Botany - Section A

1.

Very small animals are rarely found in polar region mainly because:

1. Smaller animals have a relatively slower heart rate

2. Smaller animals have a more surface area relative to their volume

3. Smaller animals are invariably herbivores

4. Smaller animals rely on diffusion for exchange of gases with the environment

2.

Genetic information in a DNA molecule is coded in the:

1. Sequence of nucleotides

2. Base pairings

3. Proportion of each base present

4. The turning pattern of the helix

3.

Which of the following would not be a feature seen in a patient with the following karyotype ?

1. Many loops on finger tips

2. Congenital heart disease

3. Big and wrinkled tongue

4. Mucus clogging of airways

4.

Consider the following statements:
I. India's share of the global species diversity is 8.1% approximately.
II. Two ecological hot spots of the world cover our bio-diversity regions.
III. The Amazon rain forest has the greatest biodiversity on Earth.
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

5.

Read the following statements :-

(A) Desert lizard lack physiological ability that mammals have to deal with high temperature of their habitat.
(B) Kangaroo rat has the ability to concentrate its urine.

1. Only (A) is correct
2. Both statements are incorrect
3. Only (B) is correct
4. Both statements are correct

6.

During secondary treatment, major part of activated sludge is pumped into tanks called

1. Aerobic sludge digesters.

2. Anaerobic sludge digesters.

3. Primary sludge digesters.

4. Settling tanks.

7.

Few chromosome have non-staining secondary constrictions at a constant location, also known as :-

1. Cristae

2. Satellite

3. Kinetochores

4. Hub

8.

Development of the zygotes into young embryo takes within the female gametophytes in

1. Adiantum.

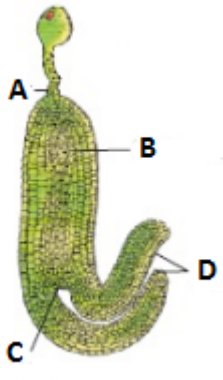
2. Selaginella.

3. Riccia.

4. Batrachospermum.

9.

What functions as the embryonic root of the plant?



(1) A

(2) B

(3) C

(4) D

10.

Transcriptionally active chromatin is termed as:
1. Heterochromatin

2. Euchromatin

3. Prechromatin

4. Prochromatin

11.

Which of the following floral features is not represented by symbols in a floral formula of a plant family?
1. Relative positions of ovary w.r.t. other parts.
2. Adhesion of stamens.
3. Aestivation of calyx and corolla
4. Symmetry of flower.

12.

"The synaptonemal complex is formed during _A_ stage and dissolves during _B_ stage".
Complete the above statement by choosing the correct option for A and B

	A	B
1.	Diplotene	Diakinesis
2.	Leptotene	Zygotene
3.	Zygotene	Diplotene
4.	Pachytene	Diplotene

13.

Select the correct sequence of taxonomic categories of Mango in ascending order

1. Mangifera → Anacardiaceae → Dicotyledonae → Sapindales → Angiospermae.

2. Mangifera → Anacardiaceae → Sapindales → Dicotyledonae → Angiospermae.

3. Angiospermae → Dicotyledonae → Sapindales → Anacardiaceae → Mangifera.

4. Angiospermae → Sapindales → Anacardiaceae → Dicotyledonae → Mangifera.

14.

Consider the following statements regarding DNA fingerprinting:

i. The technique was initially developed by Alec Jeffreys.

ii. Hybridisation using labeled VNTR probe.

iii. Sensitivity of the technique has been increased by the use of PCR.

iv. Sequences used for DNA fingerprinting generally code for many proteins.

v. Monozygotic twins have identical DNA fingerprints.

1. All statements are correct

2. Only '4' is incorrect

3. 4 and 5 are incorrect

4. 1, 3, 4, and 5 are correct

15.

The continuous excretion of watery substance from stump of a well-watered potted plant after cutting off the shoot slightly above the base is due to

1. root pressure
2. guttation
3. transpiration
4. imbibitions

16.

