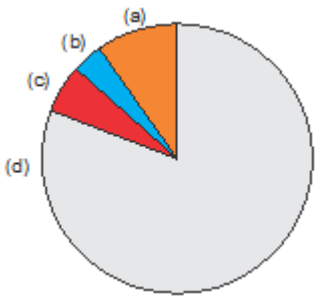
1.

Identify 1., 2., 3. and 4. in the given figure.



The pie-chart for the number of species of major taxa of invertebrates represent respectively

1. a – Insects; b – Crustaceans; c. – Molluscs; d – Other animal groups

2. a – Other animal groups; b – Molluscs; c – Crustaceans; d –Insects

3. a –Molluscs; b – Insects; c – Other animal groups; d – Crustaceans

4. a – Insects; b – Molluscs; c – Crustaceans; d – Other animal groups

2.

Loss of water in liquid phase from the margin of leaves in many herbaceous plants is/occurs

1. Guttation

2. Transpiration

3. At noon

4. Due to cohesion-tension model of water movement.

3.

What happens, when a cell is placed in a isotonic solution?
(a) There is not net flow of water towards the inside or outside.

(b) Cells are said to be flaccid.

(c) ψ_P becomes positive.

(d) Enlargement and extension growth of cells occur.

The correct statement(s) is/are

1. a only

2. a and b only

3. a, b and c only

4. all are correct

4.

Natural selection is best defined as occurring when the environment causes :
1. differential success in reproduction

2. differential mortality

3. assortative mating

4. a reduced gene pool

5.

It is unfortunate that in our society women are blamed for producing female children and have been ostracised and ill-treated because:
1. The sex is determined by the type of sperm fertilizing the egg

2. The sex is determined by the type of egg fertilizing the sperm

3. The sex is determined by the hormones produced by the fetus

4. The sex is determined by God’s Will

6.

The family pedigree of Queen Victoria shows a number of haemophilic descendants as she was:
1. Affected by the disease
2. Carrier for the disease
3. Did not carry the allele for haemophilia
4. Was not a queen

7.

In most prokaryotes, the transcription unit is:
1. Mono-cistronic

2. Poly-cistronic

3. Multi-cistronic

4. Uni-cistronic

8.

Which of the following is not a stop codon?
1. UAA

2. UGA

3. UAC

4. UAG

9.

Which one is not a key criteria for determining a hotspot?
1. Very high levels of species richness.
2. High degree of those species which are confined to that region and not found anywhere else.
3. Degree of threat, which is measured in terms of habitat loss.
4. No habitat loss.

10.

If for some reason, the vasa efferentia in the human reproductive system gets blocked, the gametes will not be transported from
1. epididymis to vas deferens
2. ovary to uterus
3. vagina to uterus
4. testes to epididymis

11.

Some plant groups exhibit intermediate condition w.r.t life cycle pattern. Which characteristic will not be exhibited by such kind of plant?

1. Haplodiplontic life cycle pattern.
2. Both phases are multicellular and often free living.
3. They can differ in their dominant phase.
4. Meiosis takes place in the zygote

12.

Out of the following examples, how many are belonging to Fabaceae, Solanaceae, Liliaceae?
Aloe, Indigofera, Asparagus, Colchicum, Belladonna, Mulaithi

	Fabaceae	Solanaceae	Liliaceae
1.	3	2	1
2.	2	2	2
3.	2	1	3
4.	4	1	1

13.

Which is the correct set of options w.r.t. the following?
1. Dicot stem – Differentiated ground tissue.
Monocot stem – Endarch xylem.
Dicot leaf – Isobilateral leaf.
Monocot leaf – Dorsiventral leaf.

2. Dicot stem – Scattered vascular bundle.
Monocot stem – Arranged vascular bundle.
Dicot leaf – Amphistomatic.
Monocot leaf – Hypostomatic.

3. Dicot stem – Endodermis is called a starch sheath.
Monocot stem – Vascular bundle surrounded by a sclerenchymatous sheath.
Dicot leaf – Palisade and spongy parenchyma.
Monocot leaf – Stomata present on both surfaces.

4. Dicot stem – Arranged vascular bundle.
Monocot stem – Endodermis is called a starch sheath.
Dicot leaf – Amphistomatatic.
Monocot leaf – Palisade and spongy parenchyma.

14.

Mark the incorrect statement regarding the Malpighian tubule in cockroach?

1. It is present at the junction of the midgut and hindgut.

2. It is lined by glandular and ciliated cells.

3. It absorbs uric acid from the hemolymph.

4. It about 100-150 in number and its thin yellow filamentous tubule

15.

MALT (Mucosa associated lymphoid tissue) constitute

1. 25 percent of the lymphoid tissue in the human body

2. 50 percent of the lymphoid tissue in the human body

3. 75 percent of the lymphoid tissue in the human body

4. 90 percent of the lymphoid tissue in the human body

16.

Which of the following plants produce(s) chasmogamous and cleistogamous flowers?

1. *Viola* (Commonpansy)

2. *Oxalis*

3. *Commelina*

4. All of the above

17.

Which of the following is correct to check the inbreeding depression ?

1. Artificial hybridisation

2. Cross breeding

3. Selected animal should be mated with unrelated superior animals of the same breed

4. Selected animal should be mated with unrelated superior animals of the different breed

18.

Match the terms given in Column-I with their physiological processes given in column-II and choose the correct answer

	Column-I		Column-II
(A)	Proximal convoluted tubule	(i)	Formation of concentrated urine
(B)	Distal convoluted tubule	(ii)	Filtration of blood
(C)	Henle's loop	(iii)	Reabsorption of 70-80% of electrolytes
(D)	Counter-current mechanism	(iv)	Ionic balance
(E)	Renal corpuscle	(v)	Maintainance of a concentration gradient in medulla

1. (A)-(iii); (B)-(v); (C)-(iii); (D)-(ii); (E)-(i)

2. (A)-(iii); (B)-(iv); (C)-(i);(D)-(v);(E)-(ii)

3. (A)-(i);(B)-(iii); (C)-(ii); (D)-(v);(E)-(iv)

4. (A)-(iii) ; (B)-(i) ; (C)-(iv) ; (D)-(v) ; (E)-(ii)

19.

Peristalsis occurs

1. from the mouth to the small intestine
2. from the beginning of the esophagus to the anus
3. only in the stomach
4. only in the small and large intestines

20.

Which among the following is used to remove over 99 percent particulate matter present in the exhausts from a thermal power plant?

1. Scrubber.
2. Incinerator.
3. Catalytic convertor.
4. Electrostatic precipitator

21.

How many statements are correct about decomposition?
(A) Oxygen independent process.
(B) Faster if detritus is rich in lignin and chitin.
(C) Light is the most important climatic factor for decomposition.
(D) Warm and moist environment favour decomposition.

