

EAPCET (AP) – 2024

(Engineering, Agriculture and Pharmacy Common Entrance Test)

MODEL TEST



CENTRE FOR EDUCATIONAL DEVELOPMENT OF MINORITIES

Osmania University

Minorities Welfare Department, Government of Telangana

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MOCK TEST– 2024

BOTANY

- The term taxon refers to
 - 1) Name of a species
 - 2) Name of genus
 - 3) Name of family
 - 4) A taxonomic group of any rank.
- Class is present between
 - 1) Kindom & Phyllum
 - 2) Phylum and order
 - 3) Order and family
 - 4) family & genus.
- Descending arrangement of Categories is called
 - 1) Key
 - 3) Heirarchy
 - 3) Taxonomy
 - 4) Classification
- The label of a herbarium Sheet dres not carry information on
 - 1) Date Collection
 - 2) Name the collector
 - 3) Local names
 - 4) Height of the plant
- Viroids differ from viruses is having
 - 1) DNA molecules without.
 - 2) RNA molecules with protein coat
 - 3) RNA molecules without protein coat
 - 4) DNA molecules with protein coat
- After Karyogamy followed by meiosis, spores are produced exogenously in
 - 1) Agarious
 - 1) Alternaria
 - 3) Neurosppra
 - 4) Sacharomyces
- Bacillus thuringiensis (Bt) strains have been used for designing novel
 - 1) Bioinsectidal plants
 - 2) Bio-mineralizations
 - 3) Biofuertizers
 - 4) Bio-metallurgical techniques
- Cry protein is obtained from
 - 1) Bacillus thuringiensis
 - 2) Bacillus subtilis
 - 3) Clostridium Welchi
 - 4) E-coli
- In primary settling tank, all sediments that settle are termed as
 - 1) Primary sludge
 - 2) Effluent
 - 3) Activated sludge
 - 4) Floccs
- The term poly adelphous is related to
 - 1) Gyroceium
 - 2) Androecium
 - 3) Corella
 - 4) Calyx
- Coconut fruit is a
 - 1) Berry
 - 2) Nut
 - 3) Capsule
 - 4) Drupe
- When Stamens are attached to perianth, Condition is known as
 - 1) Epipetalous
 - 2) Epiphylous
 - 3) Polyandrous
 - 4) Diadelphous
- Tricarpellary syncarpous gynoecium is found in flowers of
 - 1) Fabaceae
 - 2) Poaceoe
 - 3) Liliacee
 - 4) Solanaceoe
- Placentation in tomato and Lemon is
 - 1) Marginal
 - 2) Axile
 - 3) Parietal
 - 4) Free Central
- Cork is formed from
 - 1) Cork combium
 - 2) Vascular combium
 - 3) Phloem
 - 4) Xylem
- Companion cells are associated with
 - 1) Vessel elements
 - 2) Trichomes
 - 3) Guard celle
 - 4) Sieve elements

17. The most primitive type of stele is
 1) Eustete 2) Solenostele 3) Protostele 4) Siphonostele.
18. The functional xylem of dicot tree is
 1) Sap wood 2) Hard wood 13) Heartwood 4) Autumn
19. Age of a tree Can be estimated by
 1) Number of annual rings 2) Diameter of its heartwood
 3) Its height and girth 4) Biomass
20. Inflorescence is racemose in
 1) Brinjal 2) Tulip 3) Aloe 4) Soyabean
21. The mechanism that causes a gene is called to move from one linkage group to another
 1) Inversion 2) Duplication 3) Translocation 4) Crossing-over
22. Which of the following most appropriately describes haemophilia.
 1) Chromosomal disorder 2) Dominant gene disorder
 3) Recessive gene disorder 4) Recessive gene disorder
23. The ratio of complementary genes in F_2 generation
 1) 12:3:1 2) 9:8 3) 9:3:4 4) 9:6:1
24. Which one is the incorrect statement with regard to the importance of Pedigree analysis.
 1) It confirms that DNA is the Carrier of genes information
 2) It helps to understand whether the trait question is dominant or recessive
 3) It confirms that the trait is linked to one of the autosomes
 4) It helps to trace the inheritance of a specific trait
25. Down's Syndrome in humans is due to
 1) The X chromosome 2) Three copies of Chromosomes
 3) Monosomy 4) Two Y chromosomes.
26. Uridine, present only in RNA is a
 1) Nucleoside 2) Nucleotide 3) Purine 4) Pyrimidine
27. Which of the following is the start codon
 1) UAA 2) UAG 3) AUG 4) UGA
28. The final proof of DNA as the genetic Material Came from the experiments of
 1) Hershey & Chase 2) Avery, Mcleod & McCarty
 3) Hargobind Khorana 4) Griffith
29. Which of the following is codons codes for Proline
 1) CCC, CCU, CCG 2) UCC, UGU, CCU 3) CUG, CUU, CUA 4) CGC, CGG, CCA.
30. Which one of the following is a restriction endonuclease
 1) DNase I 2) RNase 3) Hind II 4) Protease
31. The cutting of DNA at specific Locations because possible with the discovery of
 1) Selectable markers 2) Ligases 3) RE 4) Probes
32. Which organism is used to transfer T-DNA
 1) Streptomyces hygroscopicus 2) Agrobacterium tumefaciens
 3) Salmonella typhi 4) E-coli
33. A gene whose expression helps to transformed cell is known as
 1) Vector 2) Plasmid 3) Structural gene 4) Selectable markers