Which among the following characteristics confers stability to the DNA helical structure?

i. Presence of Uracil.

ii. Plane of one base pair stacking over the other in DNA helix.

iii. Left handed fashion coiling of DNA helix.

iv. Presence of hydrogen bonds.

1. i and ii
2. ii and iii
3. iii and iv
4. ii and iv

17.

Match the Column I with Column II –

	Column-I		Column-II
1.	Terminalization of chiasmata	A.	Zygotene
2.	Synapsis	B.	Diplotene
3.	Crossing over	C.	Metaphase I
4.	Dissolution of synaptonemal complex	D.	Diakinesis
5.	Best stage for the study of chiasmata	E.	Pachytene
6.	Nuclear membrane and nucleolus disappear		
7.	Tetrads are arranged on equatorial line		

1. A – 2, B – 4,5, C – 7, D – 1,6, E – 3
2. A – 2, B – 3, C – 7, D – 1, 4, 6, E – 5
3. A – 2, B – 7, C – 3, D – 1, 4, 5, E – 6
4. A – 2, B – 1, C – 4, D – 5, 3, E – 6

18.

RQ of tripalmitin is

1. $\frac{6\,CO_2}{6O_2}$
2. $\frac{102\,CO_2}{145O_2}$
3. $\frac{2\,CO_2}{\text{Zero }O_2}$
4. $\frac{4\,CO_2}{1O_2}$

19.

Which of the following is not correctly matched?

PGR	Function
1. Auxin	Flowering in mango.
2. ABA	Dormancy of seed.
3. GA3	Breaking seed dormancy.
4. Ethylene	Sprouting of potato.

20.

Alignment of bivalent chromosomes on the equatorial plate and splitting of centromeres occur respectively in which of the following stages of cell division?

1. Anaphase I and anaphase II.
2. Metaphase II and anaphase I.
3. Metaphase I and anaphase II.
4. Pachytene and telophase I.

21.

Regeneration of damaged growing grass following grazing is largely due to :

1. Lateral meristem
2. Apical meristem
3. Intercalary meristem
4. Secondary meristem

22.

Which one of the following may require pollinators, but is genetically similar to autogamy?

1. Xenogamy
2. Apogamy
3. Cleistogamy
4. Geitonogamy

23.

In fungi, asexual reproduction takes place by

1. Fission, conidia and ascospores
2. Conidia, hypnospores and zoospores
3. Conidia, sporangiospores and zoospores
4. Sporangiospores, conidia and basidiospores

24.

At low light condition, which of the following plants respond to high CO_2 conditions ?

1. Only C_3 plants
2. Only C_4 plants
3. Neither C_3 nor C_4 plants
4. Both $C_3 and$ C_4 plants

25.

Mendel published his work on inheritance of characters in 1865 but it remained unrecognised till 1900 because :-

(a) He could not provide any physical proof for the existence of factors
(b) His concept of factors as stable, discrete units that controlled the expression of traits did not find acceptance from the contemporaries
(c) Mendel's approach of using mathematics to explain biological phenomena was totally old
(d) Communication was not easy (as it is now)

1. (a), (b) & (c) are correct
2. (c) & (d) are correct
3. (a), (b) & (d) are correct
4. Only (a) is correct

26.

Some stages of development of dicot embryo are given below :-

a. Proembryo

b. Globular stage

c. Heart shape

d. Mature embryo

Arrange the given stages in correct sequence?

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

27.

The edible part of the carrot is a modified:-

1. Adventitious root
2. Underground stem
3. Fibrous root
4. Tap root

28.

In which compounds does sucrose is broken by Enzyme Invertase?

1. Glucose and galactose
2. Galactose and Fructose
3. Manose and glucose
4. Glucose and Fructose

29.

Which of the following is not true for amoeboid protozoan?

1. Pseudopodia helps in feeding
2. Silica shells present in marine form
3. Contractile vacuole
4. Flagella helps in locomotion

30.

Acid hydrolases enzymes are found in

1. RER
2. Golgi apparatus
3. Lysosomes
4. SER

31.

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

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

32.

