

1.

As we go lower from kingdom to Species, the number of common characters at each taxa:

1. Goes on decreasing
2. Goes on increasing
3. Remains same
4. There is no pattern to this



1. Early prophase
2. Late prophase
3. Metaphase
4. Telophase

2.

Members of Kingdom Protista:

1. are primarily aquatic
2. do not have membrane bound organelles
3. are all ciliated or flagellated
4. reproduce exclusively by asexual means

7.

Consider the following two statements:

I. Except for plants in shade or in dense forests, light is rarely a limiting factor in nature for photosynthesis.

II. Light saturation occurs at 50% of the full sunlight.

1. Both statements are correct and II explains I
2. Both statements are incorrect
3. I is correct and II is incorrect
4. I is incorrect and II is correct

3.

Echinoderms are not characterized by:

1. An absence of excretory system
2. Bisexual animals
3. Usually external fertilization
4. Indirect development with free swimming larva

8.

The sites of perception of light/dark duration in the plants are the:-

1. Shoot apices
2. Leaves
3. Roots
4. Branches

4.

There cannot be a living state without :

1. Metabolism
2. Capability of reproduction
3. Self-consciousness
4. Presence of DNA in a cell

9.

The useful purpose served by lactate fermentation is:

1. Make lactose available for gluconeogenesis
2. Production of additional ATP in anaerobic conditions
3. Regeneration of NAD⁺
4. Increased availability of oxygen for the skeletal muscle

5.

When the co-factor is removed from the enzyme, its catalytic activity:

1. remains same
2. is increased
3. is greatly reduced
4. is lost

10.

Scapula is a large triangular flat bone situated in the dorsal part of the thorax between:

1. the second and fifth ribs
2. the second and seventh ribs
3. the third and sixth ribs
4. the third and eighth ribs

6.

The cell shown in the given diagram is in:

11.

- The amino acid derivative among the following hormone is:-
1. Insulin
 2. Epinephrine
 3. Estradiol
 4. Testosterone
12. The intine of the pollen grain is a:
1. Thick and discontinuous layer made of sporopollenin
 2. Thick and continuous layer made of sporopollenin
 3. Thin and discontinuous layer made of cellulose and pectin
 4. Thin and continuous layer made of cellulose and pectin
13. In a monohybrid cross F_1 progeny resemble neither of the parents. What would be true in this case?
1. The parental traits would not appear in any of the F_2 - progenies
 2. The F_2 phenotypic ratio will be different from the F_2 genotypic ratio
 3. It could be a case of incomplete dominance
 4. The F_2 genotypic ratio will be similar to any Mendelian monohybrid cross
14. The two alleles of a gene pair are located on:
1. Homologous sites on homologous chromosomes
 2. Heterologous sites on homologous chromosomes
 3. Homologous sites on heterologous chromosomes
 4. Heterologous sites on heretologous chromosomes
15. DNA chemically is less reactive and structurally more stable than RNA. Therefore,
1. DNA has evolved from the RNA
 2. RNA can directly code for proteins
 3. DNA is the better genetic material than RNA
 4. The protein synthesizing machinery has evolved around RNA
16. A transcription unit does not contain:
1. A promoter
 2. The structural gene
 3. A terminator
 4. An operator
17. The similarities between the eyes of an octopus and of a mammal are a result of:
1. Convergent evolution
 2. Divergent evolution
 3. Saltation
 4. Retrograde evolution
18. Which of the following would lead to deviation from Hardy-Weinberg equilibrium?
1. Random mating
 2. Lack of mutations
 3. No gene flow or gene migration
 4. Natural selection
19. The now extinct reptile group that evolved into mammals was:
1. Therapsids
 2. Dinosaurs
 3. Thecodants
 4. Sauropsids
20. What limitation of traditional hybridization used for plant and animal breeding has been overcome by the use of rDNA techniques?
1. High cost
 2. Insertion of undesirable genes
 3. Complexity of the procedure
 4. Antigenicity of the product
21. Match each item in Column I with one in Column II and select your answer from the codes given below:

Column I		Column II	
A.	Diatoms	a.	Protein rich layer pellicle
B.	Dinoflagellates	b.	Cell wall embedded with silica
C.	Euglenoids	c.	Spores with true walls
D.	Slime moulds	d.	Celulose plates in cell wall

C.	Beijerinck	c.	Demonstrated extract of infected tobacco plants could cause infection in healthy plants
D.	Stanley	d.	Showed that viruses could be crystallized

Codes:

Codes:

	A	B	C	D
1.	b	a	c	d
2.	b	d	a	C
3.	b	c	a	d
4.	b	a	d	c

	A	B	C	D
1.	a	b	c	d
2.	a	c	b	d
3.	b	a	c	d
4.	b	a	d	c

22.

All the following statements regarding Basidiomycetes are correct except:

- The mycelium is branched and septate
- Asexual spores and vegetative reproduction generally not found
- Sex organs are absent
- Basidiospores are exogenously produced on the basidium

23.

Match the Scientists in Column I with their contribution in the field of virology given in Column II and select your answer from the codes given below:

Column I		Column II	
A.	Pasteur	a.	Gave the name 'virus'
B.	Ivanowsky	b.	Recognized tobacco mosaic is caused by microbes smaller than bacteria

24.

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

- Chlamydomonas*
- Volvox*
- Spirogyra*
- Fucus*

25.

Identify the incorrectly matched pair:

	Animals	Feature present in both
1.	<i>Balanoglossus</i> and <i>Pinctada</i>	Open circulatory system
2.	<i>Branchiostoma</i> and <i>Ascidia</i>	Persistent notochord
3.	<i>Aplysia</i> and <i>Pheretima</i>	True coelom
4.	<i>Gorgonia</i> and <i>Pennatula</i>	Cnidoblasts

26.

Pteropus is a/an:

1. Limbless amphibian
2. Extinct reptile that evolved into mammals
3. Bony fish that migrates from sea water to fresh water for breeding
4. Mammal with flight

27.

The cells of which of the following regions of the root are responsible for growth of its length?

1. Root cap
2. Region of meristematic activity
3. Region of elongation
4. Region of maturation

28.

Identify the correct statement regarding the stem morphology from the following:

- I. Stems bear only axillary buds.
- II. Axillary buds may get modified into thorns as in Citrus
- III. Stem tendrils develop from axillary buds as in gourds.

1. Only I and II
2. Only I and III
3. Only II and III
4. I, II and III

29.

The type of placentation show in the given figure is seen in:



1. *Dianthus*
2. *Argemone*
3. China rose
4. Marigold

30.

The given floral diagram can be of:



1. *Asparagus*
2. *Atropa belladonna*
3. Mustard
4. Indigofera

31.