1. One

2. Two

3. Three

4. Four

22.

Find the odd one out about levels of biological organization:-
1. Biome

2. Community

3. Species

4. Population

23.

The statement Omnis cellula-e cellula, which means all cells arise from pre-existing cells was given by

1. Rudolf Virchow

2. Schleiden

3. Robert Brown

4. Anton von Leeuwenhoek

24.

A patch of nodal tissue responsible for initiating the rhythmic contractile activity of the heart is present in

1. Lower left corner of the left ventricle

2. Upper right corner of the right atrium

3. Lower left corner of the right ventricle

4. Upper left corner of the left atrium

25.

If the initial amount of DNA is 8 C, then after S-phase the amount of DNA would be

1. 4 C
2. 8 C
3. 64 C
4. 16 C

26.

Read the following:

a. Lymph absorbs and transports fat from the intestine.

b. Lymph nodes produce fibrinogen.

c. Lymphatic capillaries present in the intestinal villi are known as lacteals.

d. Lymph transports oxygen only.

Which of these statements are true?

1. a, c
2. b, d
3. c, d
4. a, b

27.

Separation and purification by filtration, centrifugation of desired compound produced in bioreactor is a part of

1. Downstream processing only
2. Scaling up and downstream processing
3. Upstream processing
4. Screening for recombinants and downstream processing

28.

In gymnosperms, the ovule is naked because

1. Ovary wall is absent
2. Integuments are absent
3. Perianth is absent
4. Nucellus is absent

29.

Transgenic animals are those which have

1. Foreign DNA in some of its cells
2. Foreign DNA in all its cells
3. Foreign RNA in all its cells
4. DNA and RNA both in the cells

30.

Which of the following elements are required for chlorophyll synthesis?

1. Fe and Mg
2. Mo and Ca
3. Cu and Ca
4. Ca and K

31.

Ubiquinone carries electron from

1. Complex III to complex IV
2. Complex I to complex II
3. Complex II to complex III
4. Complex I or II to complex III

32.

Which of the following is a false statement?
1. All organisms have evolved similar mechanism to multiply and produce offsprings.
2. Asexual reproduction is uniparental.
3. Sexual reproduction is biparental.
4. In asexual reproduction no fertilization occurs.

33.

In how many organisms present below in the box in which reproduction is synonymous with growth?

Amoeba, Yeast, Diatom, Mules, Spirogyra, Mangifera, Panthera, Datura and Gonyaulax

1. 7
2. 5
3. 4
4. 6

34.

Which of the following is not related to formation of bivalent?
1. Synapsis
2. Recombinase
3. Zygotene
4. Synaptonemal complex

35.

Statement - 1 : Respiration is amphibolic pathway.
Statement - 2 : Pure fat & pure protein can never be respiratory substrate.
Option :

1. Only second statement is correct.
2. Both statements are correct.
3. Neither first nor second is correct.
4. Only first statement is correct

36.

Read the following statements (A-D):-
(A) A neural signal reaching the neural muscular junction releases adrenalin.
(B) Many monomeric proteins called meromyosin constitute one thin filament.
(C) A complex protein troponin is distributed at irregular intervals on the tropomyosin.
(D) During shortening of muscle, the I-bands get reduced.

How many of the above statements are true?

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

37.

Match the following:-

(i) Fibrous Joint (a) Between two adjacent vertebrae.
(ii) Cartilaginous Joint (b) Between humerus and pectoral girdle.
(iii) Pivot Joint (c) Sutures.
(iv) Ball and Socket Joint (d) Between atlas and axis.

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

38.

Read the following statements :

A. Mouth is located ventrally.
B. Notochord is persistent throughout life.
C. Gill slits are seperate and with operculum.
D. Air bladder are absent.

How many of the above statements are correct for given figure :

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

39.

Read the following four statements (a-d) and select the option which includes all correct ones only :-
(a) Exchange of O_2 and CO_2 at alveoli and tissue occur by active transport.
(b) Long exposure to industrial dust leads to inflammation leading to fibrosis and thus causing serious lung damage.
(c) EICM and IICM are muscles actively involved in normal and forced breathing respectively.
(d) Spirometer is unable to find out the functional residual capacity and total lung capacity.

1. b, c and d
2. b and d
3. a, b and d
4. a, b, c and d

40.

The most abundant chemical in living organisms is -
1. Water.
2. Protein.
3. Carbohydrate.
4. Nucleic acid.

41.

Which of the following can alter respiratory mechanism?
1. Pneumotaxic centre in the pons region of the brain.
2. Chemosensitive area in the medulla.
3. Mid brain.
4. Both 1 and 2.

42.

Find out which one of the following statement is not correct with respect to gobar-gas plant?
1. It has a floating cover which keeps on rising as gas is produced
2. It is developed by IARI and KVIC
3. Main gas produced is butane, isobutene & propane
4. Spent slurry may be used as fertilizer

43.

In 1963, varieties such as Sonalika and Kalyan Sona were introduced in India. These varieties are of

1. Rice

2. Wheat

3. Mustard

4. Maize

44.

Select the wrongly matched pair

1. Predator - Herbivore.
2. Brood parasitism - Cuckoo.
3. Commensalism - Barnacles on the whale.
4. Mutualism - Sea anemone on a hermit crab.

45.

High aspartic acid, low nitrogen, and sugar content led to provide resistance against
1. Shoot borers in Okra
2. Jassids in Flat bean
3. Aphids in rapeseed
4. Stem borers in maize

46.

First action spectrum of photosynthesis was described by
1. Engelmann
2. Robert Hill
3. Sachs
4. Van Niel

47.

Select the correct match
1. Auxin – Promote seed dormancy
2. Cytokinin – Overcoming apical dominance
3. Ethylene – Bolting in beet
4. GA_3 – Thinning of cherry and walnut

48.

Calvin cycle (C_3 cycle)
1. Is a feature of all chloroplast containing cells in plants
2. Is the main sugar-producing cycle in C_3, C_4, and CAM plants
3. Has both oxidative and reductive reactions
4. Occurs in darkness only

49.

From the given statements which of the following statement(s) is/are incorrect for Annelida?
a. Pseudometameric segmentation present
b. Coelomic fluid acts as a hydrostatic skeleton
c. They possess longitudinal and circular muscles which help in locomotion
d. Neural system consists of paired ganglia connected by lateral nerves to a single ventral nerve chord

1. a & b only

2. b & c only

3. a only

4. a & d only

50.

Study the given statements -

i. A dehydration reaction (or condensation reaction) is the process in which water molecules are produced as a polymer is formed from monomers.

ii. The four main categories of macromolecules present in living systems are proteins, nucleic acids, carbohydrates, and lipids.

iii. Glucose is the main monosaccharide used by human cells for energy.

iv. The building blocks or monomers of nucleic acid molecules are called nucleosides.
How many statements are correct-?