34. Natality refers to
 1) Number of individuals leaving the habitat 2) Birth rate
 3) Death rate 4) Number of individuals entering a habitat
35. Mycorrhizae are the example of
 1) Ammensalism 2) Antibiosis 3) Mutualism 4) Fungistasis
36. The age pyramid with broad base indicates
 1) High percentage of old individuals 2) Low Percentage of young individuals
 3) A stable population 4) High Percentage of Young individuals.
37. The term ecosystem was coined by
 1) Haeckel 2) E. Warming 3) E. P. Odun 4) A.G. Tansley
38. Which ecosystem has the maximum biomass
 1) Grassland ecosystem 2) Pond ecosystem 3) Lake ecosystem 4) Forest ecosystem
39. What is the National Aquatic Animal of India?
 1) Blue Whale 2) Sea Horse 3) Gangetic Shark 4) River Dolphin
40. Which of the following structures is not found in a prokaryotic cell
 1) Mesosome 2) Plasmamembrane 3) Nuclear envelope 4) Ribosome

ZOOLOGY

41. Branch of Zoology connected with the improvement of Human Race through laws of heredity is
 1) Eugenics 2) Euthenics 3) Euphenics 4) Ethology
42. Father of Taxonomy is
 1) William Harvey 2) Carolous Lineus 3) Aristotle 4) Theophrastus
43. Inter convertibility of Sol-gel is
 1) Natural change 2) Physical change
 3) Chemical change 4) Physico-Chemical change
44. Which of the following coelenterate does not exhibit metagenesis
 1) Obelich 2) Aurelia 3) Hydra 4) Physalia
45. Match the following columns and choose the correct answer
- | Column – A | Column – B |
|-----------------------|----------------------------|
| A. Polyembryony | I. Schistosoma hasmatobium |
| B. Liver fluke | II. Dibothricephulus |
| C. Bilharziasis | III. Trematoda |
| D. Largest tape worm | IV. Hymenolepis nana |
| E. Smallest tape worm | V. Fasciola |
- | | A | B | C | D | E |
|----|-----|----|-----|----|----|
| 1) | II | I | III | IV | V |
| 2) | III | V | I | IV | II |
| 3) | III | V | I | II | IV |
| 4) | III | IV | I | II | V |
46. The larva which performs Nocturnal periodicity
 1) Planula 2) Rhabiditi form larva
 3) Microfilaria 4) Cysticercus
47. Match the following and choose the correct answer

Column – A

- A. Stratified cuboidal epithelium
- B. Simple cuboidal epithelium
- C. Simple columnar epithelium
- D. Simple squamous epithelium

Column – B

- I. Ducts of Paratid
- II. Thyroid gland
- III. Cornea of eyes
- IV. Conjunctiva of eyes
- V. Trachea and Bronchi

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

48. Find out the correct series of diagram
- | | |
|--|--|
| 1) artery, lacunae, canaliculi | 2) Canaliculi, volkman's canal, vein |
| 3) Volkman's canal, lacunae, bone lamellae | 4) Vollkman's canal, lacunae, canaliculi |
49. Aristotle's lantern in echinoids is known as
- 1) Alimentary organ 2) Supplementary organ 3) Mastigatory organ 4) All
50. Aquatic organism with limited power of locomotion are called
- 1) Plankton 2) Nektons 3) Neustons 4) Periphytons
51. One of the following is useful measures for prevention and control of TDA abuse among the adolescents
- A) Avoid undue parental pressure, and by Responsibility of parents and teachers
 B) Seeking help from peers, education and counseling
 C) Seeking help from professional, alcohol and drug consumptive persons
- 1) A and C are true, B is false 2) B and C are true, A is false
 3) A and B are true, C is false 4) A, B and C are true, None is false
52. In earthworm lateral Heart can be differentiated from lateral oesophageal Hearts by the presence of
- 1) 2 pairs of valves 2) 3 pairs of valves 3) 4 pairs of valves 4) All
53. Rapid increase in the number of cells in the organ of host due to the presence of a parasite is known as
- 1) Hyperplasia 2) Hypertrophy 3) Over growth 4) Necrosis
54. The body cavity of cockroach is not a true body cavity, filled with blood is called
- 1) Haemato fluid 2) Haemalymph 3) Haemocoel 4) Pseudocuel
55. Read the following statement and choose the correct answer
- A. In Phereretima dorsal Blood vessel is collecting and distributing Blood vessel.
 B. Dorsal Blood vessel is considered as true heart in earthworm.
- 1) A & B are false 2) A is correct and B is correct explainaihen to A.
 3) A is false and B is true. 4) A is correct explanation to B, But B is false
56. Choose the Correct Statement regarding malaria and its parasite.
- I. Malaria Caused in man by plasmodium vivax.
 II. Every year world Mosquito day is celebrated on 20th August
 III. Sexual Cycle of plasmocdium discovered by Ronald Ross in female Anopheles.

IV. Anisogamy and Isogamy are the Naturally Seen Reproduction in plasmodium vivax.

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

57. Choose the Correct statement of the following regarding circulation in frog.

I. Heart is 3 Chambered.

II. Heart Situated in pericardial Cavity

III. Conus arteriosus is absent

IV. Blood contains erythrocytes, leucocytes and thrombocytes.

V. Sinus venosus is not a Pacemaker.

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

58. The Mass of eggs are released by the female frog is named

- 1) milt 2) Spawn 3) 1 & 2 4) ova

59. The arrangements of Abdominal ganglia in Segments cockroach is

- 1) 1,2,3,5,6,7 2) 1, 2, 3, 4, 6, 7 3) 1, 3, 4, 5, 6, 7 4) 1, 2, 3, 4, 5, 7

60. Fat bodies in Cockroach are Similar to

- 1) The liver of Invertebrates stores food & uric acid
 2) The liver of vertebrates stores food & uric acid, Symbioses & Synthesize lipids.
 3) The heart of vertebrates, filter the blood & Circulation,
 4) The Brain of Invertebrate & co-ordinate the all body functions.