Parts of grasses removed by the grazing herbivores are regenerated due to the activity of:

1. Apical meristem
2. Intercalary meristem
3. Interfascicular cambium
4. Fascicular vascular cambium

32.

In the dicot root, the vascular cambium:-

1. is absent
2. is completely secondary in origin
3. does not form a continuous ring
4. originates from the tissue just above the phloem bundles

33.

The most abundant and widely distributed tissue in the bodies of complex animals is:

1. Epithelium
2. Connective
3. Muscular
4. Neural

34.

The mouth part of cockroach shown in the given diagram acts as a/an:



1. Upper lip
 2. Tongue
 3. Lower lip
 4. Uvula
- 35.
- The tail of the phospholipid molecule:
1. is hydrophilic and composed of phosphate
 2. is hydrophilic and composed of saturated hydrocarbons
 3. is hydrophobic and composed of saturated hydrocarbons
 4. is hydrophobic and composed of unsaturated hydrocarbons
- 36.
- In animal cells, lipid-like steroidal hormones are synthesized in the:
1. Nucleus
 2. Rough endoplasmic reticulum
 3. Smooth endoplasmic reticulum
 4. Golgi apparatus
- 37.
- Unless specifically stained by a vital stain like Janus Green, which of the following will not be visible under a microscope?
1. Rough endoplasmic reticulum
 2. Smooth endoplasmic reticulum
 3. Golgi apparatus
 4. Mitochondria
- 38.
- Phenyl mercuric acetate (PMA) results in
1. reduced photosynthesis
 2. reduced transpiration
 3. reduced respiration
 4. killing of plants.
- 39.
- When the plants are grown in magnesium deficient but urea rich soil, the symptoms expressed are:
1. yellowish leaves
 2. colourless petiole
 3. dark green leaves
 4. shoot apex die.
- 40.
- Choose the correct order for the steps of hemostasis:
1. Blood coagulation, platelet plug formation, blood vessel spasm
 2. Platelet plug formation, blood coagulation, blood vessel spasm
 3. Blood vessel spasm, platelet plug formation, blood coagulation
 4. Blood vessel spasm, blood coagulation, platelet plug formation
- 41.
- The right atria of the human heart receive:
1. Oxygenated blood
 2. Deoxygenated blood
 3. Arterial blood
 4. Venous blood
- 42.
- Which of the following statements about the kidneys is incorrect?
1. They consume over 20% of the oxygens used by the body at rest.
 2. Approximately 1200ml of fluid is filtrated by the kidneys each day.
 3. 120-125 ml of plasma is forced into the renal tubules each minutes.
 4. They compose less than 1% of the body weight.
- 43.
- The following statements refer to gas carriage by the blood:
1. After leaving the lungs, each litre of blood contains about 20 ml of oxygen.
 2. Haemoglobin is half saturated with oxygen when the PO_2 is about 30 mm Hg
 3. As the PCO_2 rises, the affinity of haemoglobin for oxygen is increased.
 4. Each litre of arterial blood contains about 50 mL of carbon dioxide
- 44.

Regarding the control of water balance by the kidneys:

1. The renal medulla has an osmotic gradient that decreases from the border with the cortex to the renal papilla.

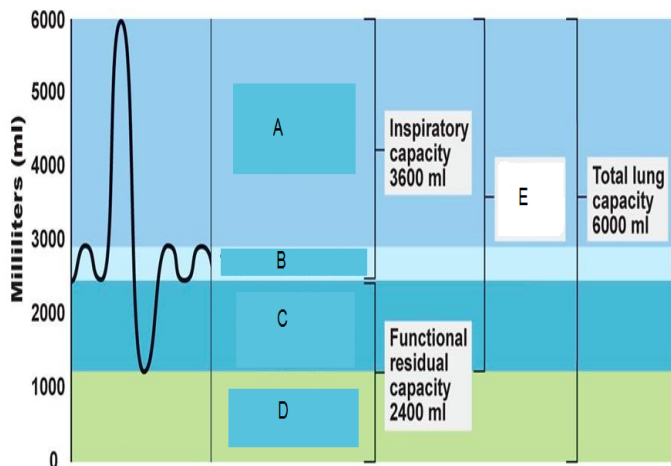
2. ADH is secreted by anterior pituitary in response to a decrease in the osmolality of the blood.

3. A normal person cannot produce urine with an osmolality greater than 300 mOsmil.kg-1.

4. ADH acts on the cells of the collecting ducts to increase their permeability to water.

45.

Study the spiograph and identify the correctly matched volumes from the codes given:



(a) Spirographic record for a male

	TV	IRV	ERV	RV	VITAL CAPACITY
1.	A	c	B	D	E
2.	A	B	C	D	E
3.	B	A	C	D	E
4.	C	B	A	D	E

46.

What regulates the opening of oesophagus into the stomach?

1. A membranous valve
2. A muscular sphincter
3. A mesodermal septum
4. A cartilaginous flap

47.

A person passes lot of dilute urine and drinks a lot of water but does not have glycosuria. He is most likely suffering from :

1. Type 1 diabetes mellitus
2. Type 2 diabetes mellitus

3. Pituitary diabetes

4. Diabetes insipidus

48.

The upper ends of the forearm bones articulate with each other in a:

1. pivot joint
2. ellipsoid joint
3. saddle joint
4. hinge joint

49.

The substrate used for sperm metabolism is produced by the

1. prostate
2. seminal vesicle
3. Cowper's gland
4. testes

50.

With respect to external fertilization, which of the following is not an advantage of internal fertilization?

1. A decreased risk of disease transmission
2. Minimal waste of gametes
3. Greater chances of individual egg fertilization
4. Relatively longer time of egg protection

51.

Which of the following is the most common abiotic pollinating agent?

1. Insects
2. Birds and bats
3. Wind
4. Water

52.

Seeds offer several advantages to angiosperms. Seed formation is more dependable because:

1. Seeds have better adaptive strategies for dispersal
2. Reproductive processes become independent of water
3. Hard seed coat provides protection to the young embryos
4. They generate new genetic combinations leading to

variations

53.

The given diagram exemplifies the fruit in:



1. Fig
2. Pineapple
3. Mulberry
4. Raspberry

54.

Which of the following hormones acts on the Sertoli cells to stimulate secretion of some factors which help in the process of spermiogenesis?

1. FSH
2. LH
3. Testosterone
4. GnRH

55.

The developing oocyte divides and releases the first polar body in :

1. Primary follicle
2. Secondary follicle
3. Tertiary follicle
4. Graffian follicle

56.

