

1.

The human ribs are termed as bicephalic because:

1. They have two articulations surfaces on their ventral end
2. They have two articulations surfaces on their dorsal end
3. They have two articulations surfaces on their ventral end and two on dorsal end
4. They have two articulations surfaces on their ventral end and one on dorsal end

2.

All the following are the part of a eukaryotic cell endomembranous system except:

1. Vacuole
2. Lysosome
3. Golgi complex
4. Mitochondria

3.

A feature unique to prokaryotes would be:

1. A cell wall not made up of cellulose
2. An extrachromosomal plasmid DNA
3. A cell membrane of peptidoglycan
4. Presence of inclusions

4.

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

- |  |         |
|--|---------|
| 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  |

5.

Consider the following statements:

- I. Trophic level in an ecosystem represents a functional level, not a species as such.
  - II. Saprophytes are accorded the position of a top consumer in an ecosystem.
  - III. A species can occupy more than one trophic level in the same ecosystem at the same time.
- 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

6.

Consider the following statements:

- I. The “bad” ozone is the ozone that is formed in the troposphere.
- II. The “good ozone” in the stratosphere acts as a shield against harmful UV radiation.
- III. UV-A radiations can cause skin cancers and snow-blindness cataracts.

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

7.

Cells in  $G_0$  phase:

1. terminate the cell cycle
2. exit the cell cycle
3. enter the cell cycle
4. suspend the cell cycle

8.

A dioecious flowering plant prevents both

1. Autogamy and xenogamy
2. Autogamy and geitonogamy
3. Geitonogamy and xenogamy
4. Cleistogamy and xenogamy

9.

All the following statements about ZIFT are correct, but one is wrong. Which one is wrong?

1. It is zygote intra fallopian transfer
2. Zygote is transferred into the fallopian tube about after IVF
3. Early embryos upto 8 blastomeres can also be transferred into the fallopian tubes
4. Embryos with more than 8 blastomeres are also transferred into the fallopian tubes

10.

Which of the following groups of hormones produced in women only during pregnancy ?

1. hCG, hPL, relaxin
2. Estrogen, progesterone, hCG
3. Cortisol, prolactin, thyroxine
4. Prolactin, progesterone, hCG

11.

During sewage treatment, biogases are produced which include :

1. Methane, oxygen, hydrogen sulphide
2. Hydrogen sulphide, methane, sulphur dioxide
3. Methane, hydrogen sulphide, carbon dioxide
4. Hydrogen sulphide, nitrogen, methane

12.

What key characteristic of T2 bacteriophage allowed Hershey and Chase to use it in their studies of the genetic material?

1. Its genes encode proteins that assemble to produce the viral coat.
2. It injects its genetic material into a bacterial cell.
3. It can undergo either the lytic or lysogenic life cycle.
4. It enters the bacterial cell to cause infection.

13.

To study whether a gene exhibits multiple allelism or not one must study:

1. An individual
2. A population
3. A species
4. With concentration

14.

Which of the following is a pyrimidine base found in DNA?

1. Adenine
2. Guanine
3. Uracil
4. Cytosine

15.

What do you mean by bioprospecting?

1. Biological analysis of living things to classify them?
2. Exploring molecular, genetic and species level diversity for product of economic importance.

3. Exploring forests to identify diversity present there.

4. It is branch of biology which deals with prospect of conservation.

16.

Which of the given feature is not related to mustard?

1. Superior ovary.
2. Variable length of filaments of stamens.
3. Parietal placentation.
4. Opposite phyllotaxy.

17.

Group of organisms in which cell wall forms two thin overlapping shells are

1. Responsible for bioluminescence.
2. Chief producers of ocean.
3. Prokaryotes.
4. Heterotrophs.

18.

Which of the following statements is NOT correct?

1. Microvilli increase the surface area of the small intestine for absorption of nutrients.
2. Enzymes located on the brush-border finish the digestion of chyme.
3. Absorption is an active process in the small intestine.
4. Sugars and amino acids cross columnar epithelial cells to enter the lacteal.

19.

Intercalated discs are associated with what type of cells?

1. dense regular connective tissue
2. dense irregular connective tissue
3. cardiac muscle
4. skeletal muscle

20.

*Planaria* possess high capacity of

1. metamorphosis
2. regeneration
3. alternation of generation
4. bioluminescence

21.

*Chlamydomonas*, *Chlorella*, *Volvox*, *Ulothrix*, *Fucus*, *Dictyota*, *Polysiphonia*, *Gelidium*, *Acetabularia*, *Laminaria* Out of these 10 organisms, how many organisms belong to the class chlorophyceae, phaeophyceae and rhodophyceae respectively?

1. 4, 3, 3
2. 4, 4, 2

3. 5, 3, 2

4. 6, 2, 2

22.

According to R.H. Whittaker Chlamydomonas and Chlorella will be kept under

1. Monera
2. Protista
3. Plantae
4. Both 2 & 3

23.

If there are 12 molecules of  $\text{CO}_2$  to be fixed in photosynthesis, then how many turns of Calvin cycle and how many molecules of glucose will be synthesized respectively?

1. 9 turns, 2 molecules.
2. 12 turns, 1 molecule.
3. 6 turns, 1 molecule.
4. 12 turns, 2 molecules.

24.

Which of the following cross often helps to overcome inbreeding depression ?

1. Inbreeding
2. Outcrossing
3. Cross breeding
4. Interspecific hybridisation

25.

Enzymes that catalyse removal of groups from substrate by mechanisms other than hydrolysis leaving double bonds belongs to

1. Dehydrogenases
2. Hydrolases
3. Lyases
4. Transfereases

26.

Select the option having all the correct characteristics

| Structure | Percentage | Function |
|-----------|------------|----------|
|-----------|------------|----------|



- |    |         |            |
|----|---------|------------|
| 1. | 0.3-0.5 | Phagocytic |
|----|---------|------------|



- |    |         |                   |
|----|---------|-------------------|
| 2. | 0.5-1.0 | Secrete histamine |
|----|---------|-------------------|



- |    |       |                           |
|----|-------|---------------------------|
| 3. | 30-40 | Defense against parasites |
|----|-------|---------------------------|



- |    |       |                    |
|----|-------|--------------------|
| 4. | 30-40 | Allergic reactions |
|----|-------|--------------------|

27.

Match the vessels in Column-I with appropriate organs if serves in Column-II

| Column-I |                      | Column-II |   |
|----------|----------------------|-----------|---|
| (A)      | Hepatic portal vein  | (p)       | Heart's blood system                    |
| (B)      | Pulmonary trunk      | (q)       | Returns blood to heart from lower limbs |
| (C)      | Coronary circulation | (r)       | Carries blood to liver                  |
| (D)      | Inferior vena cava   | (s)       | Leads to lungs                          |

1. (A)→(r), (B)→(s), (C)→(p), (D)→(q)

2. (A)→(r), (B)→(q), (C)→(s), (D)→(p)

3. (A)→(s), (B)→(p), (C)→(r), (D)→(q)

4. (A)→(s), (B)→(q), (C)→(p), (D)→(r)

28.

Select the correct option that represents the enzyme composition of succus entericus

1. Pepsin, amylase, rennin, lipase
2. Enterocinin, carboxypeptidase, trypsin, elastase
3. Enterokinase, nucleosidase, dipeptidase, lactase
4. Renin, pepsinogen, trypsinogen, lipase

29.

