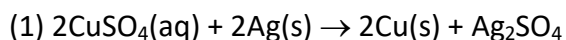
138. **I:** The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole-dipole interaction.
II: The boiling points of aldehyde and ketones are lower than the alcohols of similar molecular masses due to absence of H-bonding
(1) **I** is incorrect but **II** is correct   (2) both **I** and **II** are correct
(3) Both **I** and **II** are correct   (4) **I** is correct but **II** is incorrect

139. Find the emf of the cell in which the following reaction takes place at 298K
$Ni(s) + 2Ag^+ (0.002M) \rightarrow Ni^{2+} (0.001M) + 2Ag(s)$
[Given that E° cell = 10.5V, $\frac{2.303RT}{F} = 0.059$ at 298K]
(1) 1.05V   (2) 1.4115V   (3)1.385 V   (4) 0.9615 V

140. The IUPAC name of the complex $[Ag(H_2O)_2] [Ag(CN)_2]$ is
(1) diaqua silver (i) dicyanide argentite (i)   (2) dicyanide silver (ii) diaquaargentate
(3) diaqua silver (ii) dicyanide argentite (ii)   (4) dicyanide silver (i) diaqua argentite (i)

141. Gadolinium has a low value of third ionisation enthalpy because of
(1) high basic character   (2) small size
(3) high exchange enthalpy   (4) high electronic activity

142. In the natural or saintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from
(1) +6 to +5   (2) +7 to +4   (3) +6 to +4   (4) +7 to +3

143. A 10 litre flask contains 64 gram of oxygen at 27°C. The pressure inside the flask in bar is (And O_2 gas is behaving ideally) (R = 0.0831 μ bar K^{-1} mol^{-1})
(1) 4.9   (2) 2.5   (3) 498.6   (4) 49.8

144. Copper crystallises in FCC unit cell with cell edge length of 3.608×10^{-8} cm. The density of copper is 8.92 gcm^{-3}. Calculate the atomic mass of copper.
(1) 65 μ   (2) 63.1 μ   (3) 31.55 μ   (4) 60 μ

145. The order of energy absorbed which is responsible for the color of compresses
(A) $[Ni(H_2O)_2(en)_2]^{2+}$ (B) $[Ni(H_2O)_4(en)_2]^{2+}$ (C) $[Ni(en)_3]^{2+}$
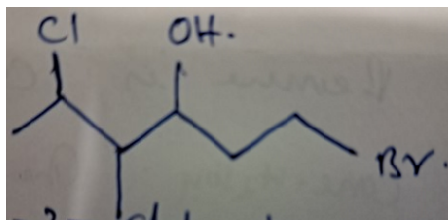(1) B > A > C   (2) A > B > C   (3) C > B > A   (4) C > A > B

146. The pollution due to oxides of sulphur gets enhanced due to the presence of


(a) particulate matter   (b) ozone   (c) hydrocarbon   (d) hydrogen peroxide
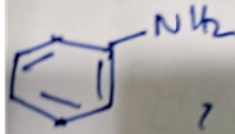(1) a, c, d only   (2) a, d only   (3) a, b, d only   (4) b, c, d only

147. The correct IUPAC name of the following compound is

    (1) 6-bromo-4-methyl-z-choloro hexon-4-01
    (2) 1-bromo-2-cholor-4-methythexon-4-01
    (3) 6-bromo-2-chloro-4-methythexan-4-01
    (4) 1-bromo-4-methyl-5-chloro hexon-3-01

148. Which of the following square of reaction is suitable to synthesize chlorobenzene
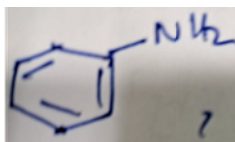
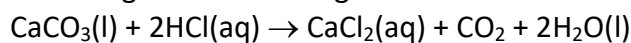(1) , HCL, Heating   (2) Benzene, Cl_2, anhydrous $FeCl_3$