Progesterone alone or in combination with estrogen can also be used as contraceptives by females as injections or implants under their skin. When used in this manner, they:

1. do not affect the release of the ovum
2. induce a foreign body reaction leading to rejection of the implanted blastocyst
3. can cause increased risk of ectopic pregnancy
4. have a much longer effective period

57.

A synthetic mRNA of repeating sequence 5'-CACACACACACACAC... is used for a cell-free protein synthesizing system like the one used by Nirenberg. If we assume that protein synthesis can begin without the need for an initiator codon, what product or products would you expect to occur after protein synthesis?

1. one protein, consisting of a single amino acid
2. three proteins, each consisting of a different, single amino acid
3. two proteins, each with an alternating sequence of two different amino acids
4. one protein, with an alternating sequence of two different amino acids

58.

Fredrick Griffith accidentally discovered transformation when attempting to develop a vaccine for pneumonia. He injected mice with samples from S-strain (virulent) and/or R-strain (nonvirulent) pneumococci bacteria (*Sterptococcus pneumoniae*). Which of the following results is NOT consistent with Griffith's experiments?

1. injected S-strain; mouse dies.
2. injected R-strain; mouse lives.
3. injected heat-killed S-strain; mouse lives.
4. injected mixture of heat-killed S-strain and live R-strain; mouse lives.

59.

Which scientists first gave experimental evidence that DNA is the genetic material?

1. Avery, MacLeod , and McCarty who repeated the transformation experiments of Griffith, and chemically characterized the transforming principle.
2. Garrod, who postulated that Alcaptonuria, or black urine disease, was due to a defective enzyme.
3. Beadle and Tatum, who used a mutational and biochemical analysis of the bread mold *Neurospora* to establish a direct link between genes and enzymes.
4. Meselson and Stahl who showed that DNA is replicated semiconservatively.

60.

Consider the cross AaBb x AaBb. If the alleles for both genes exhibit complete dominance, what genotypic ratio is expected in the resulting offspring?

1. 1:1:1:1
2. 9:3:3:1

3. 3:6:3:1:2:1
4. 1:2:1:2:4:2:1:2:1
61. The function of the rho protein is
1. to help terminate translation
 2. to help RNA polymerase bind to the DNA
 3. to help RNA polymerase find a promoter
 4. to help terminate transcription
62. Two phenotypically normal individuals have an affected child. What can we conclude about the parents?
1. they both carried the disease allele
 2. they are not the parents of the child
 3. they are affected
 4. no conclusions can be drawn
63. What is the basis of pleiotropy?
1. A spontaneous mutation during the replication of DNA.
 2. Interrelationship between various metabolic pathways in the body.
 3. Chromosomal aberration as chromosomes are the vehicles of genes.
 4. the behaviour of chromosomes during meiosis or gamete formation.
64. A female whose father was colorblind marries and normal male whose father was also colorblind. What is the probability that their daughter will be colorblind?
1. 0 %
 2. 25 %
 3. 50 %
 4. 75 %
65. DNA damage leading to neoplastic transformation can be brought about by ionizing radiations like :
1. UV rays
 2. Gamma rays
 3. Infrared waves
 4. Radio waves
66. Inbreeding depression in animals can be overcome by:
1. A single outcross
 2. Out cross for many generations
 3. Cross-breeding
 4. Inter-specific hybridization
67. Identify the incorrectly matched pair:
- | | | |
|----|-----------------------|-------------------|
| 1 | Streptococcus | Clot buster |
| 2. | Monascus purpureus | Statins |
| 3. | Trichoderma harzianum | Immunosuppressant |
| 4. | Aspergillus niger | Citric acid |
68. Baculoviruses are:
1. Species specific, narrow spectrum insecticides
 2. Species specific, broad spectrum insecticides
 3. Non specific, narrow spectrum insecticides
 4. Non specific, broad spectrum insecticides
69. Microinjection is suitable for :
1. Injecting an ovum into the sperm in IVF
 2. Transforming animal cells
 3. Injecting very small sized drug particles into neurons
 4. Conferring antibiotic resistance to certain strain of bacteria
70. Polymerase Chain Reaction is not used in :
1. Confirming presence of a pathogen during early infection
 2. Identifying the mutated genes in suspected cancer patients

3. Isolating the gene of interest from host DNA to be cloned by recombinant procedures
4. Detection of the presence of HIV in suspected AIDS patient
71. If gene isolate from marrow cells producing ADA is introduced into cells at early embryonic stage, it could be a permanent cure of ADA deficiency because the early embryonic cells :
1. Are more differentiated than the later stage cells
 2. Are constantly dividing and do not get differentiated
 3. Are easy to manipulate than the later stage cells
 4. Are virtually immortal
72. To test the safety of polio vaccine, the organisms used are transgenic :
1. Mice
 2. Pigs
 3. Monkey
 4. Cattle
73. Very small animals are rarely found in polar region mainly because:
1. Smaller animals have a relatively slower heart rate
 2. Smaller animals have a more surface area relative to their volume
 3. Smaller animals are invariably herbivores
 4. Smaller animals rely on diffusion for exchange of gases with the environment
74. When the population density reaches the carrying capacity, the logistic growth curve is said to be in:
1. Lag phase
 2. A phase of acceleration
 3. A phase of deceleration
 4. Asymptote
75. The rate of formation of new organic matter by consumers is called as:
1. Secondary productivity
 2. Standing crop
 3. Standing state
 4. Net primary productivity
76. The limitations of ecological pyramids include all the following except:
1. They do not take into account the same species belonging to two or more trophic levels
 2. They do not represent relationships between organisms at different trophic levels
 3. They assume a simple food chain and do not consider food webs
 4. Saprotrophs are not given any place in the ecological pyramids
77. About what percent of the global carbon is contained in the atmosphere?
1. 71
 2. 49
 3. 17
 4. about 1
78. Which of the following has maximum global biodiversity?
1. Angiosperms
 2. Algae
 3. Fungi
 4. Mosses
79. What is applicable to both *Lates niloticus* and *Lantana camara* ?
1. They are on the verge of extinction due to over-exploitation by humans.
 2. They are alien species that became invasive in certain environments causing threat to indigenous biodiversity.
 3. They are mutualists and likely to undergo co-extinction in recent future.
 4. They are keystone species and are vital to the stability of tropical ecosystems.
80. Eventually, the only solution for the treatment of e-wastes, provided it is carried out in an environment friendly manner, is:
1. Incineration

2. Burying in landfill sites
3. Dumping in developing countries
4. Recycling

81.