Which of the following statements about cross-bridges is false?

1. They are composed of myosin
2. They bind to ATP after they attach to actin
3. They contain an ATPase
4. They split ATP before they attach to actin

30.

A test cross enables one to

1. Determine the viability of cross.
2. Distinguish between homozygous dominant and heterozygous dominant.
3. Determine whether two species can interbreed.
4. Determine the similarities in the DNA of two species.

31.

Mark the correct statement for pBR322 as a plasmid vector

- I. Contains relaxed origin of replication.
- II. Two genes coding for resistance to antibiotics have been introduced.
- III. There are single recognition sites for a number of restriction enzymes at various points.
- IV. Insertional inactivation is a useful selection method for identifying recombinant vectors with insert.

1. I, II, III & IV
2. I, II only
3. II, III only
4. II only

32.

Cylindrical meristem is term used for?

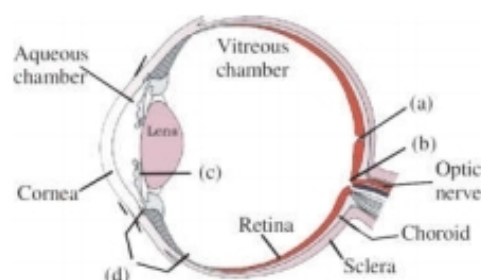
1. Lateral meristem.
2. Promeristem.
3. Intercalary meristem.
4. Primary meristem.

33.

Sunlight is essential for photosynthesis is established by

1. Jan Ingenhousz.
2. Robert Hill.
3. Emerson.
4. Julius Von Sach.

34.



For the given diagram which labeling and function is correctly matched/described?

1. (a) → Fovea → Rods are densely packed.
2. (b) → Blindspot → No image formed.
3. (c) → Choroid → Coloured part of the eye which regulates diameter of pupil.
4. (d) → Ciliary body → No role in accommodation

35.

Read all statements carefully and find out how many statement's are correct ?

- (a) Neural system provides an organised network of point to point connection's for a quick co-ordination.
- (b) Impulse transmission across a chemical synapse is always faster than that across a electrical synapse.
- (c) Cerebral aqueduct passes through the mid-brain.
- (d) The hypothalamus contain centre's which control respiration and gastric secretions.

1. One
2. Two
3. Three
4. Four

36.

Triangular age pyramid represents

1. Expanding population.
2. Declining population.
3. Mature population.
4. Both 1 and 3

37.

Match the column and choose the correct answer.

| Column-I             | Column-II         |
|----------------------|-------------------|
| a. Hypothalamus      | (i) Spermatolysin |
| b. Acrosome          | (ii) Estrogen     |
| c. Graffian follicle | (iii) Relaxin     |
| d. Leydig cells      | (iv) GnRH         |
| e. Parturition       | (v) Testosterone  |

1. a(iv), b(i), c(ii), d(iii), e(v)
2. a(ii), b(i), c(iv), d(iii), e(v)
3. a(ii), b(i), c(v), d(iv), e(iii)
4. a(iv), b(i), c(ii), d(v), e(iii)

38.

Which one of the following is wrong about Chara?

1. Globule and nucule present on the same plant
2. Upper antheridium and lower oogonium
3. Globule is male reproductive structure

4. Upper oogonium and lower round antheridium

39.

Restriction endonuclease generated DNA fragments separated by gel electrophoresis and blot transferred onto a membrane filter are probed with radioactive DNA fragment. This procedure is called

1. Gene cloning
2. The southern blotting technique
3. Northern blotting
4. Western blotting

40.

During primary succession in water body, the pioneers are \_\_\_\_\_, they are replaced by \_\_\_\_\_ with time

1. Phytoplanktons, rooted hydrophytes
2. Free floating hydrophytes, rooted hydrophytes
3. Phytoplanktons, rooted submerged plants
4. Free floating angiosperms, sedges

41.

Plant growth regulator, which promotes senescence and abscission of plant organs, is also related to which of the following physiological effects?

1. Thinning of cotton, cherry, and walnut
2. Overcome apical dominance
3. Early seed production in conifers
4. Formation of new leaves

42.

- (i) Thymus
- (ii) Spleen
- (iii) Appendix
- (iv) MALT
- (v) Bone marrow

How many of the above are secondary lymphoid organs except?

1. ii, iii, iv only
2. i, v only
3. i, ii, iii, iv, v
4. i, ii, iii, iv only

43.

Spongy tissue is generally situated towards which side in dorsiventral leaf ?

1. Abaxial

2. Adaxial

3. Upper

4. Ventral

44.

Which of the following option is correct?

1. Fertilization is internal and development is indirect in Scypha, Pleurobrachia
2. Flame cells help in osmoregulation and alimentary canal present in Fasciola, Taenia
3. Body is segmented and perform locomotion with the help of parapodia in Nereis, Pheretima
4. Body is covered by mantle layer and gills are present in Unio, Pila

45.

Match the column-I with column II and choose correct option :-

|   | Column-I           |     | Column-II  |
|---|--------------------|-----|------------|
| a | RNA polymerase-I   | i   | ScRNA      |
| B | RNA polymerase-II  | ii  | 5.8S r-RNA |
| c | RNA polymerase-III | iii | hn-RNA     |

1. a-(i), b-(ii), c-(iii)

2. a-(ii), b-(i), c-(iii)

3. a-(ii), b-(iii), c-(i)

4. a-(iii), b-(i), c-(ii)

46.

Which of the following nitrogenous waste is least toxic and can be removed with minimum loss of water?

1. Urea
2. Ammonia
3. Degraded products of hormones
4. Uric acid

47.

First step in urine formation is carried out by which part of nephron?

1. Glomerulus

2. PCT

3. Loop of Henle and Vasa recta

4. Collecting duct

48.

Which of the following is wrongly matched in the given table?

|                 |                    |  |
|-----------------|--------------------|--|
| (i) Golden rice | Transgenic rice    | Vitamin A enriched                     |
| (ii) Flavr savr | Transgenic tobacco | Delayed ripening                       |
| (iii) Bt-cotton | Transgenic cotton  | Bacterial and viral resistance         |
| (iv) Rosie      | Transgenic cow     | milk contained human alpha antitrypsin |

1. i and ii

2. ii, iii and iv

3. ii and iii

4. Only iii

49.

Respiratory Quotient is 0.7 for:-

1. Malic Acid

2. Glucose

3. Triplamitin

4. Sucrose

50.

Sacred groves are example of in situ conservation are found in :-

(a) Khasi and Jaintia – In Meghalaya

(b) Aravalli hills – In Rajasthan

(c) Chanda and Bastar – In Madhya Pradesh

(d) Western ghats – In Karnataka

1. a, b Only

2. b, c Only

3. a, c Only

4. a, b, c, d

51.

Which of the following is not an invasive weed?

1. Parthenium

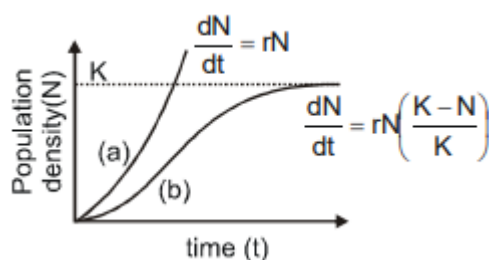
2. Lantana

3. Eicchornia

4. Clarias

52.