How many properties are associated with active transport?

a. Requires special membrane proteins

b. Highly selective in nature

c. Transport saturates

d. Requires ATP as source of energy

e. Responds to protein inhibitors

1. a, b, c, d only
2. b, c, d, e only
3. a, c, d, e only
4. All a, b, c, d, e

33.

The total number of pure lines prepared by Mendel for his hybridization experinent in garden pea plant for seven characters were

1. 7
2. 14
3. 2
4. 22

34.

Which of the following cannot be a biofertiliser?

1. Cyanobacteria
2. Fungi
3. Viruses
4. Bacteria

35.

Mark the odd one (w.r.t internal factors affecting photosynthesis)

1. Amount of chlorophyll
2. Light intensity
3. Mesophyll cells
4. Orientation of leaves

Botany - Section B

36.

For each ATP produced, how many H passes through F_0 from the intermembrane space to the matrix down the electrochemical proton gradient?

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

37.

Population density will increase if

1. Number of births and number of deaths increase.
2. Number of births and number of immigrants is high.
3. Number of immigrants and number of deaths is high.
4. Number of births and number of immigrants is low.

38.

Term ‘biodiversity’ was popularized by

1. Robert May
2. Edward wilson
3. Paul Ehrlich
4. C. Mobius

39.

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

40.

Vernalisation stimulates flowering in

1. Zamikand
2. Turmeric
3. Carrot
4. Ginger

41.

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.

42.

Centromere is situated at the end in
1. Telocentric chromosome.
2. Acrocentric chromosome.
3. Metacentric chromosome.
4. Sub-metacentric chromosome

43.

A : Pollen grains carry the male gamete from microsporangium to micropyle of ovule in angiosperms.
B : Pollen grain itself a male gamete further divides and form another one on stigma only.
1. Both A and B are correct
2. A is correct only
3. B is correct only
4. Both A and B are incorrect

44.

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

45.

The Government of India in 1980s has introduced the concept JFM to :-

1. Work closely with the local communities for protecting and managing forests.

2. To control the emission of ozone depleting substances.

3. To take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits.

4. To convert forest to agricultural land so as to feed the growing human population.

46.

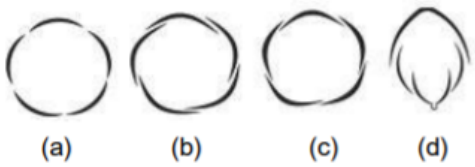
Match the column-I with column-II

	Column-I		Column-Il
A	Micropropagation	i	To obtain virus free plants
B	Meristem culture	ii	Production of large number of plants
C	Biofortification	iii	Improvement of nutritional quality in crops
d	Somatic hybridization	iv	Protoplast fusion

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

47.

The aestivation in petals of ladyfinger and Calotropis plants are respectively:-



1. a &d
2. b & a
3. d & a
4. d & b

48.

Double fertilization is exhibited by

1. Angiosperms

2. Gymnosperm

3. Algae

4. Bryophytes

49.

Read the given statements stating true (T) and false (F) and select the correct option.

A. Anthropogenic ecosystem possess self regulatory mechanism

B. Forest is a natural ecosystem

C. Estuaries is a terrestrial ecosystem

	A	B	C
1.	T	T	F
2.	F	T	F
3.	F	F	T
4.	T	F	F

50.

Sterile female lacks one X chromosome. This female is suffering from

1. A disease caused due to trisomy

2. Klinefelter's syndrome

3. Turner’s syndrome

4. Phenylketonuria

Zoology - Section A

51.

The mucosal layer in the stomach form irregular folds known as:-
1. villi
2. lumen
3. rugae
4. crypts of Lieberkuhn

52.

Consider the following statements:
I. Biolistics or gene gun can be used to introduce genes in both plant and animal cells.
II. Agrobacterium tumIfaciens does not naturally infect Monocots.
III. Liposomes are used in the gene therapy for cystic fibrosis.
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

53.

Which of the following statements regarding enzyme inhibition is correct -

1. Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein

2. Non-competitive inhibitors often bind to the enzyme irreversibly

3. Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme

4. Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate

54.

In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation?