Match each item in Column I with one item in Column II and choose the correct answer from the code given below:

COLUMN I

COLUMN II

- A. Air [Prevention and Control of Pollution] Act
a. 1981
- B. Water [Prevention and Control of Pollution] Act
b. 1974
- C. Environment [Protection] Act
c. 1986
- D. Montreal Protocol
d. 1987

Codes:

- | | A. | B. | C. | D. |
|----|----|----|----|----|
| 1. | a | b | c | d |
| 2. | b | a | d | c |
| 3. | d | c | b | a |
| 4. | c | d | a | b |

82.

Which of the following processes makes direct use of oxygen?

1. Glycolysis
2. Fermentation
3. Krebs' citric acid cycle
4. Electron transport

83.

When a cell stops growing, say due to shortage of nutrients, this will occur in which phase of the cell cycle?

1. G₀
2. G₁
3. S
4. G₂

84.

In what way does thermal pollution affect organisms?

1. Lowers the pH of water
2. Interrupts normal physiological pathways
3. Decreases oxygen supply in water
4. Increases oxygen supply in water

85.

The vasomotor center that controls the diameter of blood vessels is located in the

1. medulla oblongata
2. pons
3. cerebrum
4. cerebellum

86.

Which of the following is a hinge point?

1. At the base of the first metacarpal
2. Intervertebral disc
3. Interphalageal
4. Between carpal bone

87.

AIDS is characterized by the presence of:

1. Nosocomial infections
2. Iatrogenic infections
3. Opportunistic infections
4. Subclinical infections

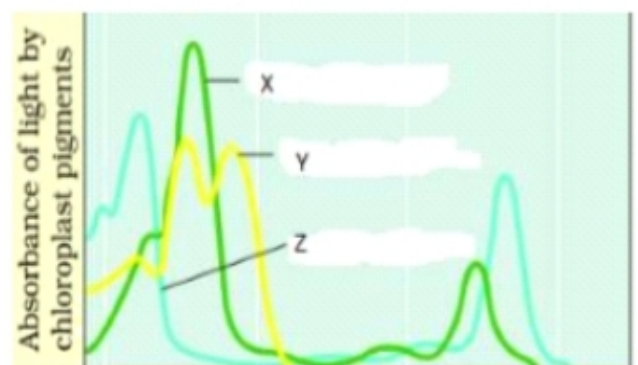
88.

Hyperthyroidism [Graves' disease] is characterized by all the following except:

1. Toxic goiter
2. Exophthalmos
3. Bradycardia
4. Muscle weakness and tremors

89.

In the given diagram, X, Y and Z respectively represent the absorption spectrum of:

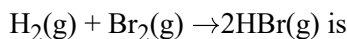


1. Chlorophyll a, Chlorophyll b and Carotenoids

2. Chlorophyll b, Chlorophyll a and Carotenoids
3. Chlorophyll b, Carotenoids and Chlorophyll a
4. Chlorophyll a, Carotenoids and Chlorophyll b
90. Consider the following statements:
- I. A motor neuron along with the muscle fibres connected to it constitute a motor unit
- II. The neurotransmitter released at the neuromuscular junction is Acetylcholine.
- III. Myosin head has ATPase activity
- Which of the above statements are true?
1. I and II only
 2. I and III only
 3. II and III only
 4. I, II and III
91. Poorest reducing agent among following is
1. atomic hydrogen
 2. nascent hydrogen
 3. dihydrogen
 4. all have same reducing strength
92. A metallic oxide contains 40% oxygen then equivalent weight of metal is
1. 48
 2. 36
 3. 24
 4. 12
93. Carbon atom in $C_2(CN)_4$ are
1. sp hybridised
 2. sp^2 hybridised
 3. sp and sp^2 hybridised
 4. sp, sp^2 and sp^3 hybridised
94. When aqueous NaCl solution is electrolysed using inert electrodes then pH of the solution
1. Increases
 2. Decreases
 3. Remains same
 4. First increases then decreases
95. $K_4[Fe(CN)_6]$ is 60% ionised. Then the value of Van't Hoff factor is
1. 1.6
 2. 2.4
 3. 3
 4. 3.4
96. The concentration of reactant X decreases from 0.1 M to 0.005 M in 40 minutes. If the reaction follows first order kinetics, the rate of reaction when concentration of X is 0.01 M will be
1. $1.73 \times 10^{-4} \text{ M min}^{-1}$
 2. $3.47 \times 10^{-4} \text{ M min}^{-1}$
 3. $3.47 \times 10^{-5} \text{ M min}^{-1}$
 4. $7.50 \times 10^{-4} \text{ M min}^{-1}$
97. Which of the following complex will show geometrical as well as optical isomerism ?
1. $[Pt(NH_3)_2Cl_2]$
 2. $[Pt(NH_3)Cl_3]$
 3. $[Pt(en)_2Cl_2]$
 4. $[Pt(en)_3]^{4+}$
98. Crystal field stabilization energy for high spin d^4 octahedral complex is
1. $-1.8\Delta_o$
 2. $-1.6\Delta_o$
 3. $-1.2\Delta_o$
 4. $-0.6\Delta_o$
99. The slowest step of Cannizzaro's reaction is

- | | |
|---|---|
| <p>1. Attack of nucleophilic</p> <p>2. Hydride shift</p> <p>3. Formation of anion</p> <p>4. Transfer of proton</p> <p>100.</p> <p>Which of the following is used to make non stick cookware ?</p> <p>1. PVC</p> <p>2. Polysterene</p> <p>3. Polyethylene</p> <p>4. PTFE</p> <p>101.</p> <p>The enthalpy of combustion of cyclohexane, cyclohexene and H₂ are respectively -3920, -3800 and -241 kJ mol⁻¹. The heat of hydrogenation of cyclohexene is</p> <p>1. -121 kJ mol⁻¹ 2. 121 kJ mol⁻¹</p> <p>3. -242 kJ mol⁻¹ 4. 242 kJ mol⁻¹</p> <p>102.</p> <p>An open flask containing air is heated from 300 K to 500 K. What percentage of air will be escaped to the atmosphere, if pressure is keeping constant?</p> <p>1. 80</p> <p>2. 40</p> <p>3. 60</p> <p>4. 20</p> <p>103.</p> <p>Compound PdCl₄.6H₂O is a hydrated complex, 1 molal aqueous solution of it has freezing point 269.282K. Assuming 100% ionisation of complex, calculate the molecular formula of the complex</p> <p>(K_f for water = 1.86 K kg mole⁻¹)</p> <p>1. [Pd(H₂O)₆]Cl₄</p> <p>2. [Pd(H₂O)₄Cl₂]Cl₂.2H₂O</p> <p>3. [Pd(H₂O)₃Cl₃]Cl.3H₂O</p> <p>4. [Pd(H₂O)Cl₄]4H₂O</p> <p>104.</p> <p>Among the following, the strongest Lewis acid is</p> | <p>1. BBr₃</p> <p>2. BCl₃</p> <p>3. BF₃</p> <p>4. all are same</p> <p>105.</p> <p>White phosphorous reacts with calcium to form a certain compound which on hydrolysis produces</p> <p>1. PH₃</p> <p>2. H₃PO₄</p> <p>3. P₄O₆</p> <p>4. P₄O₁₀</p> <p>106.</p> <p>Select the incorrect statement among the following</p> <p>1. Aspirin is both analgesic and antipyretic</p> <p>2. Ampicillin is natural antibiotic</p> <p>3. Sulphadiazine is a synthetic antibacterial</p> <p>4. Some disinfectants can be used as antiseptics in lower concentrations</p> <p>107.</p> <p>Calculate the molar solubility of Fe(OH)₂ at a pH of 8</p> <p>[K_{sp} of Fe(OH)₂ = 1.6 X 10⁻¹⁴]</p> <p>1. 0.06</p> <p>2. 0.016</p> <p>3. 0.01</p> <p>4. 0.16</p> <p>108.</p> <p>Ionic radii are</p> <p>1. directly proportional to square of effective nuclear charge</p> <p>2. inversely proportional to effective nuclear charge</p> <p>3. inversely proportional to square of effective nuclear charge</p> <p>4. directly proportional to effective nuclear charge</p> <p>109.</p> <p>If the bond energies of H-H, Br-Br, and H-Br are 433, 192 and 364 kJ mol⁻¹ respectively,</p> |
|---|---|