Select the correct option with respect to following graph :-



(a)

(b)

(k)

1. Logistic plot

Exponential plot

Carrying capacity

2. Exponential plot

Logistic plot

Carrying capacity

3. Carrying capacity

Exponential plot

Logistic plot

4. Carrying capacity

Logistic plot

Exponential plot

53.

Match the items in column I and column II and choose the correct option :-

Column I

Column II

A UV rays

i Biomagnification

|   |                              |     |                |  |           |                              |
|---|------------------------------|-----|----------------|--|-----------|------------------------------|
| B | Biodegradable organic matter | ii  | Eutrophication | of the structure with its location and function :- |           |                              |
| C | DDT                          | iii | Snow blindness | Structure  | Location  | Function                     |
| D | Phosphates                   | iv  | BOD            | (1) Corpora quadrigemina                           | Mid brain | Visual and auditory reflexes |

The correct match is :-

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

54.

Standing crop is :

- (i) Amount of detritus in unit area
- (ii) Number of living organisms in unit area
- (iii) Amount of nutrient such as carbon, nitrogen, calcium in unit area
- (iv) Biomass in unit area

1. (i) and (iv)
2. (i) and (iii)
3. (ii) and (iv)
4. only (iv)

55.

ACTH stimulates the synthesis and secretion of.....hormones called.....from adrenal cortex. Complete the above sentence by filling in appropriate blanks :-

1. Protein, sex corticoids
2. Steroid, mineralocorticoids
3. Short peptides, mineralocorticoids
4. Steroid, glucocorticoids

56.

Follicle-stimulating hormone interact with ?

1. Intracellular receptor
2. Cell membrane receptor
3. Direct act on gene
4. Direct act on enzyme

57.

Select the option with incorrect combination

(2)

Thalamus

Wrapped by cerebrum

Major co-ordinating centre for sensory & motor signalling

(3)

Limbic system

Inner part of cerebral hemisphere

Emotions, sexual behaviour and motivation

(4)

Wernick's area

Frontal lobe

Sensory auditory area

1. (1)

2. (2)

3. (3)

4. (4)

58.

Consider the following four statement (a-d). and select the option which includes all the correct ones only.

(a) Pineal gland is situated on the ventral side of forebrain.

(b) Corpus luteum is formed after ovulation and its formation is induced by LH.

(c) In female, oxytocin stimulates contraction of uterus at the time of childbirth and milk ejection from mammary body.

(d) Pituitary gland is located in a bony cavity called sella turcica

1. Statements (a), (b) and (d)

2. Statements (b) or (d)

3. Statement (a), (c) and (d)

4. Statement (b), (c) and (d)

59.

Multiload 375 is responsible for



1. Stimulation of ovulation
2. Stimulation of gametogenesis
3. Suppressing the sperm motility
4. Increasing the fertilising capacity of sperms

60.

Scrotum helps in maintaining the temperature of the testes which is A lower than the normal body temperature. Each testis has about B compartments called testicular lobules. Select the option that fills the blanks correctly.

| A          | B   |
|------------|-----|
| 1. 1-3°C   | 300 |
| 2. 2-2.5°C | 250 |
| 3. 3-3.5°C | 250 |
| 4. 2-2.5°C | 350 |

61.

Which one is wrongly matched?

1. Red algae – Porphyra
2. Corellloid roots – Cycas
3. Moss – Funaria
4. Bryophyte – Pinus

62.

Dikaryon phase appears during sexual reproduction of

1. Mushroom
2. Alternaria
3. Albugo
4. Mucor

63.

Apomixis is a method of

1. Asexual reproduction
2. Sexual reproduction
3. Sexual reproduction that mimics asexual reproduction
4. Fusion of somatic cells

64.

Plant in which endosperm is completely consumed by the developing of the embryo before seed maturation is

1. Castor

2. Coconut

3. Pea

4. Maize

65.

Choose the incorrect match

1. Testicular lobules in each testis → 250
2. Number of primary follicles in each ovary at puberty → 6000 to 8000
3. Sperm count in healthy male per ejaculate → 200 to 300 million
4. Mammary lobes in each breast → 15 to 20

66.

Which of the given bacteria is autotrophic, free-living as well as symbiotic nitrogen fixer?

1. Rhizobium
2. Frankia
3. Anabaena
4. Azotobacter

67.

The reaction centre w.r.t. cyclic photophosphorylation is

1. P<sub>700</sub>
2. P<sub>680</sub>
3. P<sub>540</sub>
4. P<sub>660</sub>

68.

The most important cause driving animals and plants to extinction is

1. Overexploitation
2. Habitat loss and fragmentation
3. Alien species invasion
4. Co-extinction

69.

The enzyme that seals 5' PO<sub>4</sub> and 3' OH polynucleotide ends while creating a recombinant DNA molecule is

1. Alkaline phosphatase
2. DNA ligase
3. DNase



4. Restriction endonuclease
70. Which of the following is a product of cross-breeding?
1. Mule
  2. Jersey
  3. Leghorn
  4. Hisardale
71. Select the incorrect match
1. Biological response –  $\alpha$ -interferon modifiers
  2. Insomnia – Benzodiazepines
  3. Cannabis sativa – Smack
  4. Metastasis – Malignant neoplasma
72. Examples of phenomenon named adaptive radiation is not seen in/amongst
1. Marsupials in Australia
  2. Finches on Galapagos islands
  3. Dark and light moths w.r.t. industrial melanism
  4. Structure of limbs for locomotion in mammals
73. Select the correct statement w.r.t. *Periplaneta americana*.
1. Paurometabolous development with 9-10 nymphal stages.
  2. A pair of spermatheca is present in the 6th segment of only female cockroach.
  3. Anal styles present exclusively in males are attached to 10th tergite.
  4. Mesothoracic wings are opaque, dark and leathery in appearance and are used in flight.
74. Select the incorrect statement.
1. Dietary proteins are the source of essential amino-acids.
  2. Concanavalin A is a lectin and is considered a secondary metabolite
  3. Cellulose, inulin, starch and glycogen are homopolymers of glucose
  4. Phosphodiester bonds are a characteristic feature of both RNA and DNA
75. Which among the following plant has these characteristics-actinomorphic flower, hypogynous, syncarpous and parietal placentation?
1. China rose
  2. Marigold
  3. Brinjal
  4. Mustard
76. At atmospheric temperature and pressure, water potential of pure water is
1. Can not be positive
  2. Always negative
  3. Lower than  $\Psi_s$
  4. Zero
77. In a person suffering from sickle-cell anaemia, the template strand of sickle-cell Hb(s) gene has a specific nitrogenous base sequence that codes for valine amino acid. The base sequence on template strand is
1. 5'-CAC-3'
  2. 5'-GAG-3'
  3. 3'-CAG-5'
  4. 3'-CAC-5'
78. The number of genes present on the human - "Y"-chromosome, is
1. 321
  2. 123
  3. 312
  4. 231
79. Mass of bacteria associated with fungal filaments which forms mesh-like structure in Sewage treatment plants (STPs) is called
1. Sludge
  2. Inoculum