61. Mouth parts of Insects are

- 1) Homologous organs 2) Analogous organs. 3) Vestigeal organs. 4) Atavistic organs.

62. Break-bone fever is also known as

- 1) yellow fever 2) Malaria 3) Filariasis 4) Dengue fever

63. Chikungunya transmit to man by

- 1) Infected person 2) Mosquito
 3) infected female Aedes aegyptimosquito 4) Culex female

64. The Symptoms of Dengue fever are are begins after biting of mosquito to man is

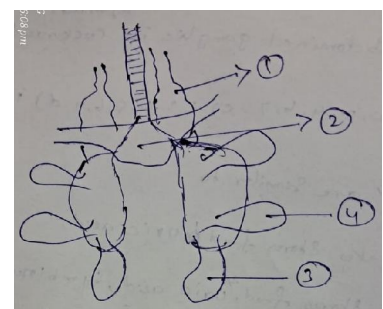
- 1) 1 to 2 days 2) 2 to 4 days 3) 7 to 10 days 4) 4 to 10 days.

65. One of the following are Symptoms & Signs of dengue fever.

- 1) Headach & muscular pain 2) Bone or Joint pains
 3) High fever, Rash & Swollen glands 4) All

66. Look the diagram & find out the correct Series of Names

- 1) Posterier thoracic air sac, Inter claricle, Abdominal, trachea
 2) Cervical, Inter claricle, Right lung, Abdominal
 3) Cervical, Inter claricle, Abdominal & Posterier thoracic air sac.
 4) Cervical, Inter claricle, left lung, posterier therocic



67. Match the following columns.

S.NO	Food Substances.	Enzyme	Products.
I	Carbohydrates.	Amylase	maltose, Sucrose & lactose
II	Maltose	Maltase	Glucose & Galaclose
III	Sucrose	Invertrase	Glucose + Cellulose
IV	Lactose	Lactase	Glucose & Galaclose

which of the Above are Correct.

- 1) I & II 2) II & III 3) III & IV 4) I & IV
68. A Healthy human breaths normally per minute.
 1) 12 to 13 times 2) 12 to 15 times 3) 12 to 16 times 4) 13 to 18 times.
69. Match the following and choose the correct Answer
 A. Asbestosis I. in halation of coal dust
 B. Silicosis II in halation of cold dust
 C. Siderosis III. Hyper ferremia
 D. Black lung disease IV. Asbestos industry
 V. Silica dust
- | | | | | |
|----|----|----|-----|----|
| | A | B | C | D |
| 1) | I | II | III | IV |
| 2) | IV | V | III | II |
| 3) | IV | V | II | I |
| 4) | IV | V | III | I |
70. In human being Heart beat is initiated by
 1) A. V.node b) S. A node 3) Sinus venosus 4) Purkenji fibres.
71. Steps involve in Heart beat are
 1) Auricular systole → ventricular diastole → ventricular Systole
 2) Auricular systole → ventricular systole → ventriculer diastole
 3) Auricular systole → ventricular systole → diastole of Complete Heart
 4) None of these
72. One of the following high, B.P is fatal to human's Kidney & Brain.
 1) $1 \frac{190}{110} Hg$ 2) $\frac{120}{190} Hg$ 3) $\frac{150}{90} Hg$ 4) $\frac{120}{80} Hg$
73. **Assertion (A)** Infection of the urinery fract is more common in woman than in man.
Reasen (R) Due to Short urethra, which is more close to the Anal aperture.
 1) A is true, R is false
 2) A is true, R is true, but R is not the correct explanation of A.
 3) A is true, R is true and R is the correct explanation of A.
 4) A is false R is false and R is the correct explainaitien of A.
74. Match the following & choose the correct Answer
 A. Motor unit I. Neuron & set of the Muscle fibres innervated by
 B. Neuro Muscular Junction telodendrites & constitute.
 C. Functional unit II. Sarcomere of striated muscle.
 D. Voluntary muscle III. Cardiac muscle
 IV. Junction between a motor neuron and Sarcolemma.
 V. Skeletal muscles.
- | | | | | |
|----|----|----|-----|----|
| | A | B | C | D |
| 1) | I | II | III | IV |
| 2) | II | I | III | IV |
| 3) | I | IV | V | II |
| 4) | I | IV | II | V |
75. Smallest bone in human's body

- 1) Atlas 2) Malleus 3) Steps 4) Patella

76. Match the following & choose the correct Answer

Column-I

- A. Myocoelel
B. Diacoel
C. Lateral ventricle
D. Rhinocoel

Column - II

- I. Ol factory lobe
II. Cerebral hemisphere.
III. Foramen of monro
IV. Diencephalon
V. Medulla oblongata

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

77. Re absorption of H₂O in Nephrons is controlled by

- 1) ACTH 2) STH 3) Vasopressin 4) Oxytocin

78. Hormone which stops ovulation is

- 1) F.S.H 2) L. H 3) Prolactin 4) Progesterone

79. The body is covered by fine hair, eye lids, eye lashes are formed by the end of

- 1) 24 weeks in third trimester 2) 24 weeks in 2nd trimester
3) 36 weeks in 2nd trimester 4) 36 weeks in 3rd trimester..