1. Intrauterine transfer

2. Gamete intracytoplasmic fallopian transfer

3. Artificial Insemination

4. Intracytoplasmic sperm injection

55.

One example of animals having a single opening to the outside that serves both as mouth and as anus is
1. Octopus
2. Asterias
3. Ascidia
4. Fasciola

56.

“This segment allows passage of small amounts of urea into the medullary interstitium to keep up the osmolarity”. Which segment does the statement suggest?

1. Descending limb of Henle’s loop.
2. Ascending limb of Henle’s loop.
3. Collecting duct.
4. Proximal convoluted tubule.

57.

The hormones from heart, kidney and gastrointestinal tract respectively are

1. ANF, Rennin, Trypsin
2. ADH, Renin, GIP
3. ANF, Erythropoietin, CCK
4. GIP, CCK, Renin

58.

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

59.

The choroid layer is thin over the posterior two-thirds of the eye ball, but it becomes thick in the anterior part to form the

1. Iris
2. Ciliary body
3. Pupil
4. Suspensory ligament

60.

The contractile protein of skeletal muscle involving ATPase activity is

1. Tropomyosin
2. Myosin
3. Actinin
4. Troponin

61.

Opinion of how many registered medical practitioners is required for MTP, if the pregnancy has lasted more than 12 weeks, but fewer than 24 weeks?
1. One
2. Two
3. Three
4. Four

62.

The role of calcium in muscle contraction is

1. to break the cross-bridges as a cofactor in the hydrolysis of ATP
2. to bind with troponin, changing its shape so that the actin filament is exposed
3. to transmit the action potential across the neuromuscular junction
4. to spread the action potential through the T tubules

63.

The atrial wall of our heart secretes a very important peptide hormone called_____, which_____ because it causes dilation of the blood vessels. Choose the option which correctly fills the blank

1. Rennin, increase the blood pressure

2. Angiotensiogen, decreases the blood pressure

3. Atrial natriuretic factor, increases the blood pressure

4. Atrial natriuretic factor, decreases the blood pressure

64.

Mark the incorrect match that is not related?

1. Sertoli cell - Spermiation

2. Spermatid - Spermiogenesis

3. Secondary spermatocyte - Mitotic division

4. Spermatozoa - Capacitation

65.

Which one of the following statements is incorrect?

1. The medullary zone of the kidney is divided into a few conical masses called medullary pyramids projecting into calyces.

2. Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.

3. glomerulus along with Bowman's capsule is called the renal corpuscle.

4. Renal corpuscle, proximal convoluted tubule (PCT), and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of the kidney.

66.

Which of the following is correct about probe ?
A. It is ssDNA or ssRNA.
B. Used to detect gene of interest from gene library.
C. Used to detect mutations in genes in suspected cancer patients.
D. Used to detect HIV is suspected AIDS patients.

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

67.

Consider the following four statements (a-d) and select the option which includes all the correct :-

(a) Coronary Artery disease, (CAD) often referred to as Atherosclerosis

(b) Heart failure means when the heart muscle is suddenly damaged by an inadequate blood supply

(c) High blood pressure leads to heart diseases and also affects vital organs like brain and kidney

(d) Angina occurs due to conditions that affect the blood flow

Options :

1. Statements (b), (c) and (d).
2. Statements (a), (b).
3. Statements (b), (d).
4. Statement (a), (c) and (d).

68.

Compound epithelia is present in -
1. Dry surface of the skin.
2. Moist surface of buccal cavity.
3. Inner lining of ducts of salivary gland.
4. All of these

69.

Mark the incorrect statement regarding the transport of gas.

1. About 97% of O_2 is transported by RBC.

2. Nearly 20-25% of CO_2 is transported by RBC.

3. Every 100 ml of deoxygenated blood deliver 4 ml of CO_2 to the alveoli.

4. Every 100 ml of oxygenated blood deliver 20 ml of O_2 to the body tissues

70.

Which one of the following four glands is correctly matched with the accompanying description?

1. Thyroid - hyperactivity in young children causes cretinism

2. Thymus - starts undergoing atrophy after puberty

3. Parathyroid - secrete parathormone which promotes movement of calcium ions from blood into bones during calcification

4. Pancreas - Delta cells of the Islets of Langerhans secrete a hormone which stimulates glycolysis

71.