3. Floc
4. Activated sludge
80. Choose the **correct** statement
1. ADH deficiency leads to diabetes mellitus
  2. Kidneys produce urine more concentrated than initial filtrate
  3. A healthy human produces 5L urine per day
  4. Ascending limb of loop of Henle is permeable to water
81. Chronic cigarette smoking leads to
1. Pneumonia
  2. Emphysema
  3. Pleurisy
  4. More than one option is correct
82. Choose the correct sequence during expiration
- (i) Pressure increases in pulmonary cavity
  - (ii) Volume of thoracic cavity decreases
  - (iii) Expulsion of air from high pressure to low pressure
  - (iv) Decrease in volume of pulmonary cavity
1. i → ii → iii → iv
  2. iv → i → iii → ii
  3. ii → iv → i → iii
  4. iii → iv → i → ii
83. Select the correctly matched pair w.r.t plastids
1. Amyloplast – Stores fats and oils
  2. Aleuroplast – Stores proteins
  3. Elaioplast – Stores starch
  4. Chromoplast – Contains chlorophylls
84. Congression of chromosomes is seen in
1. Prophase
  2. Metaphase
  3. Anaphase
  4. Telophase
85. Barnacles growing on the back a whale, a type of population interaction, is an example of
1. Competition
  2. Mutualism
  3. Amensalism
  4. Commensalism
86. Select the incorrect match.
1. Herbarium – Quick reference in taxonomical studies
  2. Botanical garden – ‘ex-situ’ conservation of plants
  3. Museum – Collection of preserved animals
  4. Flora – Listing and description of all organisms of a particular area
87. Himgiri
1. Is fortified with fats
  2. Has produced by mutation breeding
  3. Is a variety of wheat
  4. Is a crop of rice
88. A type of natural selection in which more individuals acquire peripheral character value at both ends of distribution curve is
1. Directional selection
  2. Disruptive selection
  3. Balancing selection
  4. Stabilising selection
89. The toxin coded by cryIIAb gene is responsible for controlling
1. Corn borer
  2. Cotton bollworm
  3. Nematode
  4. Bacillus thuringiensis
- 90.

Which of the given hormone is an adenine derivative?

1. IAA
2. GA<sub>3</sub>
3. Zeatin
4. ABA

2. 0.84 V

3. 1.34 V

4. 1.10 V

95.

Which of the following cannot act both as Bronsted acid and as Bronsted base?

1.  $\text{HCO}_3^-$
2.  $\text{NH}_3$
3.  $\text{HCl}$
4.  $\text{HSO}_4^-$

91.

Ice crystallizes in a hexagonal lattice having the volume of the unit cell as  $132 \times 10^{-24} \text{ cm}^3$ . If the density is  $0.92 \text{ g/cm}^3$  at a given temperature, then number of  $\text{H}_2\text{O}$  molecules per unit cell is

1. 1
2. 2
3. 3
4. 4

96.

Which of the following lanthanoid has the highest tendency to form complexes?

1.  $\text{Ce}^{+3}$
2.  $\text{Pm}^{+2}$
3.  $\text{Lu}^{+3}$
4.  $\text{Eu}^{+2}$

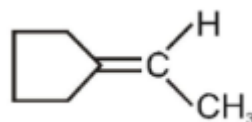
92.

Which of the following statements about the interstitial compounds is incorrect ?

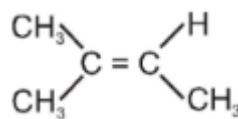
1. They retain metallic conductivity
2. They are chemically reactive
3. They are much harder than the pure metal
4. They have higher melting points than the pure metal

97.

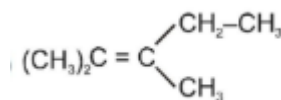
Which of the following alkene on ozonolysis give a mixture of ketones only :-



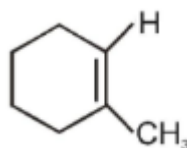
1.



2.



3.



4.

93.

For  $A \rightarrow B$ ,

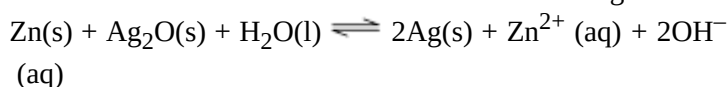
$$\Delta H = 4 \text{ kcal mol}^{-1}, \Delta S = 10 \text{ cal mol}^{-1} \text{K}^{-1}.$$

Reaction is spontaneous when the temperature can be :

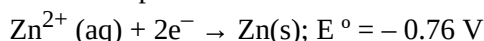
1. 400 K
2. 300 K
3. 500 K
4. none is correct

94.

A button cell used in watches functions as following



If half cell potentials are :

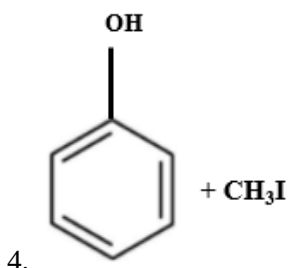
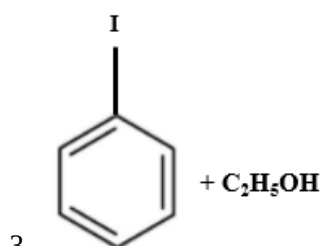
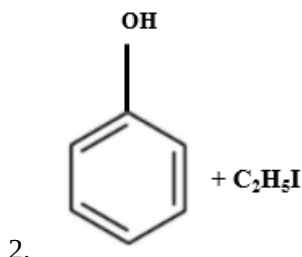
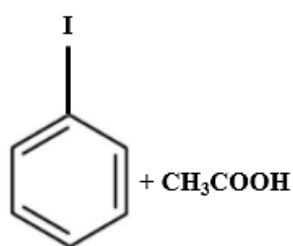


The cell potential will be:

1. 0.42 V

Anisole on cleavage with HI gives:

- 1.



99.

The number of electrons with the azimuthal quantum number  $l = 1$  and 2 for  ${}_{24}\text{Cr}$  in ground state are:

1. 16 and 5
2. 12 and 5
3. 16 and 4
4. 12 and 4

100.

The wavelength of the radiations emitted when in a H atom, electron falls from infinity to stationary state 1, is:

1. 15 nm
2. 192 nm
3. 406 nm
4. 91 nm

101.

The pH of 0.05 M aqueous solution of diethylamine is 12. Its  $K_b$  is

1.  $2 \times 10^{-3}$
2.  $2.5 \times 10^{-3}$
3.  $3 \times 10^{-3}$
4.  $4.5 \times 10^{-3}$

102.

Using MO theory predict which of the following species has the shortest bond length?

1.  $\text{O}_2^+$
2.  $\text{O}_2^-$

3.  $\text{O}_2^{2-}$

4.  $\text{O}_2^{2+}$

103.

Lactic acid on oxidation by alkaline potassium permanganate gives

1. propionic acid
2. cinnamic acid
3. pyruvic acid
4. tartaric acid

104.

2-bromopentane reacts with alcoholic KOH to give

1. cis-2-pentene
2. trans-2-pentene
3. 1-pentene
4. none of the above

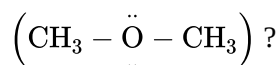
105.

Which concept replaced the Bohr Model of an atom?

1. Rutherford Model
2. Heisenberg's Uncertainty Principle
3. J.J. Thomson Model
4. Photoelectric Effect

106.

Which is true for bond angle of water and dimethyl ether



1. Water > dimethyl ether
2. Dimethyl ether > Water
3. Dimethyl ether = Water
4. Not determined

107.

What is the increasing ionic character of the following compounds?