80. Formation & Development of blastocyst and its attachment to the uterine wall is called

- 1) Pertirution 2) Puberty 3) Implantation 4) Gestation

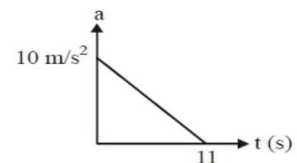
PHYSICS

81. In $S = a + bt + ct^2$, S is measured in meters and t in seconds. The unit of c is

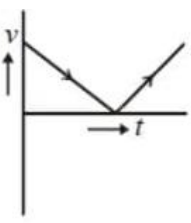
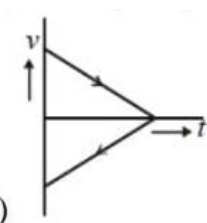
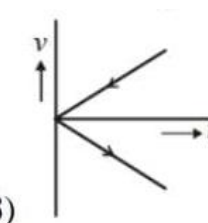
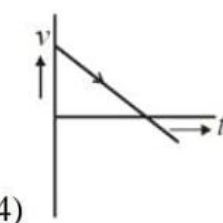
- 1) ms^{-2} 2) m 3) ms^{-1} 4) No units

82. A particle starts from rest. Its acceleration (a) versus time (t) graph is as shown in the figure. The maximum speed of the particle will be

- 1) 110 m/s 2) 55 m/s
3) 550 m/s 4) 660 m/s



83. A ball is thrown vertically upwards. Which of the following graphs represent velocity-time graph of the ball during its flight? (air resistance is neglected)

- | | | | |
|--|--|---|--|
| 1)  | 2)  | 3)  | 4)  |
|--|--|---|--|

84. As shown in figure the tension in the horizontal cord is 30 N. The weight W and tension in the string OA in Newtons are

- 1) $30\sqrt{3}, 30$ 2) $30\sqrt{3}, 60$ 3) $60\sqrt{3}, 30$ 4) None of these

85. A ball is thrown from ground level so as to just clear a wall 4 metres high at a distance of 4 metres and falls at a distance of 14 metres from the wall. The magnitude of velocity of the ball

will be

- 1) $\sqrt{182m/s}$ 2) $\sqrt{175m/s}$ 3) $\sqrt{165m/s}$ 4) $\sqrt{155m/s}$

86. A particle is moving in a circular path with velocity varying with time as $v = 1.5t^2 + 2t$. If the radius of circular path is 2 cm, the angular acceleration at $t = 2$ sec will be

- 1) 4 rad/sec^2 2) 40 rad/sec^2 3) 400 rad/sec^2 4) 0.4 rad/sec^2

87. A body of mass m tied at the end of a string of length ℓ is projected with velocity $\sqrt{4\ell g}$, at what height will it leave the circular path

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

88. The equivalent resistance between A and B is

- 1) $16/3\Omega$ 2) 16Ω 3) 8Ω 4) $3/16\Omega$

89. The magnitude of the force (in Newton) acting on a body varies with time t (in microsecond) as shown in fig. AB, BC, and CD are straight line segments. The magnitude of the total impulse on the body from $t = 4 \mu s$ to $16 \mu s$ is

- 1) $5 \times 10^{-4} N.s$ 2) $5 \times 10^{-3} N.s$ 3) $5 \times 10^{-5} N.s$ 4) $5 \times 10^{-2} N.s$

90. Three equal weights of mass m each are hanging on a string passing over a fixed pulley as shown in fig. The tensions in the string connecting weights A to B and B to C will respectively be

- 1) $\frac{2}{3}mg, \frac{2}{3}mg$ 2) $\frac{2}{3}mg, \frac{4}{3}mg$ 3) $\frac{4}{3}mg, \frac{2}{3}mg$ 4) $\frac{3}{2}mg, \frac{3}{4}mg$

91. A block of mass 2 kg is on a horizontal surface. The co-efficient of static & kinetic frictions are 0.6 & 0.2. The minimum horizontal force required to start the motion is applied and if it is continued, the velocity acquired by the body at the end of the 2nd second is ($g = 10 \text{ms}^{-2}$)

- 1) 8N, 8ms^{-1} 2) 8N, 4ms^{-1} 3) 8N, 2ms^{-1} 4) 8N, zero

92. Two satellites S_1 and S_2 revolve round a planet in the same direction in circular orbits. Their periods of revolutions are 1 hour and 8 hour respectively. The radius of S_1 is 10^4 km . The velocity of S_2 , with respect to S_1 , will be

- 1) $\pi \times 10^4 \text{ km/hr}$ 2) $\pi/3 \times 10^4 \text{ km/hr}$ 3) $2\pi \times 10^4 \text{ km/hr}$ 4) $\pi/2 \times 10^4 \text{ km/hr}$

93. A uniform steel wire of density 7800kg/m^3 is 2.5 m long and weighs $15.6 \times 10^{-3} \text{ kg}$. It extends by 1.25 mm when loaded by 8kg. Calculate the value of young's modulus of elasticity for steel.