1. i

2. ii

3. iii

4. iv

51.

The swollen base of semicircular canals contain projecting ridge is called –

1. Macula

2. Jacobson’s organ

3. Crista ampullaris

4. Organs of Corti

52.

Match column-I with column-II.

	Column-I		Column-II
(a)	Multiple alleles	(i)	Phenylketonuria in humans
(b)	Polygenes	(ii)	Blood groups in humans
(c)	Pleiotropy	(iii)	Skin color in human

1. a-ii, b-i, c-iii
2. a-ii, b-iii, c-i
3. a-iii, b-ii, c-i
4. a-i, b-iii, c-ii

53.

Sutton combined Cytological observation on meiotic cell division and Mendel's concept on inheritance to propose.

1. Laws of inheritance
2. Chromosomal theory of inheritance
3. Law of segregation
4. Law of sex determination

54.

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

	Microbe	Product	Application
(1)	Trichoderma polypore	Cyclosporin A	immuno-suppressive drug
(2)	Monascus purpureus	Statins	lowering of blood cholesterol
(3)	Streptococcus	Strepto-kinase	removal of clot from a blood vessel
(4)	Clostridium butylicum	Lipase	removal of oil stains

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

55.

The C - peptide is:-

1. Not present in proinsulin.
2. Present in mature insulin.
3. Removed during maturation of insulin.
4. Also present in artificial insulin.

56.

The impacts of the loss of biodiversity may lead to:-

(I) Lowered resistance to environmental perturbation.

(II) Decrease in plant production.

(III) Increase variability in ecosystem processes like water use, pest/disease cycle, plant productivity.

(IV) Increase in plant production.

Choose the correct option:-

1. I and II

2. I and IV

3. I and III

4. I, II, and III

57.

E-wastes are buried in ...A.. or ...B....

Complete the given statement by choosing the appropriate option for A and B:-

1. A-landfills; B-incinerated

2. A-open area; B-recycle

3. A-dumping zone; B-recycle

4. A-open area; B-incinerated

58.

What steps should be taken before the disposal of nuclear waste?

1. Nuclear waste should be pre-treated

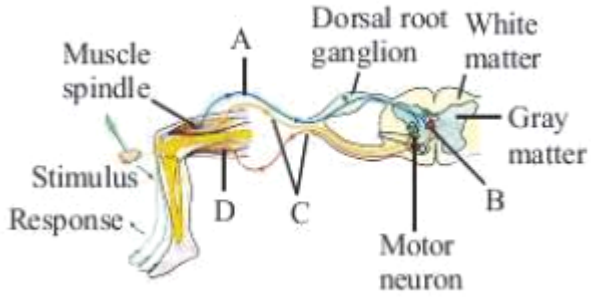
2. It should be stored in shielded containers

3. It should be buried about 500 m deep within the rock

4. All of the above

59.

Given below is a diagrammatic presentation of knee jerk reflex, select the option with correct identification of the structures labelled as A, B, C and D in the same:-



1. A-Afferent fibre, B-Interneuron, C-Sensory fibre
2. B-Interneuron, C-Efferent fibre, D-Receptor
3. A-Sensory fibre, C-Afferent fibre, D-Motor endplate (Effector)
4. A-Afferent fibre, B-Interneuron, D-Motor end plate (Effector)

60.

Find out the correct match for the following table.

Column-l	Column-ll	Column-lll
(i) Pituitary gland	Growth hormone	Acromegaly
(ii) Thyroid gland	Thyroxine	Exophthalmic goitre
(iii) Pituitary gland	ADH	Diabetes mellitus

1. (i) only

2. (i) and (ii)

3. (i) and (iii)

4. (ii) and (iii)

61.

Find out the correct match from the following table

	Column-I	Column-II	Column-III
(i)	Heart	Atrial natriuretic factor	Decreases blood pressure
(ii)	Kidney	Erythropoietin	Formation of RBC
(iii)	Gastro-intestinal tract	Gastrin	Induces gastric secretion

1. (ii) and (iii)
2. (i) and (iii)
3. (i) and (ii)
4. (i), (ii), and (iii)

62.

A hormone responsible for normal sleep-wake cycle is:-

1. epinephrine
2. gastrin
3. melatonin
4. insulin

63.

In the human being, chromosome 1 has ___A___ genes and Y has __B__ genes.

Select the option which correctly fills A and B.

1. A – 2968, B – 231
2. A – 231, B – 2968
3. A – 2168, B – 321
4. A – 321, B – 2168

64.

Find the correct mathematical expression for geometric growth resulting in a J-shaped population growth curve.

1. $\frac{dN}{dt} = rN$
2. $\frac{K-N}{K}$
3. $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
4. $\frac{dN}{dt} = rN\left(\frac{N-K}{N}\right)$

65.

Pioneer community on rocks is of

1. Phytoplanktons
2. Zooplanktons
3. Lichens
4. Herbs

66.

Which among the given taxa has the maximum number of species in the Amazonian rain forest?

1. Birds
2. Reptiles
3. Amphibians
4. Mammals

67.

Which of the following is an example of homologous organs?

1. Wings of butterfly and of birds
2. Eye of the Octopus and of mammals
3. Sweet potato and potato
4. Thorns of Bougainvillea and tendrils of Cucurbita

68.

Choose the incorrect match

1. Homo habilis – 650 - 800 cc
2. Homo erectus – 900 cc
3. Neanderthal man – 1000 cc
4. Cro-Magnon man – 1650 cc

69.

Double fertilization is exhibited by

1. Angiosperms
2. Gymnosperm
3. Algae
4. Bryophytes

70.

Column-I	Column-II
(i) Relaxin	(a) Maternity hormone
(ii) Prolactin	(b) Ovulation
(iii) Progesterone	(c) Parturition
(iv) LH	(d) Pregnancy hormone

1. $(i) \rightarrow (a), (ii) \rightarrow (c), (iii) \rightarrow (b), (iv) \rightarrow (d)$
2. $(i) \rightarrow (c), (ii) \rightarrow (d), (iii) \rightarrow (b), (iv) \rightarrow (a)$
3. $(i) \rightarrow (c), (ii) \rightarrow (b), (iii) \rightarrow (d), (iv) \rightarrow (a)$
4. $(i) \rightarrow (c), (ii) \rightarrow (a), (iii) \rightarrow (d), (iv) \rightarrow (b)$

71.

Select incorrectly matched pair.

1. Inferior ovary – Guava
2. Aestivation with unequal petals– Cotton sized petals
3. Polyadelphous condition – Citrus
4. Irregular flower – Canna

72.

80S ribosomes are found in

1. Cytoplasm of eukaryotes
2. Mitochondria
3. Chloroplast
4. Prokaryotes

73.