N – H, F – H, C – H and O – H

1.  $\text{N} - \text{H} > \text{F} - \text{H} > \text{C} - \text{H} > \text{O} - \text{H}$
2.  $\text{F} - \text{H} > \text{N} - \text{H} > \text{C} - \text{H} > \text{O} - \text{H}$
3.  $\text{O} - \text{H} > \text{C} - \text{H} > \text{F} - \text{H} > \text{N} - \text{H}$
4.  $\text{F} - \text{H} > \text{O} - \text{H} > \text{N} - \text{H} > \text{C} - \text{H}$

108.

What is the increasing order of the non-metallic character of the elements N, P, O, and S?

1.  $P < S < N < O$
2.  $O < S < N < P$
3.  $O < N < S < P$
4.  $N < S < N < P$

109.

If 1 g of each of the following gases are taken at STP then which of the gases will occupy the greatest volume

CO, H<sub>2</sub>O, CH<sub>4</sub>, NO

1. CH<sub>4</sub>
2. H<sub>2</sub>O
3. NO
4. CO

110.

What is the oxidation state of two S-atoms in Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>?

1. +2 and +4
2. +3 and -2
3. +4 and -2
4. +6 and -2

111.

H<sub>2</sub>O, B<sub>2</sub>H<sub>6</sub> and NaH belong to the type of Hydride respectively?

1. Covalent, Covalent & Covalent
2. Covalent, Covalent & Ionic
3. Covalent, Ionic & Covalent
4. Interstitial, Covalent & Covalent

112.

What is the thermal stability of carbonates of Group 2 elements?

1.  $\text{BeCO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BaCO}_3$
2.  $\text{BeCO}_3 < \text{MgCO}_3 < \text{BaCO}_3 < \text{SrCO}_3 < \text{CaCO}_3$
3.  $\text{BaCO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BeCO}_3$
4.  $\text{BaCO}_3 < \text{CaCO}_3 < \text{MgCO}_3 < \text{SrCO}_3 < \text{BeCO}_3$

113.

Why Carbon shows catenation property but lead does

not?

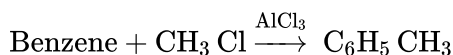
1. Due to the smaller size of C is than Pb
2. Due to the smaller size of Pb than C
3. Due to the smaller ionization energy of C than Pb
4. Due to inert pair effect

114.

What is the IUPAC name of an unsaturated hydrocarbon 'A', which adds two molecules of H<sub>2</sub> and on reductive ozonolysis A gives butane-1, 4-dial, ethanal, and propanone?

1. 2-methylocta-2,6-diene
2. 2-methylocta-1,5-diene
3. 3-methylocta-2,6-diene
4. 2-methylocta-1,6-diene

115.

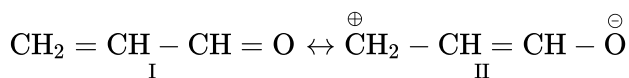


Which type of mechanism & intermediate involve in above reaction?

1. Aromatic electrophilic substitution & carbocation
2. Aromatic Nucleophilic substitution & carbanion
3. Aromatic free radical substitution & Free radical
4. Carbene based substitution reaction & Carbene

116.

Compare the stability of the two resonating structures given below



1. I > II
2. II > I
3. I = II
4. None of these

117.

Why Ozone is a very important for stratosphere although it is very toxic gas and strong oxidising agent ?

1. Due to Entrapping of Harmful UV-rays
2. Due to balance in Global warming
3. Due to Entrapping of Harmful X-rays

4. Due to Entrapping of Harmful  $\gamma$ -rays

118.

Feeling of weakness and discomfort in breathing at high altitudes is based on law?

1. Boyle's law
2. Charles's law
3. Henry's law
4. Raoult's law

119.

How will the pH of brine (aq NaCl solution) be affected when it is electrolysed?

1. pH of the solution will rise.
2. pH of the solution will fall.
3. No change in the pH of the solution.
4. none of these

120.

For a certain reaction large fraction of molecules have energy more than the threshold energy, yet why the rate of reaction is very slow?

1. Due to improper orientation of colliding molecules
2. Due to improper energy of colliding molecules
3. Due to improper volume of colliding molecules
4. Due to improper entropy of colliding molecules

121.

What is collodion?

1. it is 4% solution nitrocellulose in a mixture of ethyl alcohol and ether.
2. it is 14% solution nitrate in a mixture of ether and ethanol.
3. it is 20 % solution nitrate in a mixture of propanol and diethyl ether.
4. none of these

122.

Why is nitric oxide paramagnetic in a gaseous state but the solid obtained on cooling it is diamagnetic?

1.  $\text{NO}_2$  exists as a dimer in a gaseous state as well as a solid state.
2.  $\text{NO}_2$  exists as a monomer in a gaseous state as well as a solid state.

3.  $\text{NO}_2$  exists as a dimer in a gaseous state and it becomes a monomer in a solid state.

4.  $\text{NO}_2$  exists as a monomer in a gaseous state and it becomes dimerize in solid-state.

123.

Which iron ore is used to line the reverberatory furnace to prepare the purest form of iron?

1. Haematite
2. FeO
3.  $\text{Fe}_3\text{O}_4$
4. None of these

124.

What is the empirical formula of an oxide of iron, which has 69.9% iron and 30.1% dioxygen by mass?

1. FeO
2.  $\text{Fe}_2\text{O}_3$
3.  $\text{Fe}_3\text{O}_4$
4.  $\text{Fe}_3\text{O}_2$

125.

Electrons are emitted with zero velocity from a metal surface when it is exposed to radiation of wavelength 6800 Å. The work function ( $W_0$ ) of the metal is

1.  $3.109 \times 10^{-20} \text{ J}$
2.  $2.922 \times 10^{-19} \text{ J}$
3.  $4.031 \times 10^{19} \text{ J}$
4.  $2.319 \times 10^{-18} \text{ J}$

126.

The reason for the highest oxidation state of manganese in fluoride is +4 ( $\text{MnF}_4$ ) but highest oxidation state in oxides is +7 ( $\text{Mn}_2\text{O}_7$ )

1. Fluorine is more electronegative than oxygen
2. Fluorine does not possess d orbitals
3. Fluorine stabilizes lower oxidation state
4. In covalent compounds, fluorine can form a single bond only while oxygen forms a double bond

127.

Which of the following is the most stable complex species?

1.  $[\text{Fe}(\text{CO})_5]$
2.  $[\text{Fe}(\text{CN})_6]^{3-}$
3.  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$
4.  $[\text{Fe}(\text{H}_2\text{O})_6]^{+3}$

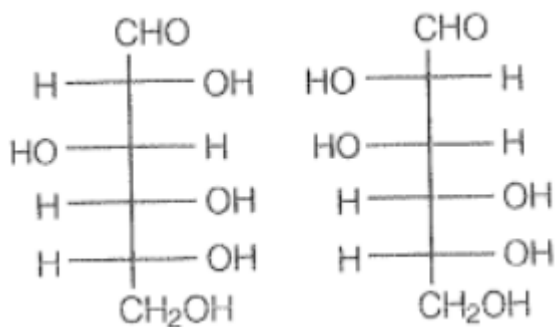
128.

Which of the following species is not expected to be a ligand?