(3) Phenol, $NaNO_2$ HCl, CuCl   (4) , HCl

149. The p^H of the solution containing 50ml each of 0.10M sodium acetate and 0.01M acetic acid is (Given pka of CH_3COOH = 4.57)
    (1) 2.57   (2) 5.57   (3) 3.57   (4) 4.57

150. What mass of 95% pure $CaCO_3$ will be required to nutralize 50 ml of 0.5M HCl solution according to the following reaction?
$CaCO_3(l) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2 + 2H_2O(l)$
    (1) 9.50g   (2) 1.25g   (3) 1.32g   (4) 3.65g

151. Nitration of benzene is carried out with concentrated HNO_3 in pressure of concentrated H_2SO_4 in to provide
    (1) Nucleophile during the reaction   (2) Free radical during the reaction
    (3) Electrophile during the reaction   (4) Catalyst during the reaction

152. Some meta directing substitutes in aromatic substitution are given which one is most deactivating?
    (1) −COOH   (2) $-NO_2$ (3) −C≡N   (4) $-CO_3H$

153. In calcium fluoride having the fluorite structure, the coordination numbers for calcium ion (Ca^{+2}) and fluoride ion (F^-) are
    (1) 4 & 2   (2) 6 & 6   (3) 8 & 4   (4) 4 & 8

154. The mixture that from maximum boiling azeotrope is
   (1) heptane + octane   (2) water + nitric acid
    (3) ethanol + water   (4) acetone + carbon disulphide

155. Identify the incorrect statement, regarding the molecule XeO_4.
    (1) XeO_4 molecule if square planar   (2) There are four $p\pi$–$d\pi$ bonds
    (3) There are four sp^3–p, σ bonds   (4) XeO_4 molecule is tetra hedral

156. The pair of compound boiling metals in their highest oxidation state is
    (1) $[Fe(CN)_6]^{3-}$ and $[Cu(CN)_6]^{2-}$ (2) $[FeCl_4]^-$ and CO_2O_3

(3) $[NiCl_4]^{2-}$ and $[COCl_4]^{2-}$ 　　　　　　　　　　　　　　(4) MnO_2 and CrO_2Cl_2
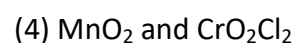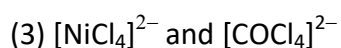
157. The type of Isomerism shown by the complex $[CoCl_2(en)_2]$ is
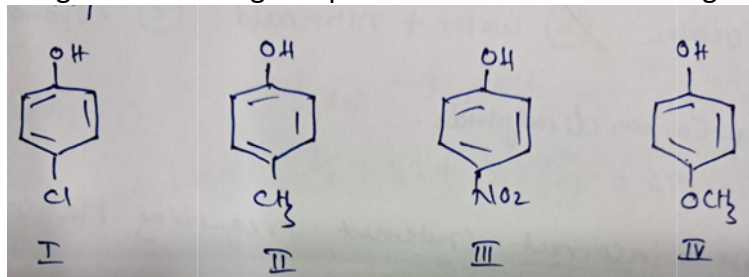   (1) Geometrical isomerism 　　　　　　　(2) Coordination isomerism
    (3) Ionisation isomerism 　　　　　　　　(4) Linkage isomerism

158. Arrange the following compounds in order of decreasing acidity

    (1) IV > III > I > II 　　　(2) II > IV > I > III 　　　(3) I > II > III > IV 　　　(4) III > I > II > IV

159. Which of the following reaction is appropriate for converting acefamide to methanamine?
    (1) Hoffmann hypobromamide reaction 　　　(2) Stephens reaction
    (3) Gabriel pthlamide synthesis 　　　　　　(4) carbylamine reaction

160. In a protein molecule various amino acids are linked together by
    (1) peptide bon 　　　(2) dative bond 　　　(3) α-glycosidic bond 　(4) β-glycosidic bon