

# EAMCET MEDICAL MODEL PAPER

No. of Questions: 160

Maximum Marks: 160

Time: 3 Hrs

## BOTANY

- Water potential value is highest for
  - 1) Hypertonic solution
  - 2) Hypotonic solution
  - 3) Isotonic solution
  - 4) Pure water
- Which saprophytic prokaryote becomes an endosymbiotic diazotroph
  - 1) Rhizobium
  - 2) Clostridium
  - 3) Nostoc
  - 4) Azotobacter
- Nucleic acids which behave like enzymes
  - 1) Ribose acid
  - 2) Ribozyme
  - 3) Catalyst
  - 4) Deoxyribose acid
- The enzyme rubisco participate in the following pathways
 

I) Calvin cycle	II) CAM pathway		
III) C4 pathway	IV) Photo respiration		
1) I, II, III	2) I, III, IV	3) II, III, IV	4) I, III only
- Net gain of ATP in aerobic respiration per molecule of glucose
 

1) 32 ATP	2) 40 ATP	3) 8 ATP	4) 36 ATP
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- Study the following
 

List – I	List – II	List – III
I. Fruit ripening	Ethylene	Cousins
II. Promotion of bolting	Gibberellins	Kurosawa
III. Phototropism	Cytokinins	F.W Went
IV. Supression of cell division	Auxin	Charles darwin

Identify the correct combination

1) I, II	2) II, III	3) III, IV	4) I, IV
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- Crown gall of apple and pear is caused by
 

1) Xanthomonas Oryzae	2) Salmonella typhi
3) Agrobacterium tumefaciens	4) Vibrio cholerae
- “Biological entities” known to infect every type of cell are called
 

1) Bacteria	2) Fungi	3) Protozoans	4) Viruses
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- In snapdragon plant, the inheritance of flower color indicates
 

1) Complete dominance	2) Incomplete dominance
3) Complete recessiveness	4) Incomplete recessiveness
- Among the traits which were selected for hybridisation in pea plant the recessive character is
 

1) violet flower	2) Inflated pods
3) Yellow seeds	4) Terminal flower

- 11.** The method of gene mapping of chromosomes was developed by
- 1) Alfred Hershey
  - 2) Alfred sturtevant
  - 3) Franklin stahl
  - 4) Marshall warren niren berg
- 12.** Dihybrid test cross ratio is
- 1) 9 : 3 : 3 : 1
  - 2) 7 : 1 : 1 : 7
  - 3) 1 : 7 : 7 : 1
  - 4) 1 : 1 : 1 : 1
- 13.** If the sequence of bases in template strand of DNA is 3'ATTCGATG5' then the sequence bases in its transcript will be
- 1) 5'GUAGCUUA3'
  - 2) 5'TAAGCTAC3'
  - 3) 5'UAAGCUAC3'
  - 4) 3'UAAGCUAC5'
- 14.** During the replication of DNA, the anchor molecule required to initiate the new strand of DNA molecule is
- 1) DNA polymerase
  - 2) RNA polymerase
  - 3) DNA primer
  - 4) RNA primer
- 15.** In 'Lac operon' system, the repressor binds to the operator in the absence of
- 1) Inducer
  - 2) Regulator gene
  - 3) Promoter gene
  - 4) Inhibitor
- 16.** A protein comprises of totally 400 amino acids given this data, assess the total number nucleotides on mRNA and also the number of ATP, number of peptide bonds formed, number of translocations and number of ribosomes respectively
- 1) 1203, 400, 399 and 1
  - 2) 1200, 300, 400, 399 and 400
  - 3) 1203, 400, 399, 399 and 400
  - 4) 1200, 800, 400, 399 and 1
- 17.** During its action on palindrome of DNA, the EcoRI recognises which one of the following?
- 1) 5'GATTC3'
  - 2) 5'TTCGAA3'
  - 3) 5'GAATTC3'
  - 4) 3'GATATC5'
- 18.** Identify the chief enzyme that is involved in PCR technique
- 1) Restriction enzymes
  - 2) DNA ligases
  - 3) Topoisomerases
  - 4) Taq polymerases
- 19.** Transgenic golden rice with enhanced nutritional value obtained from one of the following
- 1) Taipei
  - 2) Jaya
  - 3) Ratna
  - 4) Basmati
- 20.** Statin is a
- 1) Clot buster
  - 2) Blood cholesterol lowering agent
  - 3) Remove only stains
  - 4) Immunosuppressive drug
- 21.** National botanical research institute is located at
- 1) Delhi
  - 2) Kolkata
  - 3) Lucknow
  - 4) Dehradun
- 22.** Thick walled Asexual spores formed in blue green algae are called
- 1) Akinetes
  - 2) Aplanospres
  - 3) Conidia
  - 4) Sporangiospores
- 23.** Unicellular Eukaryotes are belongs to
- 1) Kingdom - Monera
  - 2) Kingdom – Fungi
  - 3) Kingdom - Animalia
  - 4) Kingdom - Protista

24. Identify the wrong combination.

- 1) Pongamia, Jatropha – petroplant rich in hydrocarbons
- 2) Cinchona, digitalis – food for astronauts
- 3) Spirulina, chlorella – single cell proteins
- 4) Azolla, Nostoc – Biofertilizers

25. Haplo – diaplontic life cycle is found in

- 1) Pteridophytes
- 2) Bryophytes
- 3) Ferns
- 4) Fungi

26. Study the following

PLANT	FRUIT	EDIBLE PART
I. Pisum	Legume	Cotyledons
II. Mango	Drupe	Mesocarp
III. Citrus	Sorosis	Mesocarp
IV. Coconut	Hesperidium	Pericarp

The correct combination is

- 1) I, II
- 2) I, III
- 3) II, III
- 4) II, IV

27. Functions of modified roots in taeniophyllum, vanda, avicennia, maize are respectively

- I. Respiration
- II. Photosynthesis
- III. Support
- IV. Absorption of moisture

- 1) I, IV, II, III
- 2) II, IV, I, III
- 3) III, II, I, IV
- 4) IV, III, II, I

28. The plant that tolerates salinity of sea water and show negatively geotropic roots is

- 1) Asparagus
- 2) Loranthus
- 3) Avicennia
- 4) Opuntia

29. In the family fabaceae, flowers are

- 1) Actinomorphic
- 2) Zygomorphic
- 3) Asymmetrical
- 4) Radial symmetry

30. Plant material or unit used for the purpose of vegetative propagation is called

- 1) Spore
- 2) Conidium
- 3) Propagule
- 4) Gamete

31. The single large and shield shaped cotyledon of a monocot embryo is called

- 1) Coleorhiza
- 2) Coleoptile
- 3) Radicle
- 4) Scutellum

32. Fragrant flowers with well developed nectaries are adopted for

- 1) Entomophily
- 2) Zoophily
- 3) Hydrophily
- 4) Anemophily

33. Study the following lists

List – I

- a) Plasma membrane
- b) Cell wall of algae
- c) Secondary wall
- d) Chromatin

List – II

- I. Calcium carbonate
- II. Cutin
- III. Histones
- IV. Phosphoglycerides
- V. Calcium pectate

The correct match is

- | a     | b  | c  | d   | a     | b   | c | d  |
|-------|----|----|-----|-------|-----|---|----|
| 1) IV | I  | II | III | 2) II | III | I | IV |
| 3) V  | IV | II | I   | 4) IV | III | I | II |

34. Number of spindle apparatus formed during meiosis for the formation of 80 microspores

- 1) 40
- 2) 80
- 3) 60
- 4) 160

35. Dendrochronology deals with the study of

- 1) Counting the combinal rings
- 2) Formation of annual rings
- 3) Rate of growth in trees
- 4) Estimation of age of trees

36. Ephemeral plants

- 1) Store water
- 2) Live for very short period
- 3) Have long slender stem
- 4) Grow in saline soils

37. In a hydrarch succession, the seral stage at which trees appear is called

- 1) Scrub stage
- 2) Reed – swamp stage
- 3) Marsh – meadow stage
- 4) Free floating plant stage

38. Which of the following is a succulent xerophyte?

- 1) Casuarina
- 2) Tribulus
- 3) Nerium
- 4) Opuntia

39. **Assertion (A):** Some plants donot possess well developed root system.