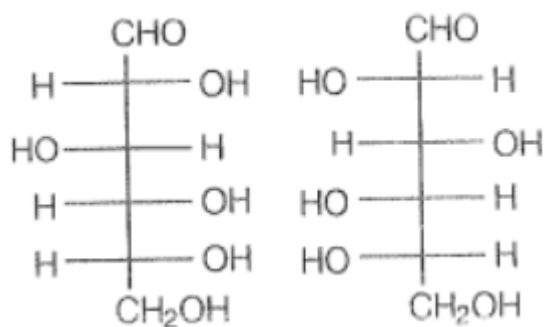
1. NO
2.  $\text{NH}_4^+$
3.  $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
4. CO

129.

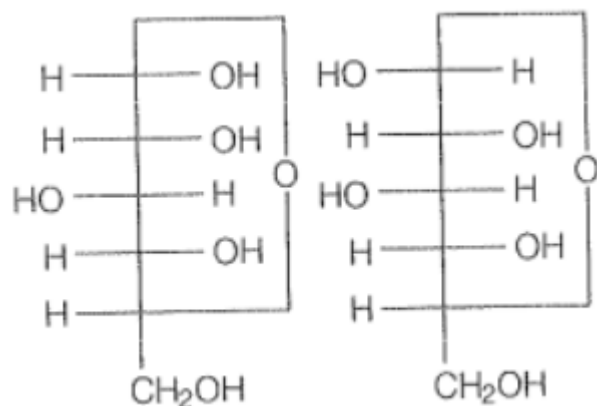
Which of the following pairs represents anomers:



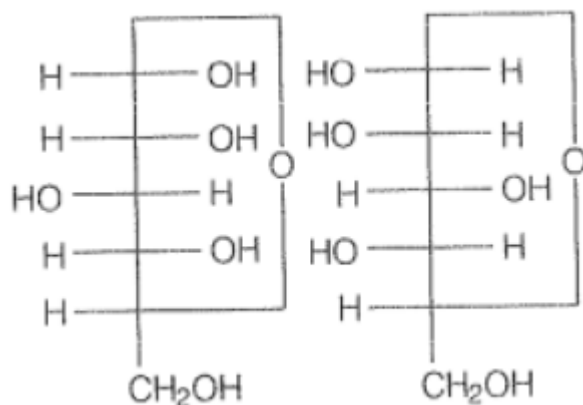
1.



2.



3.



4.

130.

Which statement about aspirin is not true?

1. Aspirin belongs to narcotic analgesics
2. It is effective in relieving pain
3. It has anti-blood-clotting action
4. It is a neurologically active drug

131.

Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is

1. Electrophilic elimination reaction
2. Electrophilic substitution reaction
3. Free radical addition reaction
4. Nucleophilic substitution reaction

132.

- (i) *Aromatic amine* + *Nitrous acid*  $\rightarrow$  A  
 (ii) *Aliphatic amine* + *Nitrous acid*  $\rightarrow$  B

Identify A and B

1. Alcohol, Diazonium salt
2. Aldehyde, Diazonium salt
3. Diazonium salt, Alcohol
4. Diazonium salt, Aldehyde

133.

How many monohydric phenols can be formed of the molecular formula,  $\text{C}_7\text{H}_8\text{O}$ .

1. 2
2. 3
3. 4



4. 5

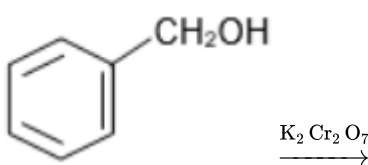
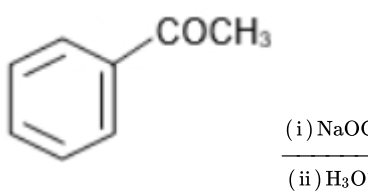
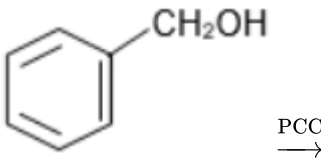
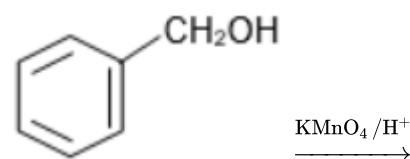
134.

The alkoxy group in aryl alkyl ethers activate the benzene ring towards

1. Nucleophilic addition reaction
2. Electrophilic addition reaction
3. Nucleophilic substitution reaction
4. Electrophilic substitution reaction

135.

The reaction that does not give benzoic acid as the major product is-

1.   $\xrightarrow{\text{K}_2\text{Cr}_2\text{O}_7}$
2.   $\xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) NaOCl}}$
3.   $\xrightarrow{\text{PCC}}$
4.   $\xrightarrow{\text{KMnO}_4/\text{H}^+}$

136.

A particle starts from the origin at  $t = 0$  and moves in the x-y plane with constant acceleration 'a' in the y direction.

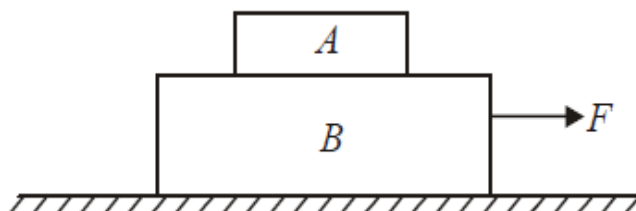
Its equation of motion is  $y = bx^2$ . The x component of its velocity is:

1. variable
2.  $\sqrt{\frac{2a}{b}}$
3.  $\frac{a}{2b}$
4.  $\sqrt{\frac{a}{2b}}$

137.

A 4 kg block A is placed on the top of an 8kg block B

which rests on a smooth table. A just slips on B when a force of 12 Newtons is applied on A. Then the maximum horizontal force  $F$  required to make both A and B move together is



1. 12 N
2. 24 N
3. 36 N
4. 48 N

138.

A heavy box is thrust across a rough floor with an initial speed of 4 m/s. It stops moving after 8 seconds. If the resisting force of friction was on an average 10 N, the mass of the box (in kg) is

1. 40
2. 20
3. 5
4. 2.5

139.

Under the action of a force, a 2 kg body moves such that its position  $x$  as a function of time  $t$  is given by  $x = t^2/3$  where  $x$  is in m and  $t$  in s. The work done by the force in the first two seconds is

1. 1600 J
2. 160 J
3. 16 J
4. 1.8 J

140.

A particle of mass 2 kg located at the position  $(\hat{i} + \hat{j})$  m has a velocity of  $2(\hat{i} - \hat{j} + \hat{k})$  m/s. Its angular momentum about z-axis in  $\text{kg-m}^2/\text{s}$  is :

1. Zero
2. +8
3. 12
4. -8

141.

The linear speed of a uniform spherical shell after rolling down an inclined plane of vertical height  $h$  from rest is:

1.  $\sqrt{\frac{10gh}{7}}$
2.  $\sqrt{\frac{4gh}{5}}$
3.  $\sqrt{\frac{6gh}{5}}$
4.  $\sqrt{2gh}$

142.

Two particles executes SHM of the same amplitude of 20 cm with the same time period along the same line about the same equilibrium position. The maximum distance between the two is 20 cm. Their phase difference in radians is :

1.  $\frac{2\pi}{3}$
2.  $\frac{\pi}{2}$
3.  $\frac{\pi}{3}$
4.  $\frac{\pi}{4}$

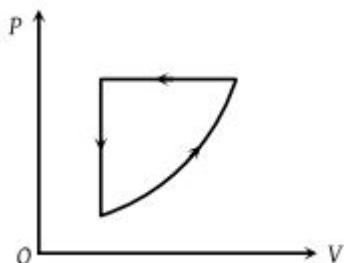
143.