the ΔH° for the reaction



1. -103 kJ
2. -261 kJ
3. +103 kJ
4. +261 kJ

110.

The frequency of radiation emitted when the electron falls from $n=4$ to $n=1$ in a hydrogen atom will be

(Given ionization energy of $\text{H} = 2.18 \times 10^{-18} \text{J atom}^{-1}$ and $h = 6.625 \times 10^{-34} \text{Js}$)

1. $2.00 \times 10^{15} \text{ s}^{-1}$
2. $1.54 \times 10^{15} \text{ s}^{-1}$
3. $1.03 \times 10^{15} \text{ s}^{-1}$
4. $3.08 \times 10^{15} \text{ s}^{-1}$

111.

In which of the following crystals alternate tetrahedral voids are occupied

1. NaCl
2. ZnS
3. CaF_2
4. Na_2O

112.

Oxidation number of carbon in CH_2Cl_2 is

1. -4
2. +4
3. -2
4. zero

113.

The correct order of relative rates of hydrogenation of alkenes is

1. Ethylene > propene > 2-butene > 2-methyl-2-butene
2. 2-methyl-2-butene > 2-butene > Propene > Ethylene
3. 2-butene > propene > ethylene > 2-methyl-2-butene
4. Propene > 2-butene > ethylene > 2-methyl-2-butene

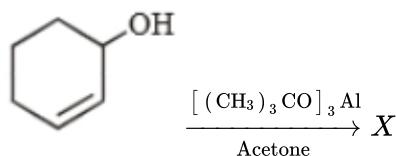
114.

For $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$, one mole of N_2 and three moles of H_2 are at pressure of 4 atm. Equilibrium pressure is

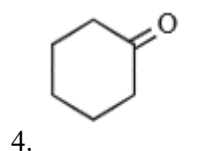
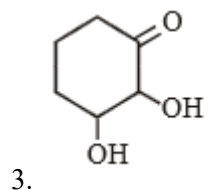
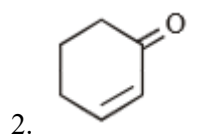
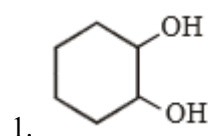
found to be 3 atm. Hence, K_p is

1. $1/(0.5) \times (0.15)^3$
2. $1/(0.5) \times (1.5)^3$
3. $3 \times 3 / (0.5) \times (1.5)^3$
4. none of the above

115.



The product (x) of this reaction is



116.

The correct order of increasing s-character of the orbital of B which overlaps with the orbital of F to form B-F bond in BF_2^+ , BF_3 and BF_4^- is

1. $\text{BF}_2^+ < \text{BF}_3 < \text{BF}_4^-$
2. $\text{BF}_3 < \text{BF}_2^+ < \text{BF}_4^-$
3. $\text{BF}_2^+ < \text{BF}_4^- < \text{BF}_3$
4. $\text{BF}_4^- < \text{BF}_3 < \text{BF}_2^+$

117.

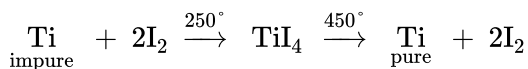
Which compound is formed when iron reacts with carbon?

1. FeC_2
2. Fe_3C
3. FeC_3
4. Fe_2C

118.

Which process of purification is represented by the

following equation?



1. Cupellation
2. Poling
3. Van Arkel
4. Zone refining

119.

On adding AgNO_3 solution into KI solution, a negatively charged colloidal sol. is obtained When they are in

1. 100 ml of 0.1 M AgNO_3 + 100 ml of 0.1 MKI
2. 100 ml of 0.1 M AgNO_3 + 50 ml of 0.2 MKI
3. 100 ml of 0.2 M AgNO_3 + 100 ml of 0.1 MKI
4. 100 ml of 0.1 M AgNO_3 + 100 ml of 0.15 MKI

120.

The structure of glycine (amino acid) is $\text{H}_3\text{N}^+\text{CH}_2\text{COO}^-$ (zwitter ion). Select the correct statement of the following

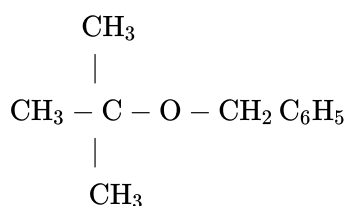
1. Glycine, as well as other amino acids are amphoteric
2. The acidic functional group in amino acids is $-\text{NH}_3^+$
3. The basic functional group in acids is $-\text{CO}_2^-$
4. All the statements are correct

121.

In the electrolysis of which solution, OH^- ions are discharged in preference to Cl^- ions?

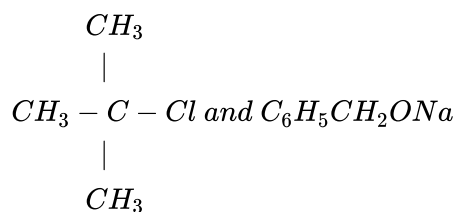
1. Dilute NaCl
2. Very dilute NaCl
3. Fused NaCl
4. Solid NaCl

122.