**Reason (R):** They grow in surplus water habitats.

- 1) Both A and R are true and R is the correct explanation of A.
- 2) Both A and R are true but R is not the correct explanation of A.
- 3) A is true but R is false.
- 4) A is false but R is true.

40. **Assertion (A):** Monocot stems do not show secondary growth.

**Reason (R):** They do not possess conducting vascular tissue.

- 1) Both A and R are true and R is the correct explanation of A.
- 2) Both A and R are true but R is not the correct explanation of A.
- 3) A is true but R is false.
- 4) A is false but R is true.

ZOOLOGY

41. Passenger pigeon previously existed in
- 1) South America
  - 2) South Africa
  - 3) North America
  - 4) Australia
42. Match the following and choose the correct combination.
- |                    |                                  |
|--------------------|----------------------------------|
| List – I           | List – II                        |
| A. Polycythemia    | I. Fall in RBC count             |
| B. Erthrocytopenia | II. Increase RBC count           |
| C. Leucocytopenia  | III. Blood Cancer                |
| D. Leucocytosis    | IV. Slight increase in WBC count |
|                    | V. Fall in WBC count             |
- |                |              |
|----------------|--------------|
| A B C D        | A B C D      |
| 1) II I VI III | 2) II I V IV |
| 3) I II V IV   | 4) II I IV V |
43. The sponge that lives in the shallow marine water is
- 1) Leucosolenia
  - 2) Euplectella
  - 3) Chalina
  - 4) Cliona
44. Read the following statement
- I) All scyphozoans are solitary and medusoid forms are Sedentary
  - II) Cnidarians are generally unisexual forms
  - III) Ephyra larvas are produced by scyphistoma of gorgonia
  - IV) All anthozoans are exclusively polypoid forms
- From the above statements choose the correct statement
- 1) Except I, all are correct
  - 2) Except II, all are correct
  - 3) Except III, all are correct
  - 4) Except IV, all are correct
45. The larva of cestodes is
- 1) Miracidium
  - 2) Redia
  - 3) Cercaria
  - 4) Cysticerus
46. Hagfish is also called as
- 1) Amphioxus
  - 2) lime eel
  - 3) Lancelet
  - 4) Lamprey
47. Which bone in the birds is called Wish Bone?
- 1) Synsacrum
  - 2) Pygostyle
  - 3) Sternum
  - 4) Furcula
48. Cytolytic enzymes secreted by the secretory organelles are helpful in the penetration of sporozoite into
- 1) RBC
  - 2) Liver cells
  - 3) Crop of mosquito
  - 4) WBC
49. Which part of the brain controls autonomous nervous system?
- 1) Cerebrum
  - 2) Diencephalon
  - 3) Cerebellum
  - 4) Corporabigemina

50. Trace the path of sperms after they are produced in the testes

- A) Bidders canal  
 B) Ureter  
 C) Transverse canals  
 D) Seminiferous tubules  
 E) Vasa efferentia  
 F) Cloaca

The correct answers is

- 1) D → A → E → B → C → F  
 2) E → D → A → C → F → B  
 3) D → E → A → C → B → F  
 4) A → D → B → E → C → F

51. **Assertion (A):** Female wuchereria bancrofti is ovoviviparous.

**Reason (R):** Female lays embryonated eggs.

- 1) Both A & R are true R is the correct explanation of A.  
 2) Both A & R are true R is not the correct explanation of A.  
 3) A is true but R is false.  
 4) A is false but R is true.

52. Select the correct combination from the following.

Group – 1 (Type of flagellum)	Group – 2 (Character)	Group – 3 (Example)
I) Stichonematic	Two or more rows of mastigonemes occurs on the axoneme	Chilomonas
II) Pantonematic	Two or more rows of mastigonemes are present on the terminal filament	Monas
III) Pantacronematic	A terminal naked axial filament are present	Urceolus
IV) Acronematic	Mastigonemes are absent & terminal filament is present	Polytoma

- 1) I & II                      2) II & III                      3) III & IV                      4) I & IV

53. Which one of the following interferes with the transport of dopamine in the CNS?

- 1) A white crystalline alkaloid extracted from the leaves of Erythroxylum coca.  
 2) A chemical extracted from the leaves of cannabis sativa.  
 3) A crystalline compound obtained by acetylation of morphine.  
 4) A chemical extracted from the dried lates of the unripe seed capsule of poppy plant.

54. Note the following.

- A) Mandibles                      B) Maxillary palps  
 C) Labrum                          D) Antennae  
 E) Anal cerci                      F) Labial palps

Which of the above structure of Periplaneta bear gustatory receptors?

- 1) A, B & C                      2) B, C & E                      3) B, C & F                      4) B, D & F

55. CU-T prevents pregnancy by preventing
- 1) Fertilization
  - 2) Ovulation
  - 3) Implantation of fertilized egg
  - 4) None of these
56. Population Ecology deals with
- 1) Population & Evolution
  - 2) Evolution & Ecology
  - 3) Population genetics
  - 4) Ecology, Population genetics & Evolution
57. In the total composition of air, nitrogen & oxygen gases constitute
- 1) N – 72.09% & O – 21.94%
  - 2) N – 87.2% & O – 21 %
  - 3) N – 76.09% & O – 21.34%
  - 4) N – 78.09% & O – 20.94%
58. The pH of success entericus is
- 1) 7.6
  - 2) 6.6
  - 3) 5.6
  - 4) 2.0
59. The enzymes responsible for the digestion of starch in food of man is present in
- 1) The salivary & gastric secretions
  - 2) The salivary & pancreatic secretions
  - 3) The gastric & pancreatic
  - 4) The gastric & duodenal
60. Which one of the following is the correct matching of the site of action on the given substrate, the Enzyme acting upon it and the end product?
- 1) Small intestine - Proteins pepsin amino acids
  - 2) Stomach - Fats lipase micelles
  - 3) Duodenum - Triglycerides trypsin monoglycerides
  - 4) Small intestine – starch & amylase Disaccharide (maltose)
61. The air which is taken in or given out during a single breath is known as
- 1) Residual
  - 2) Vital air
  - 3) Tidal air
  - 4) All of these
62. **Assertion (A):** Inspiration occurs due to muscular relaxation.  
**Reason (R):** During inspiration, the diaphragm & external intercostal muscles contract simultaneously.
- 1) Both A and R are true and R explains A
  - 2) Both A and R are true but R does not explain A
  - 3) A is true R is false
  - 4) A is false R is true
63. Nature of valves in the heart is
- 1) Membranous
  - 2) Muscular
  - 3) Tendinous
  - 4) Ligamentous

64. The second heart sound (dub) is associated with the closure of
- 1) Tricuspid valve
  - 2) Semilunar valves
  - 3) Bicuspid valve
  - 4) Tricuspid & Bicuspid valves
65. Match the abnormal conditions given in Column - A with their explanations given in Column - B and choose the correct option.