- 1) $1.96 \times 10^{11} \text{ N/m}^2$ 2) $19.6 \times 10^{11} \text{ N/m}^2$ 3) $196 \times 10^{11} \text{ N/m}^2$ 4) None of these

94. An ideal gas expands isothermally from a volume V_1 to V_2 and then compressed to original volume V_1 adiabatically. Initial pressure is P and final pressure is P_3 . The total work done is W . Then

- 1) $P_3 > P, W > 0$ 2) $P_3 < P, W < 0$ 3) $P_3 > P, W < 0$ 4) $P_3 = P, W = 0$

95. A charged ball B hangs from a silk thread S, which makes an angle with a large charged conducting sheet P, as shown in the figure. The surface charge density σ of the sheet is proportional to

- 1) $\sin \theta$ 2) $\tan \theta$ 3) $\cos \theta$ 4) $\cot \theta$

96. Figure given below shows two identical parallel plate capacitors connected to a battery with switch S closed. The switch is now opened and the free space between the plates of capacitors is filled with a dielectric of dielectric constant 3. What will be the ratio of total electrostatic energy stored in both capacitors before and after the introduction of the dielectric?

- 1) 3:1 2) 5:1 3) 3:5 4) 5:3

97. In the fig. shown, Calculate the current through 3 ohm resistor. The emf of battery is 2 volt and its

internal resistance is $2/3$ ohm.

- 1) 0.33 amp 2) 0.44 amp 3) 1.22 amp 4) 0.88 amp

98. A thin circular wire carrying a current I has a magnetic moment M . The shape of the wire is changed to a square and it carries the same current. It will have a magnetic moment

- 1) M 2) $\frac{4}{\pi^2}M$ 3) $\frac{4}{\pi}M$ 4) $\frac{\pi}{4}M$

99. Consider the arrangements shown in figure in which the north pole of a magnet is moved away from a thick conducting loop containing capacitor. Then excess positive charge will arrive on

- 1) plate a 2) plate b
3) both plates a and b 4) None of the plates a and b

100. A current 10 A in the primary coil of a circuit is reduced to zero at a uniform rate in 10^{-3} second. If the coefficient of mutual inductance is 3H, the induced e. m.f. in the secondary coil will be

- 1) 3 kV 2) 30 kV 3) 2 kV 4) 20 kV

101. An alternating current is given by the equation $i = i_1 \cos \omega t + i_2 \sin \omega t$. The r.m.s. current is given by

- 1) $\frac{1}{\sqrt{2}}(i_1 + i_2)$ 2) $\frac{1}{\sqrt{2}}(i_1 + i_2)^2$ 3) $\frac{1}{\sqrt{2}}(i_1^2 + i_2^2)^{1/2}$ 4) $\frac{1}{2}(i_1^2 + i_2^2)^{1/2}$

102. A light beam travelling in the X-direction is described by the electric field E_y , (300V/m) $\sin \omega(t - x/c)$. An electron is constrained to move along the Y - direction with a speed of 2.0×10^7 m/s. The maximum magnetic force (in N) on the electron is.

- 1) 3.2×10^{-18} 2) 5.1×10^{-16} 3) 6.5×10^{-11} 4) 7.8×10^{-12}

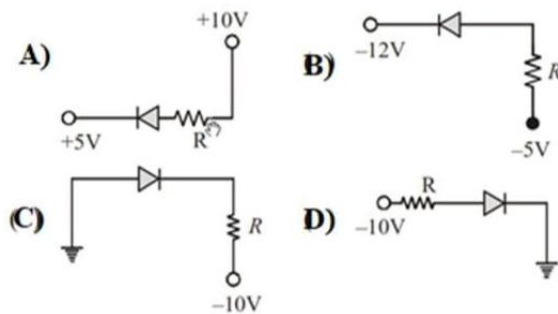
103. In Bohr model of atom an electron of charge $(-e)$ and mass m is revolving around a nucleus of charge $+ze$. If \vec{L} is the orbital angular momentum of electron, then its magnetic moment is given by

- 1) $-\frac{e}{2m}\vec{L}$ 2) $\frac{e}{2m}\vec{L}$ 3) $\frac{-Ze}{2m}\vec{L}$ 4) $\frac{Ze}{2m}\vec{L}$

104. Energy levels A, B, C of a certain atom corresponding to increasing values of energy i. e. $E_A < E_B < E_C$. If $\lambda_1, \lambda_2, \lambda_3$ are the wavelengths of radiations corresponding to the transitions C to B, B to A and C to A respectively, which of the following statements is correct?

- 1) $\lambda_3 = \lambda_1 + \lambda_2$ 2) $\lambda_3 = \frac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2}$ 3) $\lambda_1 + \lambda_2 + \lambda_3 = 0$ 4) $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

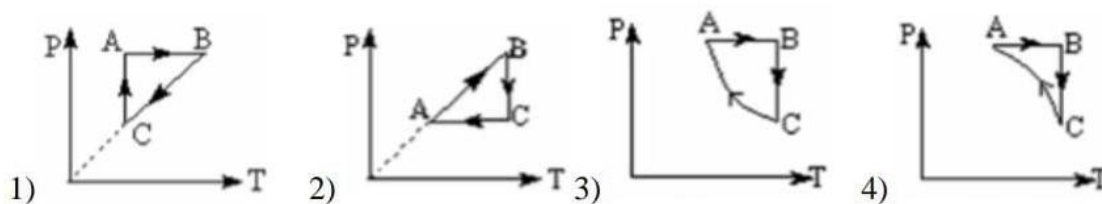
105. In the given figure, the diodes in forward biased are



- 1) A, B, C only 2) B, C only 3) A, C only 4) A only

106. An ideal gas undergoes a thermodynamics cycle as shown in figure. Which of the following graphs

represents the same cycle?