Which of the following can not determine the state of a thermodynamic system?

1. Pressure and volume
2. Volume and temperature
3. Temperature and pressure
4. Any one of pressure, volume or temperature

144.

For one complete cycle of a thermodynamic process on a gas as shown in the  $P$ - $V$  diagram, which of following is correct ?



1.  $\Delta E_{\text{int}} = 0, Q < 0$
2.  $\Delta E_{\text{int}} = 0, Q > 0$
3.  $\Delta E_{\text{int}} > 0, Q < 0$
4.  $\Delta E_{\text{int}} < 0, Q > 0$

145.

Speed of sound in a gas is  $v$  and r.m.s. velocity of the gas molecules is  $c$ . The ratio of  $v$  to  $c$  is

1.  $\frac{3}{\gamma}$
2.  $\frac{\gamma}{3}$
3.  $\sqrt{\frac{3}{\gamma}}$
4.  $\sqrt{\frac{\gamma}{3}}$

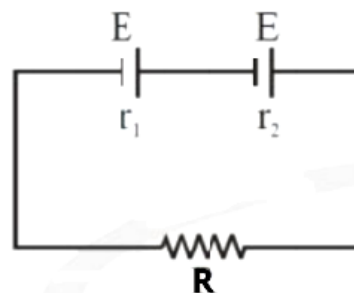
146.

A raindrop of radius  $r$  has a terminal velocity  $v$  m/s in air. The viscosity of air is  $\eta$  poise. The viscous force on it is  $F$ . If the radius of the drop be  $2r$  and the drop falls with terminal velocity in the same air, the viscous force on it will be:

1.  $F$
2.  $F/2$
3.  $4F$
4.  $8F$

147.

Two cells of the same emf  $E$  and different internal resistances  $r_1$  and  $r_2$  are connected in series to an external resistance  $R$ . The value of  $R$  for which the potential difference across the first cell is zero is given by:-



1.  $r_1$
2.  $r_2$
3.  $r_1 - r_2$
4.  $r_1 + r_2$

148.

A body is falling under gravity from rest. It loses 200 J of gravitational potential energy when its speed is  $10 \text{ ms}^{-1}$ . Mass of the body is

1. 3 kg
2. 4 kg

3. 5 kg

4. 7 kg

149.

A proton and an electron both have a kinetic energy of 1 eV. Which has the longer wavelength?

1. Electron

2. Proton

3. Both have the same wavelength

4. Wavelength and K.E. are not related

150.

The circuit represents-



1. OR gate

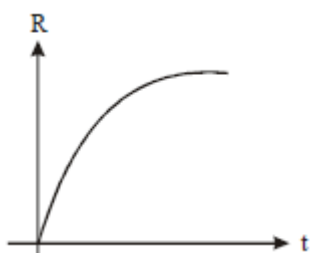
2. AND gate

3. NOR gate

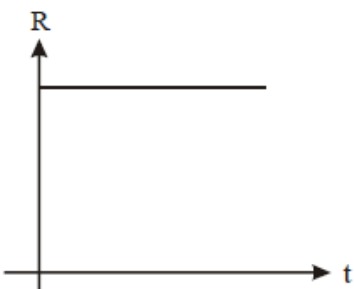
4. NAND gate

151.

A radioactive nucleus X decays to a stable nucleus 'Y'. Then the graph of rate of formation of 'Y' against time 't' will be -

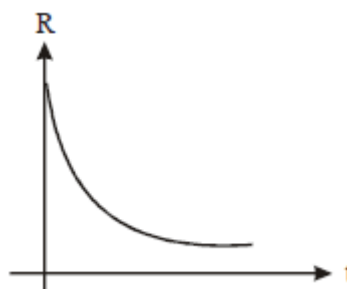


1.



2.

3.



4.

152.

A photosensitive metallic surface has work function,  $h\nu_0$ . If photons of energy  $2h\nu_0$  fall on this surface, the electrons come out with a maximum velocity of  $4 \times 10^6$  m/s. When the photon energy is increased to  $5h\nu_0$ , then the maximum velocity of photo-electrons will be-

1.  $2 \times 10^7$  m/s

2.  $2 \times 10^6$  m/s

3.  $8 \times 10^5$  m/s

4.  $8 \times 10^6$  m/s

153.

A stone tied to the end of a string of 1 m long is whirled in a horizontal circle with a constant speed. If the stone makes 22 revolutions in 44 seconds, what is the magnitude and direction of acceleration of the stone?

1.  $\pi^2 \text{ ms}^{-2}$  and direction along the tangent to the circle

2.  $\pi^2 \text{ ms}^{-2}$  and direction along the radius towards the centre.

3.  $\frac{\pi^2}{4} \text{ ms}^{-2}$  and direction along the radius towards the centre.

4.  $\pi^2 \text{ ms}^{-2}$  and direction along the radius away from the centre.

154.

The numerical ratio of displacement to the distance covered is always

1. less than one
2. equal to one
3. equal to or less than one
4. equal to or greater than one

155.

A particle with restoring force proportional to the displacement and resisting force proportional to velocity is subjected to a force,  $F = F_0 \sin \omega t$

If, the amplitude of the particle is maximum for  $\omega = \omega_1$  and the energy of the particle is maximum for  $\omega = \omega_2$ , then

1.  $\omega_1 = \omega_0$  and  $\omega_2 \neq \omega_0$
2.  $\omega_1 = \omega_0$  and  $\omega_2 = \omega_0$
3.  $\omega_1 \neq \omega_0$  and  $\omega_2 = \omega_0$
4.  $\omega_1 \neq \omega_0$  and  $\omega_2 \neq \omega_0$

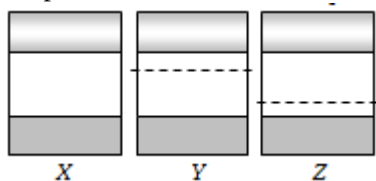
156.

The resistance of a coil for d.c. is in ohms. In a.c., the impedance:

1. Will remain the same
2. Will increase
3. Will decrease
4. Will be zero

157.

The energy band diagrams for three semiconductor samples of silicon are as shown. We can then assert that-



1. Sample X is undoped while samples Y and Z have been doped with a third group and a fifth group impurity respectively
2. Sample X is undoped while both samples Y and Z have been doped with a fifth group impurity
3. Sample X has been doped with equal amounts of third and fifth group impurities while samples Y and Z are undoped
4. Sample X is undoped while samples Y and Z have been doped with a fifth group and a third group impurity respectively

158.

The Rutherford  $\alpha$ -particle experiment shows

that most of the  $\alpha$ -particles pass through almost unscattered while some are scattered through large angles. What information does it give about the structure of the atom?

1. Atom is hollow
2. The whole mass of the atom is concentrated in a small center called nucleus
3. Nucleus is positively charged
4. All of the above

159.

On applying stress of  $20 \times 10^8 \text{ N/m}^2$  the length of a perfectly elastic wire is doubled. Its Young's modulus will be

1.  $40 \times 10^8 \text{ N/m}^2$
2.  $20 \times 10^8 \text{ N/m}^2$
3.  $10 \times 10^8 \text{ N/m}^2$
4.  $5 \times 10^8 \text{ N/m}^2$

160.