**Column - A**

- A. Glycosuria  
B. Renal calculi  
C. Glomerular Nephritis  
D. Gout

**Column - B**

- I. Accumulation of uric acid in joints  
II. Inflammation in glomeruli  
III. Mass of crystallized salts with in the kidney  
IV. Presence of glucose in urine

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

66. Consider the following statements.

- A) Flame cells are excretory structure in flatworms.  
B) Green glands are excretory organs in annelids.  
C) Columns of bertini are the conical projections of renal.

- 1) A & B correct
- 2) B & C Incorrect
- 3) A & C correct
- 4) A, B & C correct

67. The H - zone in the skeletal muscle fibre is due to

- 1) Extension of myosin filaments in the central portion of the A - band
- 2) The absence of myofibrils in the central portion of A - band
- 3) The central gap between myosin filaments in the A - band
- 4) The central gap between actin filaments extending through myosin filaments in the A - band

68. The type of joint between the human skull bones is

- 1) Synarthrodial
- 2) Synovial joint
- 3) Cartilaginous joint
- 4) Fibrous joint

69. Pneumotaxic centre which can moderate the functions of the respiratory rhythm centre is present at

- 1) Pons region of brain
- 2) Thalamus
- 3) Spinal cord
- 4) Right cerebral hemisphere

70. If an organism has more rods it will

- 1) Active during day
- 2) Possess color vision
- 3) Active during night
- 4) Both '1' & '3' are possible



71. **Assertion (A):** A tumour of adrenal cortex may cause Addison's disease.

**Reason (R):** This happens due to over secretion of cortisol by the tumour.

- 1) Both A & R are true R explains A.
- 2) Both A & R are true R do not explains A.
- 3) A is true & R is false.
- 4) Both A & R are false.

72. Choose the correct answer among the following options

List - I

List - II

A. Epinephrine

I. Increase in muscle growth

B. Testosterone

II. Decrease in blood pressure

C. Glucagon

III. Decrease in liver glycogen

D. Atrial

IV. Increase heart beat Natriuretic factor

1) A-II, B-I, C-III, D-IV

2) A-IV, B-I, C-III, D-II

3) A-I, B-II, C-III, D-IV

4) A-I, B-IV, C-II, D-III

73. FSH is a

1) Catecholamine

2) Glycoprotein

3) Polypeptide

4) Steroid

74. Organs of corti are present in the cavity known as

1) Scala tympani

2) Helicotrema

3) Reissner's membrane

4) Scala media (Cochlear canal)

75. Match the items in Column I & Column II.

Column - I

Column - II

A. Sickle-cell anaemia

I. 7<sup>th</sup> chromosome

B. Phenylketonuria

II. 11<sup>th</sup> chromosome

C. Cystic fibrosis

III. X - Chromosome

D. Color blindness

IV. 12<sup>th</sup> Chromosome

1) A - I, B - III, C - IV, D - II

2) A - II, B - III, C - IV, D - I

3) A - IV, B - II, C - III, D - I

4) A - II, B - IV, C - I, D - III

76. In the following human pedigree, the filled symbols represent the affected individuals.

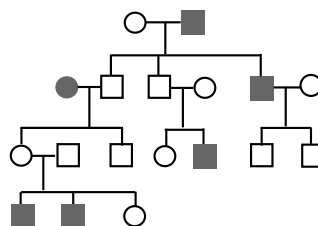
Identify the type of given pedigree

1) X - Linked recessive

2) Autosomal recessive

3) X - linked dominant

4) Autosomal dominant



77. Which one of the following is not important for Evolution?  
 1) Mutation  
 2) Recombination  
 3) Genetic drift  
 4) Somatic variation
78. Which epoch is of human civilization?  
 1) Pliocene  
 2) Holocene  
 3) Paleocene  
 4) Pleistocene
79. Following are all breeds of cows except  
 1) Jersey  
 2) Nagpuri  
 3) Sahiwal  
 4) Sindhi
80. Which one of the following is a marine Fish?  
 1) Rohu  
 2) Hilsa  
 3) Catla  
 4) Common carp

## PHYSICS

81. If  $\vec{r} = 0.2\vec{i} + a\vec{j} - 0.3\vec{k}$  is a unit vector, the value of a is  
 1)  $\sqrt{0.87}$   
 2) 0.87  
 3) 1.13  
 4)  $\sqrt{1.13}$
82. Two blocks of masses 3 kg and 1 kg are kept in constant with each other on a frictionless horizontal surface. If a force of 10 N is applied on the larger block. What is the contact force between the two blocks?  
 1) 2.5 N  
 2) 3 N  
 3) 3.5 N  
 4) 1 N
83. If unit of length is doubled and mass is Quadrupled the unit of density is  
 1) Doubled  
 2) Halved  
 3) Quadrupled  
 4) Not effected
84. A particle is moving in a circular path with constant speed v. When its angular displacement is  $120^\circ$ , change in its velocity is  
 1) v  
 2)  $\frac{\sqrt{3}}{2}v$   
 3)  $\frac{v}{2}$   
 4)  $\sqrt{3}v$
85. A boy throws n balls per second at regular time intervals, when the first ball reaches the maximum height he throws the second one vertically up. The maximum height reached by each ball is  
 1)  $\frac{g}{2(n-1)^2}$   
 2)  $\frac{g}{2n^2}$   
 3)  $\frac{g}{n^2}$   
 4)  $\frac{g}{n}$
86. The coordinates of a moving particle at any time t are given by  $x = \alpha t^3$  and  $y = \beta t^3$ . The speed of the particle at time 't' is given by  
 1)  $\sqrt{\alpha^2 + \beta^2}$   
 2)  $3t\sqrt{\alpha^2 + \beta^2}$   
 3)  $3t^2\sqrt{\alpha^2 + \beta^2}$   
 4)  $t^2\sqrt{\alpha^2 + \beta^2}$
87. Find the work done in lifting a stone of mass 10 kg and specific gravity 3 from the bed of a lake to a height of 6 m in water.  
 1) 98 J  
 2) 392 J  
 3) 196 J  
 4) 294 J
88. A particle executes SHM along a straight line 4 cm long. When the displacement is 1 cm its velocity and acceleration are numerically equal. The time period of SHM is  
 1)  $2\Pi s$   
 2)  $\frac{2\Pi}{\sqrt{3}} s$   
 3)  $\frac{2\Pi}{\sqrt{5}} s$   
 4)  $\frac{2\Pi}{\sqrt{7}} s$

89. If the density of moon is  $d$ , the time period of revolution of an artificial satellite in a circular orbit very close to the surface of the moon is

- 1)  $\sqrt{\frac{3\Pi}{16dG}}$       2)  $\sqrt{\frac{16\Pi}{3dG}}$       3)  $\sqrt{\frac{9\Pi}{dG}}$       4)  $\sqrt{\frac{3\Pi}{dG}}$