107. A uniform rope of mass m and length L is hung freely from stationary ceiling. If the cross sectional area of rope is A and Young's modulus Y , then net elongation in the rope due to its own weight

1) $\frac{mgL}{AY}$ 2) $\frac{mgL}{2AY}$ 3) $\frac{mgL}{3AY}$ 4) $\frac{mgL}{4AY}$

108. Two soap bubbles to form a single large drop (r = radius of small bubbles R = radius of large drop)

Column - I

- A) surface energy in the process
 B) pressure of the soap bubble inside will be
 C) temperature of drop will be
 D) radius of final single drop

Column - II

- P) $2^{1/3} r$
 Q) Decreases
 R) $4^{1/3} r$
 S) increases.

- 1) A-Q,B-Q,C-S,D-P
 3) A-P,B-Q,C-P,D-S

- 2) A-Q,B-P,C-S,D-P
 4) A-P,B-Q,C-P,D-S

109. In a photo electric experiment, I (current)- V (voltage) graph is as shown. Curves a,b,c correspond to three different metal surfaces irradiated with monochromatic light of same frequency. Assuming the ratio of number of electrons emitted per second to the number of photons incident per second is the same for all the three surfaces, choose the INCORRECT statement:

- 1) the work function of metals b and c are equal
 2) the intensities of light incident on a and b are same
 3) the work functions of metals a and b are not equal
 4) the intensities of light incident on a, b and c are all different

110. The value of L , C and R in an LCR series circuit are 4 mH , 40 pF and 100Ω respectively. The quality factor of the circuit is

1) 10,000 2) 100 3) 1000 4) 10

111. Two coherent sources of light emit waves with wavelength with constant phase difference of 180° . The intensity due to each at a point on a screen is I . At a point on the screen where the path

difference between two waves is $\frac{3\lambda}{2}$ the total intensity will be:

1) $2I_0$ 2) $4I_0$ 3) $6I_0$ 4) $3I_0$

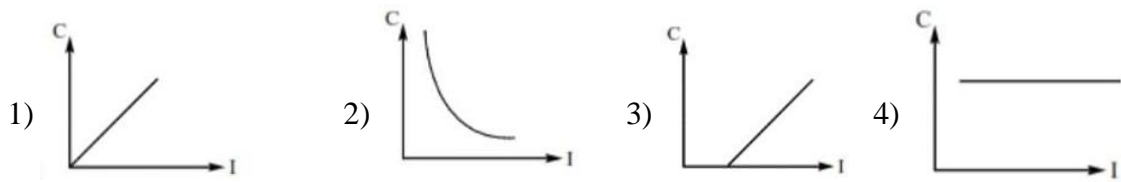
112. Statement - A: A diver under water, looks obliquely at a fisherman standing on the bank of a lake. The fisherman look shorter to the diver than what he actually is

Statement - B: A convex mirror always produces a virtual image independent of location of the real object

- 1) Both statements A & B are true 2) Statement A is true and Statement B is false
 3) Statement A is false and Statement B is true 4) Both statements A & B are false

113. In photoelectric effect experiment, the intensity of light is varied by changing the distance of light

source from emitter. Which of the following graphs depict the variation of photoelectric current 'C' with intensity of light 'I'?



114. Assertion (A): The Bohr model is not applicable to atoms having many electrons.

Reason (R): In atoms having many electrons, each electron interacts not only with positively charged nucleus but also with all other electrons.

- 1) Both assertion and reason are true and reason is correct explanation of assertion.
- 2) Both assertion and reason are true but reason is not correct explanation of assertion.
- 3) Assertion is true and reason is false
- 4) Assertion is false and reason is true

115. The combination of gates shown in the diagram is equivalent to

- 1) OR
- 2) AND
- 3) NAND
- 4) NOR

116. Two identical capacitors have the same capacitance C. One of them is charged to a potential V_1 and the other to V_2 . If they are connected with their unlike plates together, the decrease in energy of the combined system is

- 1) $\frac{1}{4}C(V_1^2 - V_2^2)$
- 2) $\frac{1}{4}C(V_1^2 + V_2^2)$
- 3) $\frac{1}{4}C(V_1 - V_2)^2$
- 4) $\frac{1}{4}C(V_1 + V_2)^2$

117. Some relations and laws related to fluids are given in column A, While the reasons behind them are given in column B. Match A and B

Column - I

Column - II

- | | |
|----------------------------|---------------------------|
| (a) Stoke's law energy | e) Surface potential |
| (b) Equation of continuity | f) Viscosity |
| (c) Bernoulli's theorem | g) Conservation of mass |
| (d) Velocity efflux | h) Conservation of energy |

- 1) (a) – (e), (b) – (f), (c) – (g), (d) – (h)
- 2) (a) – (f), (b) – (h), (c) – (g), (d) – (e)
- 3) (a) – (f), (b) – (g), (c) – (h), (d) – (e)
- 4) (a) – (e), (b) – (h), (c) – (g), (d) – (f)

118. When two identical batteries of internal resistance 10 each are connected in series across a resistor R, the rate of heat produced in R is P_1 . When the same batteries are connected in parallel across R, the rate is P_2 . If $P_1 = 2.25 P_2$, the value of R is