A rigid body rotates about a fixed axis with a variable angular velocity equal to  $\alpha - \beta t$ , at the time  $t$ , where  $\alpha, \beta$  are constants. The angle through which it rotates before it stops

1.  $\frac{\alpha^2}{2\beta}$
2.  $\frac{\alpha^2 - \beta^2}{2\alpha}$
3.  $\frac{\alpha^2 - \beta^2}{2\beta}$
4.  $\frac{(\alpha - \beta)\alpha}{2}$

161.

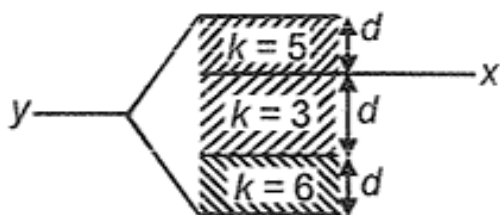
Due to a small magnet, the intensity at a distance  $x$  in the end-on position is 9 gauss. What will be the intensity at a distance  $\frac{x}{2}$  on equatorial position?

1. 9 gauss
2. 4 gauss
3. 36 gauss
4. 4.5 gauss

162.

In the given arrangements of parallel plates, each plate has area  $A$  and distance between two consecutive plates is  $d$ . The equivalent capacitance of the system

between x and y is given by-



1.  $\frac{7\epsilon_0 A}{d}$
2.  $\frac{\epsilon_0 A}{d}$
3.  $\frac{14\epsilon_0 A}{d}$
4.  $\frac{10}{7} \frac{\epsilon_0 A}{d}$

163.

An electric field is given by  $\vec{E} = (\hat{i} + 2\hat{j} + \hat{k}) \text{ N/C}$ .

The work done in moving a 1 coulomb charge from  $\vec{r}_A = (2\hat{i} + 2\hat{j})\text{m}$  to  $\vec{r}_B = (4\hat{i} + \hat{j})\text{m}$  is:

1. 8 J
2. 4 J
3. -4 J
4. Zero

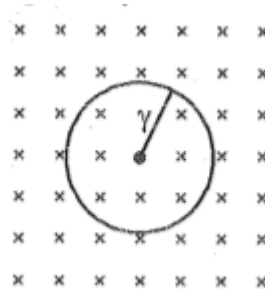
164.

Magnetic flux through a circuit of resistance  $20 \Omega$  is changed from 20 Wb to 40 Wb in 5 ms. The charge passed through the circuit during this time is

1. 1C
2. 2C
3. Zero
4. 0.5C

165.

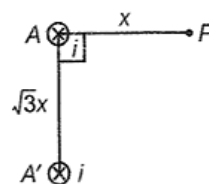
The magnetic field in the region is decreasing in such a way that  $\frac{dB}{dt} = \gamma$ . If resistance per unit length of the loop shown in the figure is  $\lambda$ , then, the current flowing in the loop is given by



1.  $\frac{2\pi r \gamma}{\lambda}$  Clockwise
2.  $\frac{2\pi r \gamma}{\lambda}$  Anticlockwise
3.  $\frac{r \gamma}{2\lambda}$  Clockwise
4.  $\frac{r \gamma}{2\lambda}$  Anticlockwise

166.

Two straight parallel thin wires carrying current  $i$  each down in plane of paper are kept at  $\sqrt{3}x$  distance apart as shown in the figure. If magnetic field due to current in wire A at P is B. The magnetic field at P by A' is :



1.  $\sqrt{5} \frac{B}{2}$
2.  $\frac{B}{2}$
3.  $\sqrt{2} B$
4.  $\frac{5B}{\sqrt{2}}$

167.

If only 1% of the main current is to be passed through a galvanometer of resistance G, then the resistance of shunt will be

1. G
2.  $\frac{G}{100}$
3.  $\frac{99}{100} G$
4.  $\frac{G}{99}$

168.

Which of the following pair of space and time-varying electric field and magnetic field would generate a

plane electromagnetic wave traveling in the z-direction?

1.  $E\hat{i}, B\hat{j}$
2.  $E\hat{i}, B\hat{i}$
3.  $E\hat{i}, B\hat{k}$
4.  $E\hat{k}, B\hat{i}$

169.

Two physical quantities have the same dimensions, then their magnitude

1. Cannot be multiplied
2. Can be added
3. Cannot be added
4. Cannot be added or subtracted

170.

An iron tyre is to be fitted onto a wooden wheel 1 metre in diameter. The diameter of the tyre is 6 mm smaller than that of the wheel. The tyre should be heated so that its temperature increases by a minimum of (coefficient of volume expansion of iron is  $3.6 \times 10^{-5}/^{\circ}\text{C}$ )

1.  $167^{\circ}\text{C}$
2.  $334^{\circ}\text{C}$
3.  $500^{\circ}\text{C}$
4.  $1000^{\circ}\text{C}$

171.

An infinite number of charges, each of charge 1C is placed on the X-axis with co-ordinates  $x = 1, 2, 4, 8, \dots, \infty$ . If a charge 1C is kept at the origin, then the net force acting on 1 C charge

1. 9000 N
2. 12000 N
3. 24000 N
4. 36000 N

172.

Which of the following statements is correct about a dipole in a non-uniform field?

1. Torque is always nonzero
2. Net force may be nonzero
3. Torque is always zero
4. Net force is always zero

173.

The root means square velocity of the molecules in a sample of helium is  $\left(\frac{5}{7}\right)^{th}$  of the molecules in a sample of hydrogen. If the temperature of the hydrogen sample is  $0^{\circ}\text{C}$  that of helium samples is about:

1. 278.5 K
2. 0 K
3.  $273^{\circ}\text{C}$
4.  $100^{\circ}\text{C}$

174.

A certain wire has a resistance R. The resistance of another wire of same material, same length but having diameter twice as that previous, will be

1. 4R
2. 2R
3.  $\frac{R}{2}$
4.  $\frac{R}{4}$

175.

According to Kepler's 3rd law  $T^2 = Ka^3$ , where K is proportionality constant which depends on

1. Mass of sun
2. Mass of planet
3. Radius of sun
4. Both 1 & 2

176.

An object is at a distance of 30 cm in front of a concave mirror of focal length 10 cm. The image of the object will be-

1. Smaller in size
2. Inverted
3. Between focus and centre of curvature
4. All of these

177.

Resolving power of compound microscope

1. Depends on wavelength of light as  $\propto \lambda$

2. Depends on wavelength of light as  $\propto \lambda^2$

3. Depends on wavelength of light as  $\propto \frac{1}{\lambda}$

4. Depends on wavelength of light as  $\propto \frac{1}{\lambda^2}$

178.

Liquid disturbed by stirring comes to rest after some time due to:

1. Surface tension

2. Viscosity

3. Buoyancy

4. Stability

179.

A car is moving along east at 10 m/s and a bus is moving along north at 10 m/s. The velocity of the car with respect to the bus is along

1. North-East

2. South-East

3. North-West

4. South-West

180.

In total internal reflection, when the angle of incidence is equal to the critical angle for the pair of media in contact, what will be angle of refraction?

1.  $90^\circ$

2.  $180^\circ$

3.  $0^\circ$

4. equal to angle of incidence

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