False statement about ‘Amniocentesis’ is

1. Foetal sex determination test based on the chromosomal pattern of cells in amniotic fluid surrounding the developing embryo
2. Amniotic fluid is withdrawn for analyzing fetal cells and dissolved substances
3. It can reveal genetic diseases, chromosomal abnormalities, and metabolic disorders
4. It can help the physician to test the fetus for eye color and cleft palate

74.

Which of the following is the incorrect match w.r.t ART?

1. ZIFT: Zygote or early embryo upto eight blastomeres is transferred into the
fallopian tubes.
2. IUT: Embryo with more than eight blastomeres is transferred into the
uterus
3. GIFT: Transfer of an ovum after fertilization into the fallopian tube of another female who cannot produce her own ova.
4. ICSI: A specialized procedure to form an embryo in the laboratory in which the sperm is injected into the ovum.

75.

Which group of three of the following statements A to E contains all correct statements w.r.t. Kwashiorkor?

A. Caused mainly by deficiency of proteins.

B. Fat is not left under the skin.

C. Extensive oedema and swelling of the body parts.

D. Is found in a child more than one year of age.

E. Extreme emaciation and thinning of limbs occur.

1. A, C and E
2. A, C and D
3. B, D and E
4. C, D and E

76.

What induces the completion of the meiotic division of the secondary oocyte?

1. Contact of the sperm with the zona pellucida layer of ovum

2. Entry of the sperm into the cytoplasm of the ovum through the zona pellucida and the plasma membrane

3. Fast block to polyspermy

4. Release of sperms by the penis into the vagina of female

77.

Type of junction that allows adjacent cells to remain connected cytoplasmically and occur at intercalated discs are

1. Adhering junctions

2. Tight junctions

3. Gap junctions

4. Interdigitations

78.

The dikaryotic condition is represented as

1. 2n

2. 3n

3. n

4. n + n

79.

Which of the following is not correct about lichens?

1. Lichens are dual organism containing phycobiont and mycobiont

2. They cannot grow in the presence of sulphur dioxide

3. They grow very fast

4. They often grow in most inhospitable places such as barren rocks

80.

Find the odd one w.r.t. the fungi imperfecti

1. Alternaria

2. Colletotrichum

3. Trichoderma

4. Penicillium

81.

Prop roots and stilt roots are found respectively in

1. Rhizophora and turnip

2. Banyan and maize

3. Potato and zaminkand

4. Pistia and Eichhornia

82.

Identify the wrong statement in the context of cork cambium

1. Cork cambium is also called phellogen

2. Cork cambium is usually developed from the secondary xylem

3. Outer cells of phellogen differentiate into cork

4. Inner part of phellogen leads to the formation of phelloderm

83.

Select the incorrect match w.r.t. group of animals and their taxon

1. Ichthyophis, Bufo, Hyla – Amphibia

2. Hippocampus, Exocoetus, – Osteichthyes Pterophyllum

3. Corvus, Chelone, Calotes – Reptilia

4. Pteropus, Equus, – Mammalia Delphinus

84.

Hilum represents the junction between

1. Funicle and nucellus

2. Ovule and funicle

3. Chalaza and funicle

4. Funicle and micropyle

85.

Choose odd one w.r.t. crop variety produced through conventional breeding for insect pest resistance

1. Pusa Sawani

2. Pusa Gaurav

3. Pusa Lerma

4. Pusa Sem 2

86.

Complete the analogy by choosing the correct option.

Typhoid : Widal test : : HIV : _____

1. VDRL test
2. Schick test
3. ELISA test
4. Mantoux test

87.

Presence of which of the following features make(s) the RNA less stable as compared to
DNA?

(a) Free 2' OH

(b) Single ringed nitrogenous base

(c) Uracil in place of 5-methyl uracil

1. (a) and (c)
2. (a) and (b)
3. (b) and (c)
4. (c) only

88.

During the process of gel electrophoresis DNA moves towards the _A_ of the electrophoretic chamber as it has _B_ charge.
Choose the option that fills the blanks correctly.

	A	B
1.	Cathode	Positive
2.	Cathode	Negative
3.	Anode	Positive
4.	Anode	Negative

89.

Ketonuria : Ketone bodies in urine : : Uremia : _____.
Complete the analogy.

1. Elevated urea in circulating blood
2. Excretion of urea in urine
3. Deposits of uric acid in bones
4. Failure of urea production by liver

90.

Which of the following represents the fluid-filled space between lens and cornea of the human eye?

1. Cerebrospinal fluid
2. Synovial fluid
3. Vitreous humor
4. Aqueous humor

91.

Which transition of electron in the hydrogen atom emits maximum energy:

1. $2 \rightarrow 1$
2. $1 \rightarrow 4$
3. $4 \rightarrow 3$
4. $3 \rightarrow 2$

92.

The outer electron configuration of Gd (Atomic no. 64) is:

1. $4f^3\ 5d^5 6d^2$
2. $4f^8\ 5d^{10} 6d^2$
3. $4f^4\ 5d^4 6d^2$
4. $4f^7\ 5d^1 6s^2$

93.

For a given reaction, presence of catalyst reduces the energy of activation by 2 kcal at 27˚C. The rate of reaction will be increased by:

1. 20 times
2. 14 times
3. 28 times
4. 2 times

94.

The best method to prepare cyclohexene from cyclohexanol is by using:

1. conc. HCl + $ZnCl_2$
2. conc. H_3PO_4
3. HBr
4. conc. HCl

95.

Which one of the elements has the highest ionization energy?

1. $[Ne]3s^2 3p^1$

2. $[Ne]3s^2 3p^2$

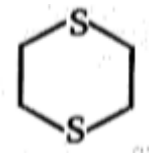
3. $[Ne]3s^2 3p^3$

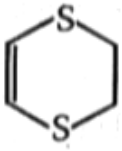
4. $[Ar]3d^{10} 4s^2 4p^2$

96.

1-2-dichloro ethane + $NaSCH_2CH_2SNa \rightarrow P\ (C_4H_8S_2)$

Unknown product (p) of the above reaction is:

1. 

2. 

3. $H-S-CH=CH-CH=CH-S-H$

4. $H-CH=CH-CH_2-S-H$

97.

For the reaction,

$$CH_3\underset{\underset{X}{|}}{CH}\cdot CH_2CH_3 \xrightarrow[475K]{H_2SO_4} \begin{cases} \rightarrow CH_3-CH=CH-CH_3 \\ \rightarrow CH_2=CH\cdot CH_2\cdot CH_3 \end{cases}$$

1. CH_3-CH=CH-CH_3 predominates

2. CH_2=CH-CH_2-CH_3 predominates

3. both are formed in equal amounts

4. the product ratio is dependent on the halogen X

98.

Common oxidizing agents used in organic chemistry are;

1. Fenton's reagent

2. osmium tetroxide

3. acidified $KMnO_4$

4. all are correct

99.