90. A steel wire of 2 mm in diameter is stretched by applying a force of 72 N, stress in the wire is

- 1)  $2.29 \times 10^7 \text{ N/m}^2$       2)  $1.7 \times 10^7 \text{ N/m}^2$       3)  $3.6 \times 10^7 \text{ N/m}^2$       4)  $0.8 \times 10^7 \text{ N/m}^2$

91. A circular disc of radius  $R$  and thickness  $\frac{R}{6}$  has moment of inertia  $I$  about an axis passing through its centre and perpendicular to its plane. It is melted and recasted into a solid sphere. The moment of inertia of the sphere about its diameter as axis of rotation is

- 1)  $I$       2)  $\frac{2I}{8}$       3)  $\frac{I}{5}$       4)  $\frac{I}{10}$

92. A thin walled glass tube of radius 0.5 cm is dipped vertically in the water of surface tension  $70 \text{ dyne cm}^{-1}$ . The force required to take it out from the water is

- 1)  $44 \times 10^{-5} \text{ N}$       2)  $44 \times 10^{-4} \text{ N}$       3)  $2.4 \times 10^{-4} \text{ N}$       4)  $0.44 \times 10^{-6} \text{ N}$

93. A bubble of radius ( $r_1$ ) is inside another bubble of radius  $r_2$  ( $r_2 > r_1$ ). The radius of a single bubble whose excess pressure is equal to difference in pressure between inside of inner bubble and outside the other bubble

- 1)  $\frac{r_1 r_2}{r_1 + r_2}$       2)  $\frac{r_1 - r_2}{r_1 r_2}$       3)  $\frac{r_1 r_2}{r_2 - r_1}$       4)  $\frac{2(r_1 r_2)}{r_1 - r_2}$

94. The frequency of a simple pendulum is 'n' oscillations per minute and that of another is (n + 1) per minute. The ratio of length of first pendulum to that of second one is

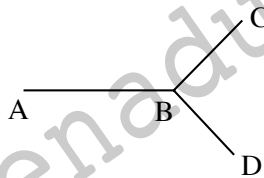
- 1)  $\left(n + \frac{1}{n}\right)^2$       2)  $\left(\frac{n+1}{n}\right)^2$       3)  $n(n+1)$       4)  $\left(\frac{n}{n+1}\right)^2$

95. At what temperature the density of a liquid is 2% less than that at  $0^\circ\text{C}$

- 1)  $49\gamma r$       2)  $\frac{1}{49\gamma r}$       3)  $\frac{\gamma r}{49}$       4)  $\frac{49}{\gamma r}$

96. Three rods AB, BC and BD are of the same material and having the same cross section have been joined as shown in the figure. The ends A, C and D are held at temperatures of  $20^\circ\text{C}$ ,  $80^\circ\text{C}$  and  $80^\circ\text{C}$  respectively. If each rod is of same length, then the temperature at the junction B of the three rods is

- 1)  $90^\circ\text{C}$   
2)  $60^\circ\text{C}$   
3)  $40^\circ\text{C}$   
4)  $30^\circ\text{C}$



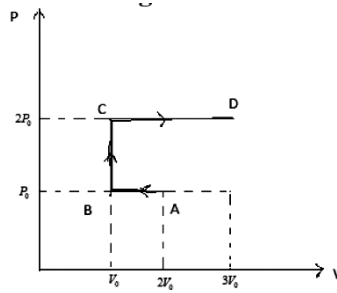
97. In the temperature, at which the r.m.s speed of gas molecules become double its value at  $0^\circ\text{C}$ , is

- 1)  $224^\circ\text{C}$       2)  $819^\circ\text{C}$       3)  $273^\circ\text{C}$       4)  $760^\circ\text{C}$

98. Two rods, one of aluminium and the other made of steel, having initial length  $l_1$  and  $l_2$  are connected together to form a single rod of length  $l_1 + l_2$ . The coefficients of linear expansion for aluminium and steel are  $\alpha_a$  and  $\alpha_s$  respectively. If the length of each rod increases by the same amount when their temperatures are raised by  $t^\circ\text{C}$ , then find the ratio  $\frac{l_1}{(l_1 + l_2)}$

- 1)  $\frac{\alpha_s}{\alpha_a}$       2)  $\frac{\alpha_a}{\alpha_s}$       3)  $\frac{\alpha_s}{(\alpha_a + \alpha_s)}$       4)  $\frac{\alpha_a}{(\alpha_a + \alpha_s)}$

99. P V diagram of an ideal gas is shown in figure. Work done by the gas in process ABCD is

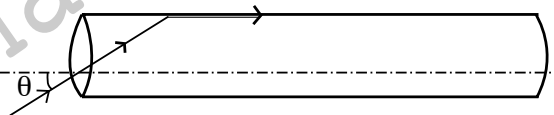


- 1)  $4 P_0 V_0$                       2)  $2 P_0 V_0$                       3)  $3 P_0 V_0$                       4)  $P_0 V_0$

100. String 1 has twice the length, twice the radius, twice the tension and twice the density of another string 2. The relation between the fundamental frequencies of 1 and 2 is

- 1)  $f_1 = 2 f_2$                       2)  $f_1 = 4 f_2$                       3)  $f_2 = 4 f_1$                       4)  $f_1 = f_2$

101. A transparent solid cylindrical rod has a refractive index of  $\frac{2}{\sqrt{3}}$ . It is surrounded by air. A light ray is incident at the midpoint of one end of the rod as shown in the figure.



The incident angle  $\theta$  for which the light ray grazes the wall of the rod is

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

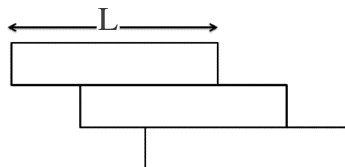
102. A thin bar magnet of length 'L' and magnetic moment 'M' bent at the mid-point so that the two parts are at right angles. The new magnetic length and magnetic moment are respectively

- 1)  $\sqrt{2} L, \sqrt{2} M$                       2)  $\frac{L}{\sqrt{2}}, \frac{M}{\sqrt{2}}$                       3)  $\sqrt{2} L, \frac{M}{2}$                       4)  $\frac{L}{2}, \sqrt{2} M$

103. Young's double slit experiment is conducted with light of wavelength  $\lambda$ . The intensity of the bright fringe is I. The intensity at a point where the path difference is  $\frac{3\lambda}{4}$  given by

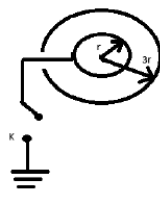
- 1) Zero                      2)  $\frac{I}{8}$                       3)  $\frac{I}{4}$                       4)  $\frac{I}{2}$

104. Three identical bricks are placed on the top of one another as shown in the figure. So that a part of one brick overhangs the another below. Find the maximum value of the total overhang.