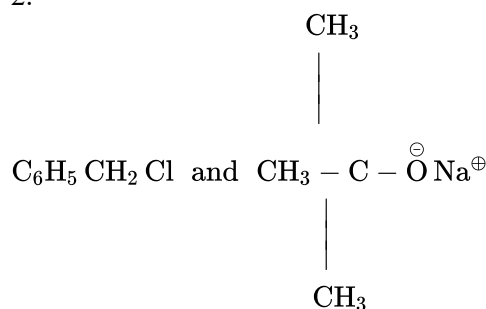


can be prepared from Williamson's synthesis using

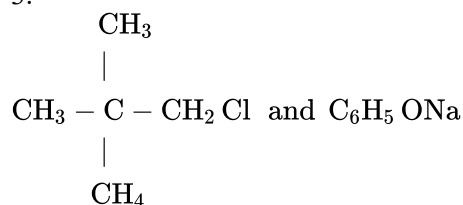
1.



2.



3.



4. All of these

123.

Which of the following statements about photo chemical smog is wrong?

1. It has high concentration of oxidizing agents
2. It has low concentration of oxidizing agents
3. It can be controlled by controlling the release of NO_2 , hydrocarbon, ozone, etc.
4. Plantation of some plants like pinus helps in controlling photochemical smog.

124.

Heating of ammonium dichromate produces

1. NH_3 , Cr_2O_3 and H_2O
2. N_2 , Cr_2O_3 and H_2O
3. NO , CrO_3 and H_2O
4. N_2O , CrO_3 and H_2O

125.

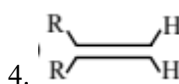
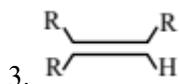
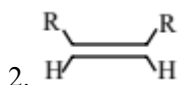
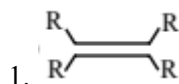
In a cold climate frozen causing damage to radiator of a car. Ethylene glycol is used as antifreezing agent. The amount of ethylene glycol to be added to 4 kg of water to prevent it from freezing at -6°C .
 $[k_f \text{ for water} = 1.85 \text{ k kg mol}^{-1}]$

- 204.22 g
- 804.32 g
- 602 gm
- 401 gm

- R
- S
- Z

130.

Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions :-



[R = Alkyl substituent]

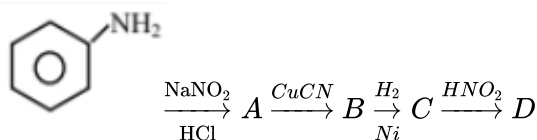
131.

Which of the following undergoes nucleophilic substitution exclusively by S_N1 mechanism :

- Ethyl chloride
- Isopropyl chloride
- Benzyl chloride
- Chlorobenzene

132.

Aniline in a set of reactions yielded a product D



The structure of the product D would be -

- $C_6H_5CH_2OH$
- $C_6H_5CH_2NH_2$
- C_6H_5NHOH
- $C_6H_5NHCH_2CH_3$

133.

The conversion of m-nitrophenol to resorcinol involves respectively

126.

Which of the following orbital can not form π as well as δ -bond?

- d_{xy}
- d_{z^2}
- $d_{x^2-y^2}$
- d_{yz}

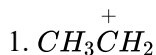
127.

The best method for the separation of naphthalene and benzoic acid from their mixture is -

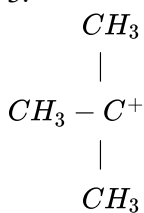
- Sublimation
- Chromatography
- Crystallisation
- Distillation

128.

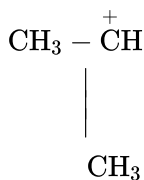
Which amongst the following is the most stable carbocation :-



3.



4.



129.

The chirality of the compound



1. E

1. reduction, diazotisation and hydrolysis
2. hydrolysis, diazotisation and reduction
3. hydrolysis, reduction and diazotisation
4. diazotization, reduction and hydrolysis

134.

To an acidic solution of an anion, a few drop of KMnO_4 solution are added. Which of the following if present, will not decolourise KMnO_4 solution?

1. CO_3^{-2}
2. NO_2^-
3. S^{-2}
4. Cl^-

135.

Paramagnetic oxides are :-

1. N_2O_4 , NO_2
2. NO , ClO_2
3. P_4O_6 , P_4O_{10}
4. N_2O_5 , O_2^+

136.

If no external force acts on the system, then the correct statement is:

1. velocity of centre of mass changes
2. momentum of centre of mass is conserved and constant
3. position of the center of mass changes with time
4. None of these

137.

A hollow sphere is rolling without slipping on the inclined plane. The minimum coefficient of friction is :

1. $\frac{2}{5}\tan\theta$
2. $\frac{2}{3}\tan\theta$
3. $\frac{3}{4}\tan\theta$
4. $\frac{5}{7}\tan\theta$

138.

A body of mass (m) is projected velocity v_0 at an angle of projection θ . The magnitude of angular momentum about origin after time t from projection is :

1. Increase with time
2. decrease with time
3. independent of time
4. none of these

139.

A body of super dense material with mass twice the mass of the earth but size very small compared to size of the earth starts from rest from $h \ll R$ above the Earth's surface. It reaches earth in time t:

1. $t = \sqrt{\frac{h}{g}}$
2. $t = \sqrt{\frac{2h}{g}}$
3. $t = \sqrt{\frac{2h}{3g}}$
4. $t = \sqrt{\frac{4h}{3g}}$

140.

Bernoulli's theorem is based on :

1. conservation of energy
2. conservation of mass
3. conservation of momentum
4. conservation of angular momentum

141.

Two spherical soap bubbles of radii r_1 and r_2 in vacuum collapse under isothermal condition. The resulting bubble has radius equal to :

1. $\frac{r_1 + r_2}{2}$
2. $\frac{r_1 r_2}{r_1 - r_2}$
3. $\sqrt{r_1 r_2}$
4. $\sqrt{r_1^2 + r_2^2}$

142.

If Young modulus (Y) equal to bulk modulus (B). Then the Poisson ratio is :

1. $\frac{1}{3}$
2. $\frac{2}{3}$
3. $\frac{1}{2}$

4. $\frac{1}{4}$

143.

The mass of 1 liter of He under a pressure 2 atmosphere and temperature 27°C is:

1. 0.16 g
2. 0.32 g
3. 0.48 g
5. 0.64 g

144.

A tuning fork and sonometer give 5 beats per second, when the length of the wire is 1 m and 1.05 m respectively. The frequency of fork is -

1. 210 Hz
2. 205 Hz
3. 410 Hz
4. 420 Hz

145.