Which of the following is optically active?

1. Glycerine

2. Acetaldehyde

3. Glyceraldehyde

4. Ketone

100.

Which of the following reactions is appropriate for converting acetamide to methanamine ?

1. Carbylamine reaction

2. Hoffmann bromamide reaction

3. Stephens reaction

4. Gabriels phthalimide synthesis

101.

Find the order of the reaction if half-life is independent of its initial concentration.

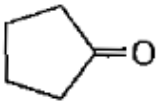
1. zero

2. first

3. second

4. more than zero but less than first

102.

Treatment of cyclopentanone  with methyl lithium gives which of the

following species?

1. Cyclopentanonyl anion

2. Cyclopentanonyl cation

3. Cyclopentanonyl radical

4. Cyclopentanonyl biradical

103.

Which of the following is not true ?

1. A 0.2% solution of phenol is an antiseptic while 1 % solution acts as a disinfectant

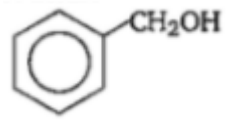
2. Chlorine and iodine are used as strong disinfectants

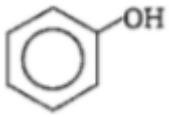
3. Dilute solutions of boric acid and hydrogen peroxide, are strong antiseptics

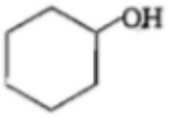
4. Disinfectants harm the living tissues

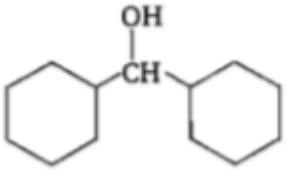
104.

Which one of the following is most acidic?

1. 

2. 

3. 

4. 

105.

What is the molality of the solution of a certain solute in a solvent if there is a freezing point depression of 0.184° and if the freezing point constant is 18.4 K kg mol^{-1}

1. 0.01
2. 1.00
3. 0.001
4. 100

106.

When enthalpy and entropy change for a chemical reaction are

-2.5×10^3 *cal* and 7.4 *cal* deg^{-1} respectively. Predict the reaction at 298 *K* is

1. Spontaneous
2. Reversible
3. Irreversible
4. Non-spontaneous

107.

The possible geometric isomers shown by $[Co(en)Br_2\,Cl_2]^-$ is :

1. 2
2. 3
3. 4
4. 6

108.

A substance gives off O_2 when heated, turns an acid solution of KI violet, and reduces acidified $KMnO_4$. The substance is –

1. SO_3
2. KNO_3
3. H_2O_2
4. All of these

109.

Which of the following statements is correct for the spontaneous adsorption of a gas ?

1. ΔS is negative and therefore, ΔH should be highly positive
2. ΔS is negative and therefore, ΔH should be highly negative
3. ΔS is positive and therefore, ΔH should be negative
4. ΔS is positive and therefore, ΔH should also be highly positive

110.

Which of the following is least likely to behave as Lewis base?

1. NH_3
2. BF_3
3. OH^-
4. H_2O

111.

An element crystallizes in a structure having FCC unit cell of an edge length 200 pm. If 200 g this element contains 24 x 10^{23} atoms, the density of the element is

1. 50.3 g/cc
2. 63.4 g/cc
3. 41.6 g/cc
4. 34.8 g/cc

112.

Which of the following is the most likely structure of $CrCl_3.6H_2O$, if $\frac{1}{3}$rd of total chlorine of the compound is precipitated by adding $AgNO_3$ to its aqueous solution :

1. $CrCl_3.6H_2O$
2. $[Cr(H_2O)_3Cl_3](H_2O)_3$
3. $[CrCl_2(H_2O)_4]Cl.2H_2O$
4. $[CrCl.(H_2O)_5]Cl_2.H_2O$

113.

Monomer of natural rubber is

1. 1, 3-butadiene
2. Isoprene
3. Styrene
4. Chloroprene

114.

Which of the follwoing is the most powerful oxidizing agent ?

1. F_2
2. Cl_2
3. Br_2
4. I_2

115.

At room temperature, the average speed of Helium is higher than that of Oxygen by a factor of

1. $2\sqrt{2}$
2. $6/\sqrt{2}$
3. 8
4. 6

116.

Following limiting molar conductivities are given as

$\lambda_m^0\left(H_2SO_4\right) = x\ Scm^2\ mol^{-1}$

$\lambda_m^0\left(K_2SO_4\right) = y\ Scm^2\ mol^{-1}$

$\lambda_m^0\left(CH_3COOK\right) = z\ Scm^2\ mol^{-1}$

$\lambda_m^0\left(in\ Scm^2\ mol^{-1}\ \right)\ for\ CH_3COOH$ will be-

1. $x - y + 2z$
2. $x + y + z$
3. x-y+z
4. $\frac{(x-y)}{2} + z$

117.

Which of the following is paramagnetic?

1. N_2
2. H_2
3. Li_2
4. O_2

118.

In water-saturated air, the mole fraction of water vapor is 0.02. If the total pressure of the saturated air is 1.2 atm, the partial pressure of dry air is-

1. 1.17 atm
2. 1.76 atm
3. 1.27 atm
4. 0.98 atm

119.

Glucose$\xrightarrow{HCN}\xrightarrow{Hydrolysis}\xrightarrow{HI,\ heat} A,\ A\ is$

1. heptanoic acid
2. 2-iodohexane
3. heptane
4. heptanol

120.

Which is true about the ionic radius of M^{2+}?

1. $Ni^{2+}<Cu^{2+}<Zn^{2+}$

2. $Ni^{2+}>Cu^{2+}>Zn^{2+}$

3. $Cu^{2+}<Ni^{2+}<Zn^{2+}$

4. $Zn^{2+}<Ni^{2+}<Cu^{2+}$

121.

The specific conductance of 0.01 M solution of the weak monobasic acid is 0.20 x 10^{-3} S cm^{-1}. The dissociation constant of the acid is ?-[given A^{∞}_{HA} = 400 S cm^2 mol^{-1}]

1. 5×10^{-2}

2. 2.5×10^{-5}

3. 5×10^{-4}

4. 2.2×10^{-11}

122.

Which of the strong oxidizing agent among the following?

1. Tl^{3+}

2. Ga^{3+}

3. In^{3+}

4. Al^{3+}

123.

Consider the reaction: $N_2 + 3H_2 \rightarrow 2\,NH_3$ carried out at constant temperature and
pressure. If ΔH and ΔU are the enthalpy and internal energy changes for the

reaction, which of the following expressions is true?

1. ΔH = 0

2. ΔH = ΔU

3. ΔH <ΔU

4. ΔH > ΔU

124.

Which of the following configuration show outer transition element:-

1. $[Rn]7s^2$
2. $[Xe]4f^7 5d^1 6s^2$
3. $[Xe]5d^1 6s^2$
4. $[Rn]5f^7 6d^1 7s^2$

125.