What is the correct sequence of sperm formation?

1. Spermatid, Spermatocyte, Spermatogonia, Spermatozoa

2. Spermatogonia, Spermatocyte, Spermatozoa, Spermatid

3. Spermatogonia, Spermatozoa, Spermatocyte, Spermatid

4. Spermatogonia, Spermatocyte, Spermatid, Spermatozoa

72.

Which of the following is the incorrectly matched set of the organisms and type of their excretory waste?

Organisms	Excretory waste
1. Bony fishes, aquatic amphilians, aquatic insects	Ammonia
2. Terrestrial amphibians cartilaginous fishes	Urea
3. Land snails	Urea
4. Reptiles, birds and insects	Uric acid

73.

Which of the following statement is incorrect w.r.t cockroach?

1. The exoskeleton of each segment consists of four plate-like pieces called sclerites

2. Labium bears tactile and gustatory sensory setae

3. In cockroach, malpighian tubules, fat bodies, nephrocytes, cuticle, and uricose glands (in some species) Helps in excretion

4. Internally mesenteron is lined by cuticle and covered by a very thin and transparent peritrophic membrane

74.

In ruptured ovum, correct sequence of layers from inside to outside is

1. Zona pellucida → Perivitelline space → Corona radiata

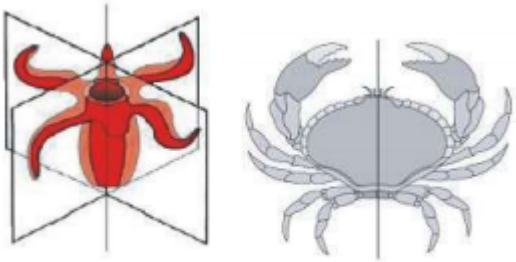
2. Corona radiata → Zona pellucida → Perivitelline space

3. Perivitelline space → Zona pellucida → Corona radiata

4. Zona pellucida → Corona radiata → Perivitelline space

75.

Identify the following diagrams and these represents



1. (a) Diploblastic, (b) Triploblastic

2. (a) Triploblastic, (b) Triploblastic

3. (a) Triploblastic, (b) Diploblastic

4. (a) Diploblastic, (b) Diploblastic

76.

See the following diagrams carefully and these animals are

1. Sycon, Leucosolenia
2. Hydra, Aurelia
3. Nereis, Hirudinaria
4. Fasciola, Taenia

77.

AIDS is caused by HIV, among the following, which one is not a mode of transmission of HIV?

1. Transfusion of contaminated blood
2. Sharing the infected needles
3. Shaking hands with infected prersons
4. Sexual contact with infected persons

78.

Match the following columns and choose the correct answer from the options given below

a. Indigestion (i) Ejection of stomach contents through the mouth

b. Constipation (ii) It reduces the absorption of food

c. Diarrhoea (iii) The faeces are retained in the rectum as the bowel movements becomes irregular

d. Vomiting (iv) Food is not properly digested

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

79.

Find out the false statement about blood ?

1. Special connective tissue
2. Fluid matrix
3. Fibre free matrix
4. No formed elements

80.

Function of eustachian tube is :-

1. Transfer of sound wave towards internal ear
2. Gives nutrition to ear ossicle
3. Equalising the pressure on either side of tympanum
4. Hearing

81.

Match the following

Column I	Column II
(A) α-1 antitrypsin	(i) SCID
(B) C-peptide	(ii) Emphysema
(C) Human lactalbumin	(iii) Rosie
(D) ADA deficiency	(iv) Proinsulin

A B C D

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

82.

Select the incorrect statement.

1. Separation of DNA fragments occurs based on their size in agarose gel.

2. Blue-white selection involves insertional inactivation of β-galactosidase.

3. Treatment with ice-cold calcium can enhance efficiency of transformation in host cells.

4. Extension step during PCR is based on thermolabile nature of Taq polymerase.

83.