Two identical metal plates are given charges Q_1 and $Q_2 (< Q_1)$ respectively. If they are now brought close to form a parallel plate capacitor with capacitance C_1 , the potential difference between them is :

1. $\frac{Q_1+Q_2}{2C}$
2. $\frac{Q_1+Q_2}{C}$
3. $\frac{Q_1-Q_2}{C}$
4. $\frac{Q_1-Q_2}{2C}$

146.

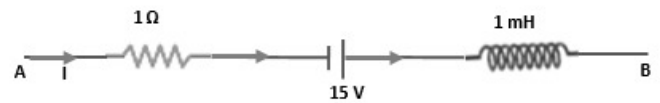
Three copper wires have their lengths in the ratio 5:3:1 and their masses are in the ratio 1:3:5. Their electrical resistance will be in the ratio of :

1. 5:3:1
2. 1:3:5
3. 125:15:1
4. 1:15:125

147.

The network shown in the figure is part of a complete circuit. If at a certain instant, the current I is 5 Amp and it is decreasing at a rate of $5 \times 10^3 \text{ A/s}$, then $V_B - V_A$

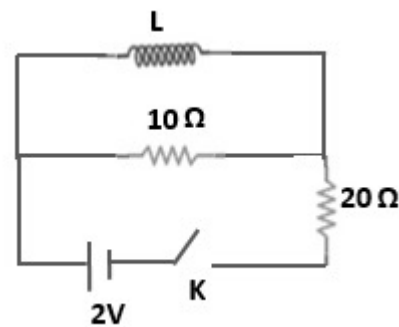
is equal to



1. 20 V
2. 15 V
3. 10 V
4. 5 V

148.

The key K is inserted at time $t = 0$. The initial ($t=0$) and final ($t \rightarrow \infty$) currents through battery are :



1. $\frac{1}{15} \text{ Amp}, \frac{1}{10} \text{ Amp}$
2. $\frac{1}{10} \text{ Amp}, \frac{1}{15} \text{ Amp}$
3. $\frac{2}{15} \text{ Amp}, \frac{1}{10} \text{ Amp}$
4. $\frac{1}{15} \text{ Amp}, \frac{2}{25} \text{ Amp}$

149.

When a ray is refracted from one medium to another, the wavelength changes from 6000\AA to 4000\AA . The critical angle for the interface will be:

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

150.

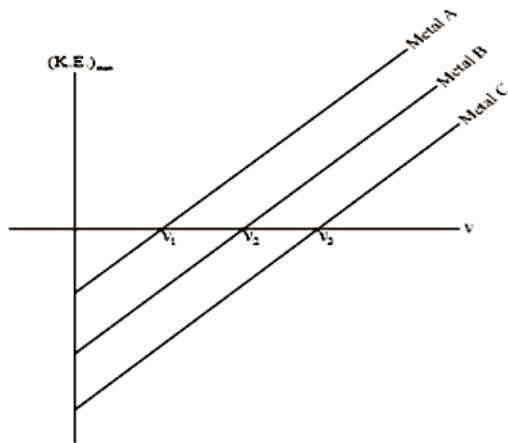
Critical angle for prism is 36° . The maximum angle of

prism for which the emergent ray is possible is :

1. 18°
2. 36°
3. 72°
4. 144°

151.

The work functions for metal A, metal B and metal C are ϕ_A , ϕ_B and ϕ_C respectively. Then-



1. $\phi_A < \phi_B < \phi_C$
2. $\phi_A = \phi_B < \phi_C$
3. $\phi_A > \phi_B > \phi_C$
4. None of these

152.

Density (D) of nucleus related to mass no. (A) as

1. $D \propto A$
2. $D \propto A^2$
3. $D \propto A^0$
4. $D \propto A^{-1}$

153.

In a common-emitter transistor, the phase difference between input and output is:

1. Zero
2. $\pi/2$
3. $\pi/3$
4. π

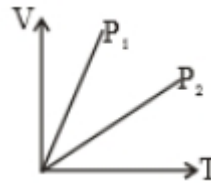
154.

Two chambers contain m_1g and m_2g of a gas at pressure P_1 and P_2 respectively are put in contact with each other. If temperature remains constant, the common pressure reached will be

1. $\frac{P_1P_2(m_1 + m_2)}{(P_2m_1 + m_2P_1)}$
2. $\frac{(m_1 + m_2)}{(P_2m_1 + m_2P_1)}$
3. $\frac{P_1P_2}{(P_2m_1 + m_2P_1)}$
4. $\frac{P_1P_2}{(m_1 + m_2)}$

155.

For an ideal gas V-T curves at constant pressure P_1 and P_2 are shown in figure. From the figure



1. $P_1 > P_2$
2. $P_1 < P_2$
3. $P_1 = P_2$
4. $P_1 \leq P_2$

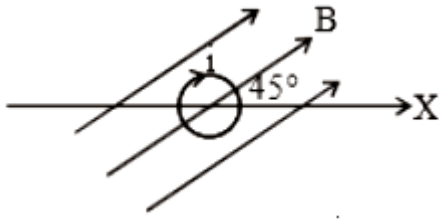
156.

The current in a wire varies with time according to the relation $i = (3+2t)A$. The amount of charge passing a cross section of the wire in the time interval $t=0$ to $t=4.0$ sec would be (where t is time in seconds)

1. 28 C
2. 30.5 C
3. 8 C
4. 82 C

157.

A circular loop has a radius = 20 cm is placed in a uniform magnetic field $B = 2T$ in the XY plane as shown. The loop carries current $i = 1A$. The magnitude of torque acting on the loop is



1. 0.25 N-m
1. 5.2 N-m
3. 2.5 N-m
4. 0.52 N-m

158.

If electron of velocity $(2\hat{i} + 3\hat{j})$ is subjected to a magnetic field $4\hat{k}$, then

1. Speed will change
2. Direction will change
3. Both (1) and (2)
4. None of the above

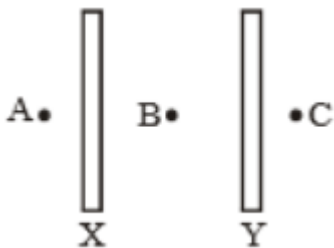
159.

For an isotropic medium B, μ, H and M are related as (where B, μ_0, H and M have their usual meanings in the context of magnetic material)

1. $(B - M) = \mu_0 H$
2. $M = \mu_0(H + M)$
3. $H = \mu_0(H + M)$
4. $B = \mu_0(H + M)$

160.

X and Y are large, parallel conducting plates close to each other. Each face has an area A . X is given a charge Q . Y is without any charge. Point A, B and C are as shown in the figure. Find the incorrect option.



1. the field at B is $\frac{Q}{2\epsilon_0 A}$
2. the field at B is $\frac{Q}{\epsilon_0 A}$

3. the fields at A, B and C are of the same magnitude
4. the fields at A and C are of the same magnitude, but in opposite directions

161.