- 1) 2Ω
- 2) 4Ω
- 3) 10Ω
- 4) 12Ω

119. If θ is the angle of projection and H, R are the maximum height, range of a projectile, then $\tan \theta$ is

- 1) $4H/R$
- 2) $4R/H$
- 3) $2H/R$
- 4) $2R/H$

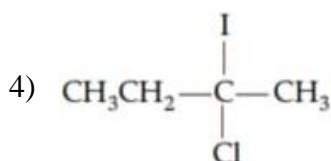
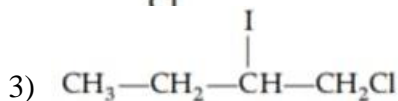
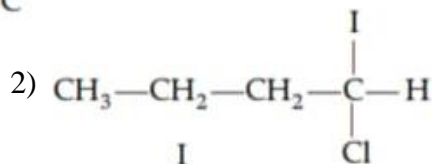
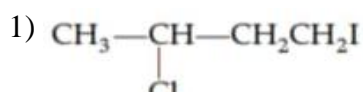
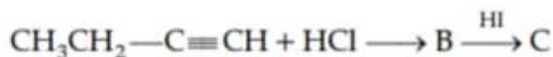
120. The force per unit length on a wire carrying current of 8A making an angle of 30° with a uniform magnetic field of 0.15 T is

- 1) 1.2 N
- 2) 1.02 N
- 3) 0.6 N
- 4) 2.4 N

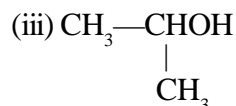
CHEMISTRY

121. A mixture of gases contains H_2 and O_2 gases in the ratio of 1:4 (w/w). What is the molar ratio of the two gases in the mixture?
- 1) 16 : 1 2) 2 : 1 3) 1 : 4 4) 4 : 1
122. In H-atom spectrum electron jumps from 5th excited state to 1st excited state then total number of spectral lines, number of lines in Lyman series and Paschen series respectively are:
- 1) 10, 4, 3 2) 15,0,4 3) 15, 4, 5 4) 10,0,3
123. The angular momentum of electron in 'd' orbital is equal to:
- 1) $2\sqrt{3}h$ 2) h 3) $\sqrt{6}h$ 4) $\sqrt{2}h$
124. Which of the following is correct with respect to -I effect of the substituents? [R = alkyl]
- 1) $-NH_2 > -OR > -F$ 2) $-NR_2 < -OR < -F$
3) $-NH_2 < -OR < -F$ 4) $-NR_2 > -OR > -F$
125. The species, having bond angles of 120° is:
- 1) PH_3 (b) ClF_3 (c) NCI_3 BCl_3
126. The species Ar, K^+ and Ca^{2+} contain the same number of electrons. In which order do their radii increase?
- 1) $Ca^{2+} < K^+ < Ar$ 2) $K^+ < Ar < Ca^{2+}$
3) $Ar < K^+ < Ca^{2+}$ 4) $Ca^{2+} < Ar < K^+$
127. The solubility of $BaSO_4$ in water is $2.42 \times 10^{-3} g L^{-1}$ at 298K. The value of solubility product (K_{sp}) will be [Given molar mass of $BaSO_4 = 233 g mol^{-1}$]
- 1) $1.08 \times 10^{-2} mol^2 L^{-1}$ 2) $1.08 \times 10^{-12} mol^2 L^{-2}$
3) $1.08 \times 10^{-14} mol^2 L^{-2}$ 4) $1.08 \times 10^{-8} mol^2 L^{-2}$
128. What is the activation energy for a reaction if its rate doubles when the temperature is raised from $20^\circ C$ to $35^\circ C$? ($R = 8.314 J mol^{-1} K^{-1}$)
- 1) $342 kJ mol^{-1}$ 2) $269 kJ mol^{-1}$ 3) $34.7 kJ mol^{-1}$ 4) $15.1 kJ mol^{-1}$
129. In which of the following options the order of arrangement does not agree with the variation of property indicated against it?
- 1) $I < Br < Cl < F$ (increasing electron gain enthalpy)
2) $Li < Na < K < Rb$ (increasing metallic radius)
3) $Al^{3+} < Mg^{2+} < Na^+ < F^-$ (increasing ionic size)
4) $B < C < N < O$ (increasing first ionization enthalpy)
130. Aqueous solution of which of the following compounds is the best conductor of electric current?
- 1) Hydrochloric acid, HCl 2) Ammonia, NH_3
3) Fructose, $C_6H_{12}O_6$ 4) Acetic acid, $C_2H_4O_2$
131. The rate of first-order reaction is $0.04 mol L^{-1} s^{-1}$ at 10 seconds and $0.03 mol L^{-1} s^{-1}$ at 20 seconds after initiation of the reaction. The half-life period of the reaction is:
- 1) 44.1 s 2) 54.1 s 3) 24.1 s 4) 34.1 s
132. In acidic medium, H_2O_2 changes $Cr_2O_7^{2-}$ to CrO_5 which has two ($-O-O-$) bonds. Oxidation state of Cr in CrO_5 is:

142. Predict the product C obtained in the following reaction of 1-butyne.



143. Following compounds are given:



Which of the above compound(s), on being warmed with iodine solution and NaOH, will give iodoform?

1) (i), (iii) and (iv)

2) Only (ii)

3) (i), (ii) and (iii)

4) (i) and (ii)

144. Consider the following statements.

(1) XeF_4 is colourless crystalline solid and undergoes sublimation.

(2) XeOF_4 is colourless volatile liquid.

(3) XeO_4 is colourless explosive solid.