Identify the correct statement from the following :

1. Blister copper has blistered appearance due to evolution of CO_2

2. Vapour phase refining is carried out for Nickel by Van Arkel method

3. Pig iron can be moulded into a variety of shapes

4. Wrought iron is impure iron with 4% carbon

126.

Find the number of valence electrons present in 0.53 grams of Na_2CO_3.

1. 3.01×10^{23}

2. 7.22×10^{22}

3. 12.046×10^{23}

4. 6.023×10^{23}

127.

The volume of CO_2 released at STP on heating 9.85 g of $BaCO_3$ on complete decomposition (atomic mass, Ba=137) will be

1. 1.12 L

2. 4.84 L

3. 2.12 L

4. 2.06 L

128.

The maximum number of 90° angles between bond pair-bond pair of electrons is observed in

1. $sp^3 d^2$ hybridization

2. $sp^3 d$ hybridization

3. sp^3 hybridization

4. dsp^2 hybridization

129.

The ratio of the wavelengths of the last lines of the Balmer and Lyman series is-

1. 4:1

2. 27:5

3. 3:1

4. 9:4

130.

Which set of oxide of nitrogen is paramagnetic in nature?

1. NO, N_2O

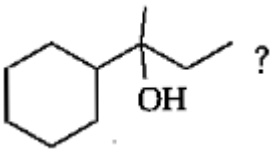
2. NO_2, NO, N_2O

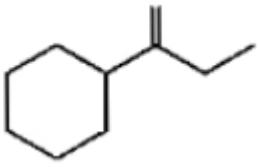
3. NO,NO_2

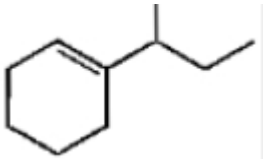
4. N_2O,NO_2

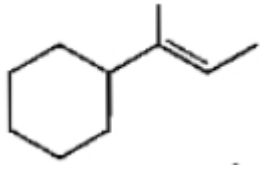
131.

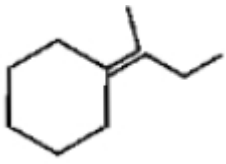
Which of the following is not the product of dehydration of



1. 

2. 

3. 

4. 

132.

Which of the following reactions will not result in the formation of carbon-carbon bonds ?

1. Reimer-Tiemann reaction

2. Cannizaro reaction

3. Wurtz reaction

4. Friedel-Crafts acylation

133.

Which of the following oxides is most acidic in nature?

1.Na_2 O

2. MgO

3.SiO_2

4. Cl_2 O_7

134.

Soil erosion can be prevented by

1. Overgrazing

2. Removal of vegetation

3. Afforestation (Plantation)

4. Increasing bird population

135.

Why actinoids show more number of oxidation state than lanthanoids?

1. 4f- orbitals more diffused than the 5f-orbitals

2. Lesser energy difference between 5f and 6d than between 4f and 5d orbitals

3. More energy difference between 5f and 6d than between 4f and 5d orbitals

4. More reactive nature of the actinoids than the lanthanoids.

136.

The energy equivalent of one atomic mass unit is [1992]

1. $1.6 \times 10^{-19}\ J$

2. $6.02 \times 10^{23}\ J$

3. 931 MeV

4. 9.31 MeV

137.

A soldier is firing 20 bullets per second from his gun having a muzzle speed of 150 m/s. The mass of each bullet is 50 g. If they strike the wall and rebound with the same speed, then the force on the wall is:

1. 75 N
2. 150 N
3. 300 N
4. 600 N

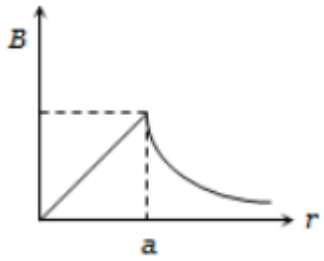
138.

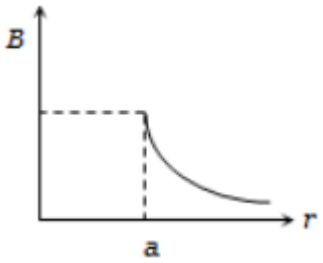
Two lines of force due to a bar magnet

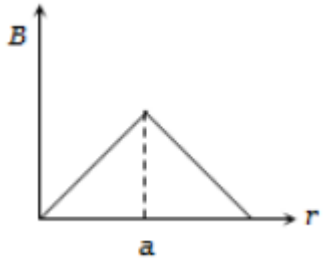
1. Intersect at the neutral point
2. Intersect near the poles of the magnet
3. Intersect on the equatorial axis of the magnet
4. Do not intersect at all

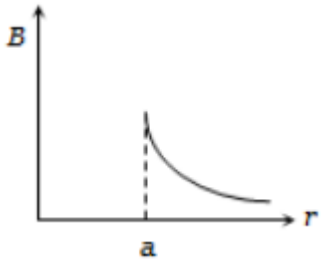
139.

The magnetic field due to a straight conductor of uniform cross-section of radius 'a' carrying steady current is represented by-

1. 

2. 

3. 

4. 

140.

Two thin long parallel wires separated by a distance *'d'* carry current '*i*' in the same direction. They will

1. Attract each other with a force of $\mu_0 i^2/\left(2\pi \mathrm{d}^2\right)$
2. Repel each other with a force of $\mu_0 i^2/\left(2\pi \mathrm{d}^2\right)$
3. Attract each other with a force of $\mu_0 i^2/(2\pi \mathrm{d})$
4. Repel each other with a force of $\mu_0 i^2/(2\pi \mathrm{d})$

141.

Three masses are placed on the x-axis: 300 g at origin, 500 g at x= 40 cm and 400 g at x=70 cm. The distance of the center of mass from the origin is

1. 40 cm
2. 45 cm
3. 50 cm
4. 30 cm

142.

Ray diverging from a point source forms a wavefront that is -

1. Cylindrical
2. Spherical
3. Plane
4. Cubical

143.

A man pushes a wall and fails to displace it. He does:
1. Negative work
2. Positive but not maximum work
3. No work at all
4. Maximum work

144.

The second law of thermodynamics states that in a cyclic process

1. Work cannot be converted into heat
2. Heat cannot be converted into work
3. Work cannot be completely converted into heat
4. Heat cannot be completely converted into work

145.

The following four wires (length L and diameter D) are made of the same material. Which of these will have the largest extension when the same tension is applied?

1. L=50 cm, D=0.5 mm
2. L=100 cm, D=1 mm
3. L=200 cm, D=2 mm
4. L=300 cm, D=0.5 mm

146.