A $4 \mu\text{F}$ capacitor is charged by a 200 V supply. It is then disconnected from the supply, and is connected to another uncharged $2 \mu\text{F}$ capacitor. How much electrostatic energy of the first capacitor is lost in the form of heat and electromagnetic radiation?

1. $2.67 \times 10^{-2} \text{ J}$
2. $4.99 \times 10^{-2} \text{ J}$
3. $6.67 \times 10^{-2} \text{ J}$
4. $8.84 \times 10^{-2} \text{ J}$

162.

A particle has initial velocity $(3\hat{i} + 4\hat{j})$ and has acceleration $(0.4\hat{i} + 0.3\hat{j})$. Its speed after 10 s

1. 7 units
2. $7\sqrt{2}$ units
3. 8.5 units
4. 10 units

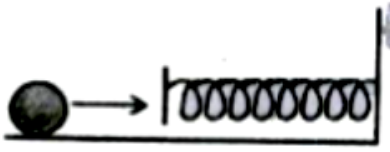
163.

The gravity in space is given by $\vec{g} = -10\hat{j} \text{ ms}^{-2}$. Two particles are simultaneously projected with velocity $\vec{u}_1 = (10 \text{ ms}^{-1})\hat{i} + (10 \text{ ms}^{-1})\hat{j}$ and $\vec{u}_2 = (20 \text{ ms}^{-1})\hat{i} + (10 \text{ ms}^{-1})\hat{j}$. Then, the ratio of their times of flight

1. 1:1
2. 1:2
3. 2:1
4. none

164.

A mass of 0.5kg moving with a speed of 1.5 m/s on a horizontal smooth surface collides with a nearly weightless spring of force constant $k = 50 \text{ N/m}$. The maximum compression of the spring would be



1. 0.5 m
2. 0.15 m
3. 0.12 m
4. 1.5 m

165.

A heavy uniform chain partly lies on a horizontal table. If the coefficient of friction between the chain and the table surface is 0.25, then the maximum fraction of the length of the chain that can hang over edge of the table is

1. 20 %
2. 25 %
3. 33 %
4. 15 %

166.

Two blocks A and B of masses 4 kg and 12 kg are placed on a smooth plane surface. A force F of 16 N is applied on A as shown. The force of contact is :



1. 4 N
2. 8 N
3. 12 N
4. 16 N

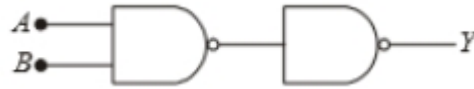
167.

A position dependent force $F = 7 - 2x + 3x^2$ N acts on a small body of mass 2 kg and displaces it from $x = 0$ to $x = 5$ m. The work done in joule is -

1. 70
2. 270
3. 35
4. 135

168.

Following diagram performs logic function of



1. AND gate
2. NAND gate
3. XOR gate
4. OR gate

169.

A particle performing S.H.M with time period T, the time for $\frac{3}{8}$ th oscillation, if particle initially at mean position

1. $\frac{T}{3}$
2. $\frac{5T}{12}$
3. $\frac{3T}{4}$
4. $\frac{3T}{8}$

170.

The displacement of a wave disturbance propagating in the positive X-direction is given by : $y = \frac{1}{1+x^2}$ at $t = 0$ and $y = \frac{1}{[1+(x-1)^2]}$ at $t = 2$ sec, where x and y are in m.

If the shape of the wave disturbance does not change during the propagation, what is the velocity of the wave ?

1. 1 m/sec
2. 1.5 m/sec
3. 0.5 m/sec
4. 2 m/sec

171.

An electromagnetic radiation has an energy of 13.2 keV. Then, the radiation belongs to the region of

1. visible light
2. ultraviolet
3. infrared
4. X-ray

172.

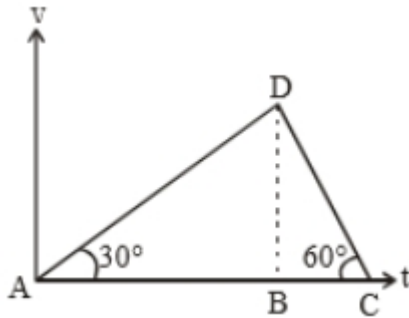
The ratio of the frequency of the long wavelength limits of Lyman and Balmer series of hydrogen spectrum is

1. 27:5
2. 5:27
3. 4:1

4. 1:4

173.

The velocity-time graph of a body is shown in the figure. For the intervals AB and BC, the ratio of the distance travelled by the body is



1. 3:1

2. 1:3

3. $\sqrt{3} : 2$

4. None of these

174.

When the conductivity of a semiconductor is only due to breaking of covalent bonds, the semiconductor is called :

1. intrinsic

2. extrinsic

3. p-type

4. n-type

175.

A 50 Hz alternating current of amplitude 4.04 A is flowing through the primary of a transformer. If coefficient of mutual induction is 0.5 H, then find the maximum value of voltage induced across the secondary of the transformer is

1. 400 V

2. 200 V

3. 314 V

4. 628 V

176.

A black body has maximum radiation intensity at wavelength λ_m at 2000 K. Its corresponding wavelength at 3000 K will be

1. $\frac{16}{81} \lambda_m$

2. $\frac{81}{16} \lambda_m$

3. $\frac{3}{2} \lambda_m$

4. $\frac{2}{3} \lambda_m$

177.

Time period of a freely suspended thin magnet is 8 s. If it is broken in length into two equal parts and one part is suspended in the same way, then its time period in seconds will be

1. 2 s

2. 4 s

3. 8 s

4. 16 s

178.

The work functions for metals A, B and C are 1.92 eV, 2.0 eV and 5eV respectively. According to Einstein's equation, the metals which will emit photoelectrons for a radiation of wavelength 4100\AA is/are-

1. None

2. A only

3. A and B only

4. All the three metals

179.

If a vector $2\hat{i} + 3\hat{j} + 8\hat{k}$ is perpendicular to the vector $4\hat{j} - 4\hat{i} + \alpha\hat{k}$, then the value of α

1. -1

2. $-\frac{1}{2}$

3. $\frac{1}{2}$

4. 1

180.

What will be the Doppler's wavelength shift expected for the light of wavelength λ emitted from the edge of the sun's disc, if the period of rotation of the sun at its equator is T, and the radius of the sun is R? (Take c the speed of light):-

1. $\pm \frac{\pi R^2 \lambda}{cT}$

2. $\pm \frac{2\pi R \lambda}{cT}$

3. $\pm \frac{cT}{2\pi R}$

4. $\pm \lambda$

[Fill OMR Sheet](#)