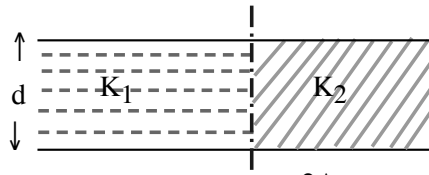
- 1)  $\frac{3L}{4}$                       2)  $\frac{L}{4}$                       3)  $\frac{L}{2}$                       4)  $\frac{3L}{5}$

105. Figure shows two conducting thin concentric shells of radii  $r$  and  $3r$ . The outer shell carries a charge 'q' and the inner shell is neutral. The magnitude of charge which flows from inner shell to the earth after the key K is closed will be equal to



- 1)  $\frac{-q}{3}$                       2)  $\frac{q}{3}$                       3)  $3q$                       4)  $-3q$
106. A parallel plate capacitor with air between the plates has a capacitance of 9 PF. The separation between its plate is  $d$ . The space between the plates is now filled with two dielectrics. One of the dielectric 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 capacitor will be
- 1) 1.8 PF                      2) 45 PF                      3) 40.5 PF                      4) 20.25 PF
107. The length of a potentiometer wire is  $l$ . A cell of emf  $E$  is balanced at a length  $\frac{l}{3}$  from the positive end of the wire. If the length of the wire is increased by  $\frac{l}{2}$ . At what distance will the same cell give a balance point?
- 1)  $\frac{2l}{3}$                       2)  $\frac{l}{2}$                       3)  $\frac{l}{6}$                       4)  $\frac{4l}{3}$
108. Photoelectric effect is explained on the basis of
- 1) Wave nature of radiation
  - 2) Particle nature of radiation
  - 3) Particle nature of electrons
  - 4) Wave nature of electrons
109. The value of Bohr magneton is equal to
- 1)  $\frac{eh}{\pi m}$                       2)  $\frac{eh}{8 \pi m}$                       3)  $\frac{eh}{2 \pi m}$                       4)  $\frac{eh}{4 \pi m}$
110. In a transformer, the number of turns in the primary coils is 140 and that in the secondary coil is 280. If the current in the primary coil is 4A, that in the secondary coil is
- 1) 2 A                      2) 4 A                      3) 6 A                      4) 10 A
111. 90% of a radioactive sample is left undecayed after time  $t$  has elapsed. What percentage of the initial sample will decay in a total time  $2t$ ?
- 1) 20%                      2) 19%                      3) 40%                      4) 38%
112. A photo metal is illuminated by lights of wavelengths  $\lambda_1$  and  $\lambda_2$  respectively. The maximum kinetic energies of electrons emitted in the two cases are  $E_1$  and  $E_2$  respectively. The work function of metal is
- 1)  $\frac{E_2 \lambda_1 - E_1 \lambda_2}{\lambda_1}$                       2)  $\frac{E_1 \lambda_1 - E_2 \lambda_2}{\lambda_1 + \lambda_2}$
- 3)  $\frac{E_1 \lambda_1 + E_2 \lambda_2}{\lambda_1 - \lambda_2}$                       4)  $\frac{E_2 \lambda_2 - E_1 \lambda_1}{\lambda_1 - \lambda_2}$

113. A parallel plate capacitor with plate area 'A' and separation 'd' is filled with two dielectrics of dielectric constants  $K_1$  and  $K_2$ . If the permittivity of free space is  $\epsilon_0$ , the capacitance of the capacitor is given by



- 1)  $\frac{A\epsilon_0}{d} (K_1 + K_2)$                       2)  $\frac{2A\epsilon_0}{d} (K_1 + K_2)$   
 3)  $\frac{A\epsilon_0}{2d} (K_1 + K_2)$                       4)  $\frac{2A\epsilon_0}{d} \cdot \frac{K_1 K_2}{K_1 + K_2}$
114. The resistance of a moving coil galvanometer is  $4 \Omega$ . When 0.2 volts is applied between its ends, it shows a full scale deflection. In order to measure 20 A current with that galvanometer, the resistance of shunt required is

- 1)  $\frac{4}{499}$                       2)  $\frac{4}{399}$                       3)  $\frac{4}{299}$                       4)  $\frac{4}{199}$

115. In an AC circuit an alternating voltage  $e = 200\sqrt{2} \sin 100 t$  volt is connected to a capacitor of capacity  $1 \mu\text{F}$ . The rms value of the current in the circuit is

- 1) 100 mA                      2) 200 mA                      3) 20 mA                      4) 10 mA

116. The magnifying power of the objective of a compound microscope is 7. If the magnifying power of the microscope is 35, then the magnifying power of eye piece will be

- 1) 245                      2) 5                      3) 28                      4) 42

117. A radioactive nucleus undergoes a series of decays according to the sequence  $A \xrightarrow{\beta} A_1 \xrightarrow{\alpha} A_2 \xrightarrow{\alpha} A_3$ . If the mass number and atomic number  $A_3$  are 172 and 69 respectively then the mass number and atomic number of A is

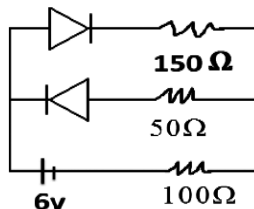
- 1) 56, 23                      2) 180, 72                      3) 120, 52                      4) 84, 38

118. A source of sound producing wavelength 50 cm is moving away from a stationary observer with  $\frac{1}{5}$ th speed of sound.

Then what is the wavelength of sound heard by the observer?

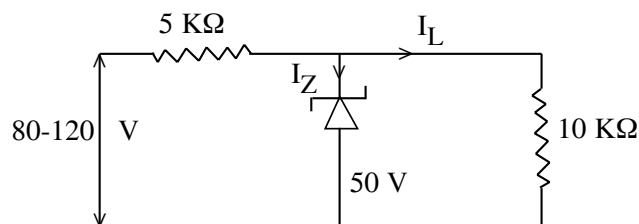
- 1) 55 cm                      2) 40 cm                      3) 60 cm                      4) 70 cm

119. Current through  $100 \Omega$  resistor is (given forward resistance of diode =  $50 \Omega$  reverse bias resistance =  $\infty$ )



- 1) 0.01 A                      2) 0.02 A                      3) 0.03 A                      4) 0.04 A

120. From the circuit shown below, the maximum and minimum values of zener diode current are



- 1) 6 mA, 5 mA      2) 14 mA, 5 mA      3) 9 mA, 1 mA      4) 3 mA, 2 mA

## CHEMISTRY

121. Wave numbers of a limiting line of Lyman series of H – atom is

- 1)  $\frac{109678}{2} \text{ cm}^{-1}$       2)  $\frac{109678}{3} \text{ cm}^{-1}$       3)  $109678 \text{ cm}^{-1}$       4)  $\frac{109678}{4} \text{ cm}^{-1}$

122. For a 'd' electron the orbital angular momentum is

- 1)  $\sqrt{6} \frac{h}{2\pi}$       2)  $\sqrt{2} \frac{h}{2\pi}$       3)  $\frac{h}{2\pi}$       4)  $\frac{2h}{\pi}$

123. Eka Silicon is known as

- 1) Scandium      2) Gallium      3) Germanium      4) Boron

124. Some oxides are shown in List-I and their nature is shown in List-II.

List - I

List - II

- |                                  |               |
|----------------------------------|---------------|
| A) MgO                           | i) Amphoteric |
| B) BeO                           | ii) Acidic    |
| C) P <sub>2</sub> O <sub>5</sub> | iii) Neutral  |
| D) CO                            | iv) Basic     |

The correct match is

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

125. In which one of the following pairs the two species have identical shape but differs in hybridisation

- 1) I<sub>3</sub><sup>-</sup>, BeCl<sub>2</sub>      2) NH<sub>3</sub>, BF<sub>3</sub>      3) XeF<sub>2</sub>, I<sub>3</sub><sup>-</sup>      4) NH<sub>4</sub><sup>+</sup>, SF<sub>4</sub>