The correct statements are:

1) (1) and (2) only

2) (2) and (3) only

3) (1) and (3) only

4) (1), (2) and (3)

145. A solution has 1 : 4 mole ratio of pentane to hexane. The vapour pressure of the pure hydrocarbons at 20°C are 440 mm of Hg for pentane and 120 mm of Hg for hexane. The mole fraction of pentane in the vapour phase would be:

1) 0.549

2) 0.200

3) 0.786

4) 0.478

146. One mole of Al^{3+} discharged completely by using charge?

1) 3F

2) 1F

3) 0.3F

4) 2F

147. In which of the following molecules/ions BF_3 , NO_2^- , NH_2^- and H_2O , the central atom is sp^2 hybridised?

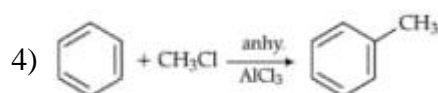
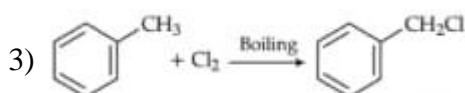
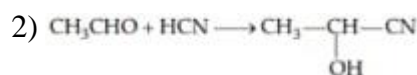
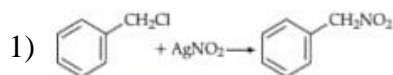
1) NO_2^- and NH_2^-

2) NH_2^- and H_2O

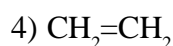
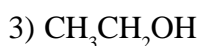
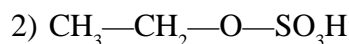
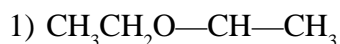
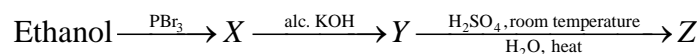
3) NO_2^- and H_2O

4) BF_3 and NO_2^-

148. Which one of the following is a free-radical substitution reaction?



149. Consider the following reaction:



150. Which of the following is an ideal solution?
 1) Ethanol + water
 2) Nitric acid + water
 3) Ethanol + benzene
 4) Benzene + toluene
151. The efficiency of a fuel cell is given by:
 1) $\frac{\Delta G}{\Delta S}$
 2) $\frac{\Delta G}{\Delta H}$
 3) $\frac{\Delta S}{\Delta G}$
 4) $\frac{\Delta H}{\Delta G}$
152. Which of the following will not show cis-trans isomerism?
 1) $\text{CH}_3\text{—CH}=\text{CH—CH}_3$
 2) $\text{CH}_3\text{—CH}_2\text{—CH}=\text{CH—CH}_2\text{CH}_3$
 3) $\text{CH}_3\text{—C}=\text{CH—CH}_2\text{—CH}_3$
 |
 CH_3
 4) $\text{CH}_3\text{—C—CH}=\text{CH—CH}_2\text{—CH}_3$
 |
 CH_3
153. Among the following compounds, one that is most reactive towards electrophilic nitration is
 1) benzoic acid. 2) nitrobenzene. 3) toluene. 4) benzene.
154. At 25°C, the dissociation constant of a base, BOH is 1.0×10^{-12} . The concentration of hydroxyl ions in 0.01 M aqueous solution of the base would be:
 1) $2.0 \times 10^{-6} \text{ mol L}^{-1}$ 2) $1.0 \times 10^{-5} \text{ mol L}^{-1}$
 (c) $1.0 \times 10^{-6} \text{ mol L}^{-1}$ (d) $1.0 \times 10^{-7} \text{ mol L}^{-1}$
155. If the enthalpy change for transition of liquid water to steam is 30 kJ mol^{-1} at 27°C. The entropy change for the process would be:
 1) $1.0 \text{ J mol}^{-1} \text{ K}^{-1}$ 2) $0.1 \text{ J mol}^{-1} \text{ K}^{-1}$ 3) $100 \text{ J mol}^{-1} \text{ K}^{-1}$ 4) $10 \text{ J mol}^{-1} \text{ K}^{-1}$
156. In which electrophilic substitution reaction slow step is breaking of C—H bond?
 1) Sulphonation of benzene 2) Nitration of benzene
 3) Chlorination of benzene 4) All of these
157. Acetone and ethanol can be chemically distinguished by:
 (a) I_2/NaOH (b) 2,4 DNP 3) Tollen's reagent 4) Both (a) and (b)
158. In which of the following reaction C—C bond formation does not take place?
 (1) Gattermann-Koch reaction (2) Étard reaction
 (3) Benzoin condensation (4) Swarts reaction
159. The value of ΔH and ΔS for the reaction,
 $\text{C}_{(\text{gradually})}(\text{s}) + \text{CO}_2(\text{g}) \rightarrow 2\text{CO}(\text{g})$ are 170 kJ and 170 JK^{-1} , respectively. This reaction will be spontaneous at:
 1) 710 K 2) 910 K 3) 1110 K 4) 510 K
160. The experimental data for the reaction $2\text{A} + \text{B}_2 \longrightarrow 2\text{AB}$
- | Exp. | [A] | [B] | Rate (Ms^{-1}) |
|------|------|------|---------------------------|
| 1. | 0.50 | 0.50 | 1.6×10^{-4} |
| 2. | 0.50 | 1.00 | 3.2×10^{-4} |
| 3. | 1.00 | 1.00 | 3.2×10^{-4} |
- The rate equation for the above data is:
 1) rate = $k[\text{B}_2]$ 2) rate = $k[\text{B}_2]^2$ 3) rate = $k[\text{A}]^2[\text{B}]^2$ (c) rate = $k[\text{A}]^2[\text{B}]$