A sphere rolls down without slipping on an inclined plane from a point at vertical height h. The speed of the centre of mass of the sphere when it reaches the bottom is:

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

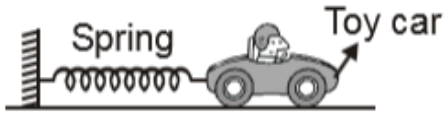
147.

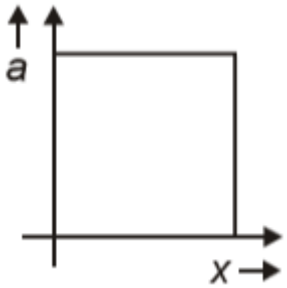
How many NAND gates are used to form AND gate?

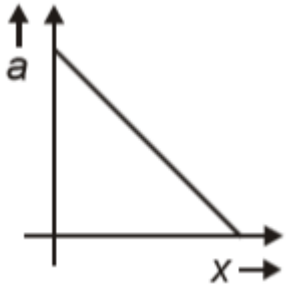
1. 1
2. 2
3. 3
4. 4

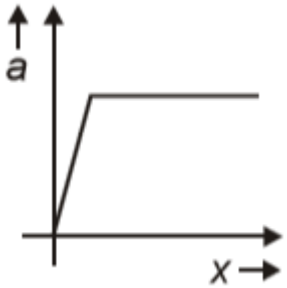
148.

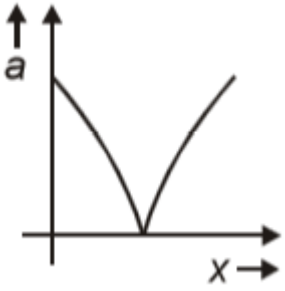
A light spring is compressed and placed horizontally between a vertical fixed wall and a toy car-free to slide over a smooth horizontal table. If the system is released from rest, which graph best represents acceleration 'a' and distance 'x' covered by the car?



1.


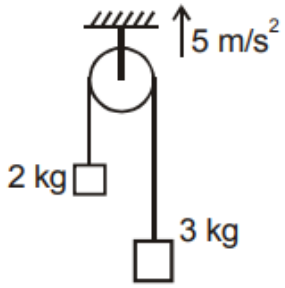
2.


3.


4.


149.

Two blocks of masses 2 kg and 3 kg are tied at the ends of a light inextensible string passing over a frictionless pulley as shown.

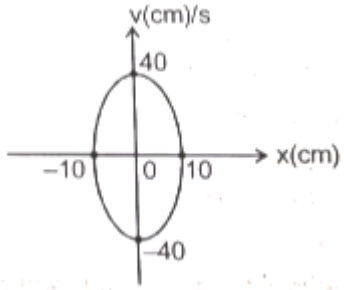


If the system is accelerating upward with acceleration $5\ \mathrm{m/s^2}$, the tension in the string is:

1. 24 N
2. 36 N
3. 48 N
4. 18 N

150.

The plot of velocity (v) versus displacement (x) of a particle executing simple harmonic motion is shown in figure. The time period of oscillation of the particle is :-



1. $\frac{\pi}{2}s$
2. π s
3. $2\pi\ s$
3. $3\pi\ s$

151.

The frequency 1057 MHz of radiation arising due to electron transition between two close energy levels in hydrogen belongs to

1. radio waves
2. infrared waves
3. micro waves
4. γ-rays

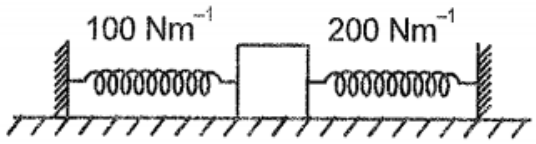
152.

A wheel is at rest. Its angular velocity increases uniformly and becomes 80 rad/s after 5 s. The total angular displacement is:

1. 800 rad
2. 400 rad
3. 200 rad
4. 100 rad

153.

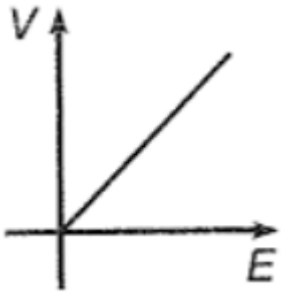
A mass of 30 g is attached with two springs having spring constants 100 N/m and 200 N/m and other ends of springs are attached to rigid walls as shown in the given figure. The angular frequency of oscillation is- (Ground is smooth)

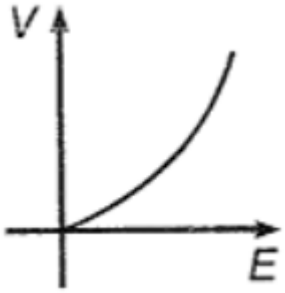


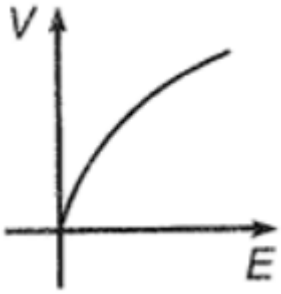
1. $\frac{100}{2\pi}$ rad/s
2. $\frac{100}{\pi}$ rad/s
3. 100 rad/s
4. 200π rad/s

154.

If E and V are electric field and electric potential respectively due to a point charge, then which of the following graph best represents their variation?

1. 

2. 

3. 

4. 

155.

If R and L are resistance and inductance of a choke coil and f is the frequency of current through it, then the average power of the choke coil is proportional to

1. R
2. $\frac{1}{f^2}$
3. $\frac{1}{L^2}$
4. $All\ of\ these$

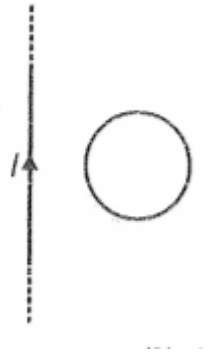
156.

A coil has 500 turns and the flux through the coil is ϕ = $3t^2$+4t+9 milliweber. The magnitude of induced emf between the ends of the coil at t = 5 s is

1. 34 millivolt
2. 17 volt
3. 17 millivolt
4. 34 volt

157.

A long straight conductor carrying current I is fixed on a smooth plane. A circular loop is placed on the same plane as shown in the figure. If the current I through the wire is increasing, then the loop will move to:



1. Right
2. Left
3. Up
4. Down

158.

The potential energy of a particle of mass 1 kg free to move along the X-axis is given by $U(x) = \left(3x^2 - 4x + 6\right)$ J. Force acting on the particle at x = 0 is:

1. $2\hat{i}$ N
2. $-4\hat{i}$ N
3. $5\hat{i}$ N
4. $4\hat{i}$ N

159.

The absolute zero temperature on Fahrenheit scale is (approximately)

1. $-273^{\circ}\mathrm{F}$
2. $-32^{\circ}\mathrm{F}$
3. $-460^{\circ}\mathrm{F}$
4. $-132^{\circ}\mathrm{F}$

160.