126. Less ionic compound among the following is

- 1) NaF      2) KCl      3) KF      4) NaCl

127. The gas which is easy to liquefy is

- 1) H<sub>2</sub>      2) He      3) CO<sub>2</sub>      4) NH<sub>3</sub>

128. The empirical formula of an organic compound is CH<sub>2</sub>O. Its vapour density is 45. The molecular formula of the compound is

- 1) CH<sub>2</sub>O      2) C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>      3) C<sub>3</sub>H<sub>6</sub>O<sub>3</sub>      4) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>

129. The volume of Perhydrol which on decomposition gives 2 lit of O<sub>2</sub> gas at STP is

- 1) 100 ml      2) 2 ml      3) 10 ml      4) 20 ml

130. 1 kg of a sample of water contained 222 mg of  $\text{CaCl}_2$  and 219 mg of  $\text{Mg}(\text{HCO}_3)_2$ . So the permanent and temporary hardness are ..... PPM and ..... PPM
- 1) 200, 200                      2) 200, 150                      3) 200, 300                      4) 150, 220
131. Among the alkali metals thermally unstable carbonate is given by
- 1) K                                  2) Cs                                  3) Rb                                  4) Li
132. The ion helpful for controlling heart beating and muscle contraction is
- 1)  $\text{Mg}^{+2}$                           2)  $\text{Na}^+$                               3)  $\text{K}^+$                               4)  $\text{Ca}^{+2}$
133. The ionisation constant of a monobasic acid is  $5 \times 10^{-2}$ . The pH of 0.01 M acidic solution is
- 1) 1.30                              2) 3.30                              3) 5.0                              4) 1.65
134. Which one of the following is not a state function?
- 1) Internal energy              2) Work                              3) Entropy                          4) Free energy
135. Which of the following compound is not a borane
- 1)  $\text{B}_5\text{H}_9$                               2)  $\text{B}_5\text{H}_{10}$                               3)  $\text{B}_5\text{H}_{11}$                               4)  $\text{B}_6\text{H}_{10}$
136. List- I                              List – II
- A) Reactive form of carbon      i) HF
- B) Acid employed for etching of glass      ii) Diamond
- C) Synthesis gas                      iii) Charcoal
- D) Un reactive form of carbon      iv)  $\text{CO} + \text{H}_2$
- The correct match is
- |       |    |     |    |        |    |     |    |
|-------|----|-----|----|--------|----|-----|----|
| A     | B  | C   | D  | A      | B  | C   | D  |
| 1) i  | ii | iii | iv | 2) ii  | iv | iii | i  |
| 3) ii | i  | iii | iv | 4) iii | i  | iv  | ii |
137. For which of the following compounds the Lassaigne's test of nitrogen will fail
- 1)  $\text{H}_2\text{NCONH.NH}_2.\text{HCl}$                       2)  $\text{H}_2\text{N.NH}_2.2 \text{HCl}$
- 3)  $\text{H}_2\text{NCONH}_2$                                   4)  $\text{C}_6\text{H}_5 - \text{N} = \text{N} - \text{C}_6\text{H}_5$
138. **Assertion (A):** Reaction of but – 2 – yne by  $\text{Na/Liq. NH}_3$  gives trans But – 2 – ene.
- Reason (R):** It is syn addition.
- 1) Both A and R are true and R is the correct explanation of A.
- 2) Both A and R are true but R is not the correct explanation of A.
- 3) A is true but R is false.
- 4) A is false but R is true.
139. Several Japanese were killed by eating fish that caused the disease namely
- 1) Minamita                          2) Cholera                          3) Typhoid                          4) Disentry
140. The mole fractions of water and methanol in a solution containing 1 mole of water add 4 moles of methanol are
- 1) 0.2 and 0.8                          2) 0.8 and 0.2                          3)  $\frac{1}{18}$  and  $\frac{1}{8}$                           4)  $\frac{1}{8}$  and  $\frac{1}{18}$



141. Which among the following will show maximum Osmotic pressure?

- 1) 1 M NaCl                      2) 1 M MgCl<sub>2</sub>                      3) 1 M (NH<sub>4</sub>)<sub>3</sub> PO<sub>4</sub>                      4) 1 M Na<sub>2</sub>SO<sub>4</sub>

142. The packing fraction in a simple cubic cell of crystal is

- 1)  $\frac{\pi}{6}$                       2)  $\frac{\sqrt{3}\pi}{8}$                       3)  $\frac{1}{2\sqrt{2}}\pi$                       4)  $\frac{\sqrt{2}\pi}{6}$

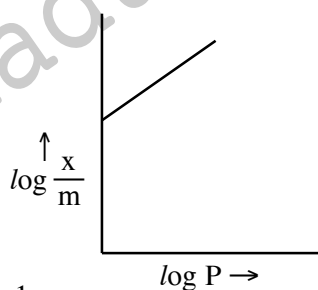
143. The electrolysis of an aqueous solution of KNO<sub>3</sub> between platinum electrodes gives

- 1) K at the cathode, NO<sub>2</sub> at the anode                      2) H<sub>2</sub> at cathode and O<sub>2</sub> at anode  
3) H<sub>2</sub> at cathode and NO<sub>2</sub> at anode                      4) K at cathode and O<sub>2</sub> at anode

144. In the reaction A → B, if the concentration of A is increased by four times, the rate of the reaction becomes doubled, the order of the reaction is

- 1) Zero                      2) 1                      3)  $\frac{1}{2}$                       4) 2

145. Freundlich adsorption isotherm is given by the expression  $\frac{x}{m} = K.P^{\frac{1}{n}}$ . Then the slope of the line in the following plot is



- 1)  $\sqrt{n}$                       2)  $\frac{1}{n}$                       3)  $\frac{x}{m}$                       4) p

146. The number of P – P bonds and Oxidation state of 'P' in hypophosphoric acid are respectively

- 1) 0, +3                      2) 0, +5                      3) 1, +5                      4) 1, +4

147. Transition temperature at which Rhombic sulphur and monoclinic are stable

- 1) 98°C                      2) 95°C                      3) 112°C                      4) 114.5°C

148. The order of basic strength of ClO<sup>-</sup>, ClO<sub>2</sub><sup>-</sup>, ClO<sub>3</sub><sup>-</sup>, ClO<sub>4</sub><sup>-</sup> is

- 1) ClO<sub>4</sub><sup>-</sup> > ClO<sub>3</sub><sup>-</sup> > ClO<sub>2</sub><sup>-</sup> > ClO<sup>-</sup>                      2) ClO<sub>4</sub><sup>-</sup> > ClO<sub>2</sub><sup>-</sup> > ClO<sup>-</sup> > ClO<sub>3</sub><sup>-</sup>  
3) ClO<sup>-</sup> > ClO<sub>2</sub><sup>-</sup> > ClO<sub>3</sub><sup>-</sup> > ClO<sub>4</sub><sup>-</sup>                      4) ClO<sup>-</sup> > ClO<sub>4</sub><sup>-</sup> > ClO<sub>3</sub><sup>-</sup> > ClO<sub>2</sub><sup>-</sup>

149. List – I

(Noble gas)

- A) He  
B) Ne  
C) Kr  
D) Rn

List– II

(Use)

- i) Treatment of cancer  
ii) Beacon lights  
iii) Miners cap lamps  
iv) Cryogenic liquid  
v) Fluorescent tubes

The correct match is

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

150. List – I (Metals)

- A) Cu  
B) Zn  
C) Al  
D) Fe

List – II (Ores)