The electric field calculated by Gauss's law is the field due to the charges which

1. Lie inside the Gaussian surface
2. Lie outside the Gaussian surface
3. Lie on the surface of the Gaussian surface
4. Lie either inside, outside, or on the Gaussian surface

161.

Two ideal gases have the same number of molecules per unit volume and the radii of their molecules are r and 3*r* respectively. The ratio of their mean free path in identical containers will be:

1. 3: 1
2. 9: 1
3. 1: 1
4. 1: 4

162.

A wire has resistance 2Ω. Now it is stretched so that its radius become half of its initial radius. New resistance of wire is-

1. 4 Ω
2. 16 Ω
3. 32 Ω
4. 8 Ω

163.

The maximum value of gravitational potential energy can be

1. Zero
2. - 1
3. + 1
4. Infinity

164.

Two heater coils of rating (100 W, 200 V) and (150 W, 200 V) are connected in series to 200 V source. Power consumed by them is

1. 60 W
2. 250 W
3. 125 W
4. 120 W

165.

Which of the following is correct about transistor in active region ?

1. Base-emitter junction in forward biased
2. Base-collector junction in reverse biased
3. Emitter is heavily doped
4. All of these

166.

The equivalent capacitance for two capacitors connected in parallel is given by $\mathrm{C_{eq}} = \mathrm{C_1} + \mathrm{C_2}$. If $\mathrm{C_1} = (30 \pm 2)\ \mu\mathrm{F}$ and $\mathrm{C_2} = (60 \pm 4)\ \mu\mathrm{F}$, then the equivalent capacitance can be written as

1. $(90 \pm 6)\ \mu\mathrm{F}$
2. $(20 \pm 6)\ \mu\mathrm{F}$
3. $(20 \pm 1)\ \mu\mathrm{F}$
4. $(90 \pm 2)\ \mu\mathrm{F}$

167.

When light of wavelength 400 nm falls on a photoelectric emitter, photoelectrons are just emitted. For another emitter, 600 nm is sufficient for liberating photoelectrons. The ratio of work functions is-

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

168.

The amount of work to be done to form a soap bubble of radius R is: (S = surface tension of soap bubble]

1. $8\ \pi \mathrm{R}^2 \mathrm{S}$
2. $\frac{3}{2}\ \pi \mathrm{R}^2 \mathrm{S}$
3. $24\ \pi \mathrm{R}^2 \mathrm{S}$
4. $4\ \pi \mathrm{R}^2 \mathrm{S}$

169.

A boy runs on a circular track of radius R (in km) with the speed of $\frac{\pi \mathrm{R}}{2}$ km/h in the clockwise sense for 3 h and then with $\pi \mathrm{R}$ km/h in the anticlockwise sense for 1 h. The magnitude of his displacement will be :

1. $\frac{\pi \mathrm{R}}{2}$
2. $\frac{\mathrm{R}}{\sqrt{2}}$
3. $\frac{3\pi \mathrm{R}}{2}$
4. $\sqrt{2}\mathrm{R}$

170.

The speed of water in a river is 4 km/h and a man can swim at 5 km/h. The minimum time taken by the man to cross the river of width 200 m is:

1. $\frac{1}{5}$ h
2. $\frac{1}{25}$ h
3. $\frac{1}{15}$ h
4. $\frac{1}{20}$ h

171.

The displacement (x) of a point moving in a straight line is given by $\mathrm{x} = 8\mathrm{t}^2 - 4\mathrm{t}$. Then the velocity of the particle is zero at:

1. 0.4 s
2. 0.25 s
3. 0.5 s
4. 0.3 s

172.

A transverse harmonic wave on a string is described by $y(x,t) = 3.0 \sin\left(36t + 0.018x + \frac{\pi}{4}\right)$ where x and y are in cm and t in sec. The positive direction of x is from left to right.

What is the least distance between two successive crests in the wave?

1. 1.3 m
2. 3.0 m
3. 2.5 m
4. 3.5 m

173.

α-particle consists of:

1. 2 protons only
2. 2 protons and 2 neutrons only
3. 2 electrons, 2 protons, and 2 neutrons
4. 2 electrons and 4 protons only

174.

The wave nature of electrons was experimentally verified by,

1. de Broglie
2. Hertz
3. Einstein
4. Davisson and Germer

175.

An object is placed at a distance of *f*/2 from a convex lens. The image will be:

1. At one of the foci, virtual and double of its size
2. At 3*f*/2, real and inverted
3. At 2*f*, virtual and erect
4. At *f*, real and inverted

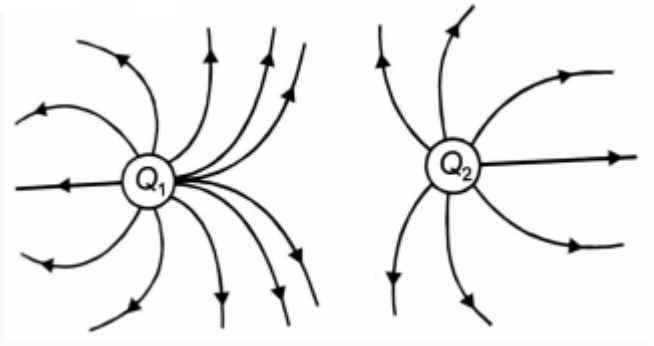
176.

Which of the following phenomenon of light forms a rainbow?

1. Reflection of light
2. Refraction
3. Total internal reflection
4. Both 2 and 3

177.

The figure shows electric lines of forces due to charges Q_1 and Q_2. Hence,



1. Q_1 and Q_2 both are negative.

2. Q_1 and Q_2 both are positive.

3. $Q_1 > Q_2$

4. Both (2) and (3)

178.

If 50 joule of work must be done to move an electric charge of 2 C from a point where the potential is -10 volt to another point where the potential is V volt, then the value of V is:

1. 5 V

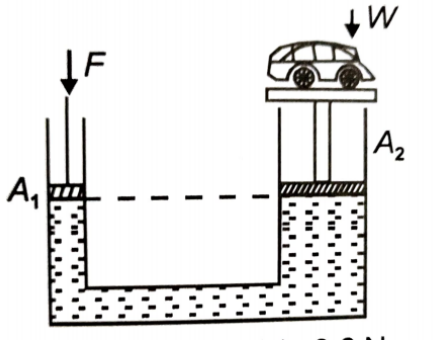
2. -15 V

3. +15 V

4. +10 V

179.

In a hydraulic jack as shown, mass of the car W=800 kg, $A_1 = 10\ cm^2$, $A_2 = 10\ m^2$. The minimum force F required to lift the car is-



1. 1 N

2. 0.8 N

3. 8 N

4. 16 N

180.

In thermodynamics, the Zeroth law is related to:

1. Work done

2. Thermal equilibrium

3. Entropy

4. Diffusion

Fill OMR Sheet