- i) Calamine  
ii) Cuprite  
iii) Hematite  
iv) Bauxite

The correct match is

- |       |     |     |    |
|-------|-----|-----|----|
| A     | B   | C   | D  |
| 1) i  | ii  | iii | iv |
| 3) iv | iii | ii  | i  |

- |       |   |     |     |
|-------|---|-----|-----|
| A     | B | C   | D   |
| 2) ii | i | iv  | iii |
| 4) ii | i | iii | iv  |

151. Match the following

List – I

- A)  $sp^3$   
B)  $dsp^2$   
C)  $sp^3d^2$   
D)  $d^2sp^3$

List – II

- i)  $[CO(NH_3)_6]^{+3}$   
ii)  $[Ni(CO)_4]$   
iii)  $[Pt(NH_3)_2]Cl_2$   
iv)  $[COF_6]^{-3}$

The correct match is

- |       |     |    |     |
|-------|-----|----|-----|
| A     | B   | C  | D   |
| 1) i  | ii  | iv | iii |
| 3) ii | iii | i  | iv  |

- |        |     |    |   |
|--------|-----|----|---|
| A      | B   | C  | D |
| 2) ii  | iii | iv | i |
| 4) iii | ii  | iv | i |

152. The absolute configuration of a molecule changes during the reaction

- |                              |           |
|------------------------------|-----------|
| 1) $SN^1$                    | 2) $SN^2$ |
| 3) Free radical substitution | 4) $SE^2$ |

153.  $CH_3OH$ ,  $CH_3CH_2OH$  can be distinguished by the following reagent

- |                             |             |
|-----------------------------|-------------|
| 1) Anhydrous $ZnCl_2 + HCl$ | 2) $NaCO_3$ |
| 3) $I_2 + Na_2CO_3$         | 4) $KOH$    |

154. Which of the following pair of reagents produces same product with ethyl alcohol

- 1) Conc.  $H_2SO_4$ ,  $170^\circ C$ ; Cu,  $-300^\circ C$
- 2) Conc.  $H_2SO_4$ ,  $170^\circ C$ ; Conc.  $H_2SO_4$   $140^\circ C$
- 3) Conc.  $H_2SO_4$ ,  $100^\circ C$ ;  $Al_2O_3$ ,  $350^\circ C$
- 4) Conc.  $H_2SO_4$ ,  $170^\circ C$ ;  $Al_2O_3$ ,  $-350^\circ C$

155. Assertion (A):  $CH_3CHO$  on reaction with dil  $NaOH$  forms Aldol.

Reason (R): Aldehydes and ketones having  $\alpha$  hydrogen undergo Aldol condensation.

- 1) Both A and R are true and R is the correct explanation of A.
- 2) Both A and R are true but R is not the correct explanation of A.
- 3) A is true but R is false.
- 4) A is false but R is true.

156. Which of the following orders is true regarding the acidic nature of COOH

- 1) Formic acid > Acetic acid > Propanoic acid
- 2) Formic acid > Acetic acid < Propanoic acid
- 3) Formic acid < Acetic acid < Propanoic acid
- 4) Formic acid < Acetic acid > Propanoic acid

157. Carbylamine reaction is characteristic of

- 1)  $R_2NH$
- 2)  $RNH_2$
- 3)  $C_6H_5NH-R$
- 4)  $R_3N$

158. In vulcanisation of rubber

- 1) Sulphur reacts to form a new compound
- 2) Sulphur cross – links are introduced
- 3) Sulphur forms a very thin protective layer over rubber
- 4) All statements are correct

159. The deficiency of pyridoxine causes

- 1) Pellagra
- 2) Dermatitis, Convulsions
- 3) Beri Beri
- 4) Sterility

160. Which of the following is used for lowering blood pressure?

- 1) Reserpine
- 2) Morphine
- 3) Diethyl ether
- 4) Cocaine

### KEY

1-4; 2-1; 3-2; 4-2; 5-4; 6-1; 7-3; 8-4; 9-2; 10-4; 11-2; 12-4; 13-3; 14-4; 15-1; 16-1; 17-3; 18-4; 19-1; 20-2; 21-3; 22-1; 23-4; 24-2; 25-2; 26-1; 27-2; 28-3; 29-2; 30-3; 31-4; 32-1; 33-1; 34-3; 35-4; 36-2; 37-1; 38-4; 39-1; 40-3; 41-3; 42-2; 43-1; 44-3; 45-4; 46-2; 47-4; 48-1; 49-2; 50-3; 51-3; 52-3; 53-1; 54-3; 55-1; 56-4; 57-4; 58-1; 59-2; 60-4; 61-4; 62-4; 63-1; 64-2; 65-3; 66-2; 67-4; 68-1; 69-1; 70-3; 71-4; 72-2; 73-2; 74-4; 75-4; 76-2; 77-4; 78-2; 79-2; 80-2; 81-1; 82-1; 83-2; 84-4; 85-2; 86-3; 87-2; 88-2; 89-4; 90-1; 91-3; 92-2; 93-1; 94-2; 95-2; 96-2; 97-2; 98-3; 99-3; 100-3; 101-3; 102-2; 103-4; 104-1; 105-2; 106-3; 107-2; 108-2; 109-4; 110-1; 111-2; 112-4; 113-3; 114-2; 115-3; 116-2; 117-2; 118-3; 119-2; 120-3; 121-3; 122-1; 123-3; 124-2; 125-1; 126-4; 127-4; 128-3; 129-4; 130-2; 131-4; 132-4; 133-4; 134-2; 135-2; 136-4; 137-2; 138-3; 139-1; 140-1; 141-3; 142-1; 143-2; 144-3; 145-2; 146-4; 147-2; 148-3; 149-1; 150-2; 151-2; 152-2; 153-3; 154-4; 155-1; 156-1; 157-2; 158-2; 159-2; 160-1.

### HINTS & SOLUTIONS

#### PHYSICS

81.  $|\vec{r}| = \sqrt{(0.2)^2 + a^2 + (0.3)^2} = 1$

82.  $a = \frac{1}{m_1 + m_2}$ ,  $F_c = m_2 a$

$$F_c = \frac{m_2 F}{m_1 + m_2}$$

83. Density =  $\frac{M}{L^3} \Rightarrow d^1 = \frac{4M}{(2L)^3}$

84.  $\Delta \vec{V} = \vec{V}_2 - \vec{V}_1$  &  $\theta = 120^\circ$

$$\Delta \bar{V} = \sqrt{V_1^2 + V_2^2 - 2V_1V_2 \cos 120^\circ} \text{ here}$$

$$|V_1| = |V_2|$$

$$\Delta V = \sqrt{V^2 + V^2 - 2V^2 \cos 120^\circ}$$

$$\Delta V = \sqrt{3}V$$

$$85. \quad v = u - gt, h_{\max} = \frac{u^2}{2g}$$

$$86. \quad v_x = \frac{dx}{dt}, v_y = \frac{dy}{dt} \Rightarrow v = \sqrt{v_x^2 + v_y^2}$$

$$87. \quad \text{Work done} = mgh$$

$$\text{Specific gravity} = \frac{W_{\text{air}}}{W_{\text{air}} - W_{\text{water}}}$$

$$w = mgh \left(1 - \frac{1}{RD}\right)$$

$$88. \quad A = 2 \text{ cm}$$

$$\omega \sqrt{A^2 - y^2} = \omega^2 y$$

$$89. \quad T = \frac{2\pi R}{V_0} = \frac{2\pi R}{\sqrt{gR}} = 2\pi \sqrt{\frac{R^3}{Gm}}$$

$$90. \quad \text{Stress} = \frac{F}{A}$$

$$91. \quad I = \frac{MR^2}{2}; \quad I_1 = \frac{2}{5} Mr^2$$

$$V_{\text{Dis}} = V_{\text{Sph}}$$

$$92. \quad F = T/(2l)$$

$$93. \quad P = P_1 + P_2$$

$$\frac{4T}{r} = \frac{4T}{r_1} + \frac{4T}{r_2}$$

$$94. \quad n \propto \frac{1}{\sqrt{l}}$$

$$\frac{n}{n+1} = \sqrt{\frac{l_2}{l_1}}$$

$$\frac{l_2}{l_1} = \left(\frac{n+1}{n}\right)^2$$

$$95. \quad r_r = \frac{d_0 - d_t}{d_t(t)}$$

$$96. \quad (\theta - 20^\circ) = (80^\circ - \theta) + (80^\circ - \theta)$$

97.  $C_{\text{rms}} = \sqrt{T}$

98.  $\alpha_1 l_1 = \alpha_2 l_2$

99. Area under the curve ABCD

100.  $n = \frac{1}{2l} \sqrt{\frac{T}{A\rho}}$

$$\frac{n_1}{n_2} = \frac{l_2}{l_1} \times \sqrt{\frac{T_1}{T_2} \times \left(\frac{r_2}{r_1}\right)^2 \times \frac{\rho_2}{\rho_1}}$$

101.  $\sin c = \frac{\sqrt{3}}{2}$

$$\sin r = \sin 90 - c = \cos c = \frac{1}{2}$$

$$\sin \theta = \frac{\mu_2}{\mu_1}$$

102.  $M^1 = \left[ \frac{L}{\sqrt{2}} \right] \times m = \frac{M}{\sqrt{2}}$

103.  $\phi = \frac{2\pi}{\lambda} (x)$

$$I = 4 a^2 \cos^2 \left( \frac{\phi}{2} \right)$$

104. C M of bricks above each brick must not be beyond its edge for top block com should be at edge of lower one.

$$l_1 = \frac{L}{2}$$

for top two blocks com should be at edge of lower one. Then

$$l_2 = \frac{L}{4}$$

$$L = l_1 + l_2 = \frac{L}{2} + \frac{L}{4} = \frac{3L}{4}$$

105.  $v = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$

106.  $C_0 = \frac{\epsilon_0 A}{d}$

$$C^1 = \frac{\epsilon_0 A}{d(t_1 + t_2) + \left( \frac{t_1}{k_1} + \frac{t_2}{k_2} \right)}$$

107.  $E \propto l$

108. Conceptual

109. Conceptual

110.  $i_s = \left(\frac{V_p}{V_s}\right) i_p = \left(\frac{N_p}{N_s}\right) i_p$

111.  $N = N_0 e^{-\lambda t}$

112.  $E - W = \frac{1}{2} m v^2 = \text{K.E}$

$\frac{hc}{\lambda_1} - W = E_1 \dots\dots\dots (1)$

$\frac{hc}{\lambda_2} - W = E_2 \dots\dots\dots (2)$

solve (1) & (2)

113.  $C_1 = \frac{K_1 \frac{A}{2} \epsilon_0}{d}, C_2 = \frac{K_2 \frac{A}{2} \epsilon_0}{d}$

$C_1$  &  $C_2$  are in parallel

114.  $S = \frac{G}{n - 1}$ , Where  $n = \frac{i}{i_g}$

115.  $I_{rms} = \frac{V_{rms}}{X_c}$

116.  $m = m_0 \times m_e$

117. Apply the concept of  $\alpha$  - decay &  $\beta$  - decay

118.  $\lambda^1 = \lambda \left(\frac{V + V_s}{V}\right)$

119. Diode connected to 50  $\Omega$  is in reverse bias, so 50  $\Omega$  is in effective

$i = \frac{V}{R} = \frac{6}{150 + r_f + 100} = \frac{6}{150 + 50 + 100}$   
 $= \frac{6}{300} = 0.02 \text{ A}$

120.  $I_z = I - I_L, V_s = V_i - V_z = \frac{V_s}{R_s} - \frac{V_z}{R_L}$

**CHEMISTRY**

121 Limiting line of means  $n_2 = \alpha$

$\bar{\nu} = \frac{1}{\lambda} = R \left[ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$

$\bar{\nu} = 109678 \left[ \frac{1}{1^2} - \frac{1}{\alpha^2} \right]$

$= 109678 \text{ cm}^{-1}$

122. Orbital angular momentum  $= \sqrt{l(l + 1)} \frac{h}{2\pi}$

123. Conceptual

124. Conceptual

125. Conceptual

126. Conceptual

127. High  $T_C$  is easily liquefied.

128. E.F.wt = 30

$$MW = 2 \times UD$$

$$MF = EF \times \frac{MW}{EFwt}$$

129. 1 ml of perhydrol in decomposition gives 100 ml of  $O_2$

$$130. \text{Degree of Hardness} = \frac{\text{wt.of salt} \times 10^8}{\text{GMW of salt} \times \text{wt of water (gm)}}$$

131.  $LiCO_3$  is covalent

132. Conceptual

$$133. [H^+] = \sqrt{K_a \cdot C}$$

$$= \sqrt{5 \times 10^{-2} \times 10^{-2}}$$

$$= \sqrt{5 \times 10^{-4}}$$

$$= 2.2 \times 10^{-2}$$

$$pH = -\log[H^+]$$

$$= 1.65$$

134. Conceptual

135. Boranes has general formulas  $B_nH_{n+4}$ ,  $B_nH_{n+6}$

136. Conceptual

137. Conceptual

138. Na in liq.  $NH_3$  gives trans alkene. This is called birch reduction (Anti addition)

139. Minamita is disease caused by eating fish.

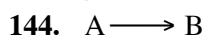
$$140. \frac{n_1}{n_1 + n_2}, \frac{n_2}{n_1 + n_2}$$

$$141. \Pi = i \cdot CRT$$

$$142. \text{For simple cubic packing fraction} = \frac{\Pi}{6}$$



Order of preferential discharge  $H^+ > K^+$  and  $OH^- > NO_3^-$



$$r = K[A]^x$$

$$2r = K[4A]^x$$

$$2 = 4^x$$

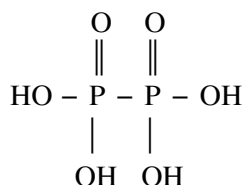
$$2^1 = 2^{2x}$$

$$2x = 1$$

$$x = \frac{1}{2}$$

145. The slope is equal to  $1/n$

146. Hypophosphoric acid  $H_4P_2O_6$



O.No of 'P' is 4, and has one P - P bond

147. Conceptual

148. Conjugate base of strong acid acts as a weak base

149. Conceptual

150. Conceptual

151. Conceptual

152. Conceptual

153.  $CH_3CH_2OH$  gives iodoform test

154.  $C_2H_5OH \longrightarrow C_2H_4$

155. Conceptual

156. Conceptual

157. Conceptual

158. Conceptual

159. Conceptual

160. Conceptual

This model paper prepared by subject experts of Sri Gayatri Educational Institutions, Hyderabad.