Non-reducing sugar among the following is

1. Ribose

2. Deoxyribose

3. Glucose

4. Sucrose

84.

Inspiration can occur if _____A_____ pressure is less than atmospheric pressure, i.e., there is _____B_____ pressure in the lungs w.r.t. atmosphere pressure. Choose the option that fills the blanks correctly.

	A	B
1.	Intra-pulmonary	Positive
2.	Intra-pulmonary	Negative
3.	Inter-pleural	Positive
4.	Intra-pleural	Positive

85.

Hypothalamus does not contain centre for controlling

1. Body temperature

2. Hunger

3. Respiration

4. Osmoregulation

Zoology - Section B

86.

Identify the correct statement amongst the following:

1. Monocots evolved later than dicots

2. Mammals evolved from extinct reptiles called thecodonts

3. *Dryopithecus* was more man like while *Ramapithecus* was more ape like

4. *Homo erectus* had a cranial capacity of about 800 cc and probably ate meat

87.

Identify the incorrectly matched pair:

1.	Ramapithecus	More man like ape like
2.	Homo habilis	First human like being, the hominid
3.	Homo erectus	Probably did not eat meat
4.	Neanderthal	Buried their dead

88.

Variations caused by mutation, as proposed by Hugo de Vries, are:

1. small and directionless

2. random and directional

3. random and directionless

4. small and directional

89.

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

90.

How many statements are false from given information?
(a) Ribozymes are enzyme made up of protein.

(b) In every chemical reaction transition state energy is always greater than activation energy.

(c) Co-factors are always proteinous in nature

(d) Enzyme inhibition can not be removed.

(e) Enzyme action can be stopped at low temp.

(f) Km value (Michaelis constant) is the specific concentration of substrate molecule.

1. 2

2. 3

3. 4

4. 5

91.

Which of the following is removed during maturation of insulin?

1. A chain

2. B chain

3. C chain

4. Disulphide bond

92.

MOET has not been practiced in

a. Cattle b. Sheep

c. Rabbits d. Poultry

1. b,c & d

2. b & d

3. d only

4. c only

93.

Which of the following combinations of phylum and description is incorrect?

1. Echinodermata–branch Bilateria, coelom from archenteron

2. Nematoda–roundworms,pseudocoelomate

3. Cnidaria–radial symmetry, polyp and medusa body forms

4. Porifera - gastrovascular cavity, mouth from blastopore

94.

Which one of the following is tested by the technique of amniocentesis?

1. Biochemical abnormalities in the foetus

2. Errors of metabolism in the foetus

3. Chromosomal abnormalities in the foetus

4. All of the above

95.

Mark the correct match with the group and its characteristic?
1. Arthropoda → Compound eye and wings.
2. Mammalia → Viviparity.
3. Echinodermata → Calcareous endoskeleton.
4. Annelida → Fresh water and segmented body.

96.

During catalytic cycle of an enzyme action the binding of the __a__ induces the __b__ to alter its shape. Here a and b is _____
1. Substrate, enzyme.
2. Enzyme, substrate.
3. Substrate, Substrate.
4. Enzyme, Enzyme

97.

The hormone that reduces the destruction of bones it also enhances deposition of Ca^{+2} in bones thus making them in solid and strong. This hormone is:-

1. Collips hormone
2. Thyrocalcitonin
3. Thyroxine
4. Vasopressin

98.

Fish with stout and strong fins could move on land and go back to water. This was happened about:

1. 300 million years ago
2. 320 million years ago
3. 2000 million years ago
4. 350 million years ago

99.

Motor neuron along with muscle fibers are connected & constitute:-

1. Motor end plate
2. Motor unit
3. Neuromuscular junction
4. Motor reticular junction

100.

Read the following statement carefully and choose how many of them are incorrect

A. Afferent neuron transmits a signal to CNS.

B. Choroid layer is bluish color and is present over posterior two-third of eyeball.

C. Olfactory bulbs are extension of hypothalamus

D. Medulla oblongata has a center to control excretion, circulation and gastric secretion.

1. one
2. two
3. three
4. four

Chemistry - Section A

101.

An atom forms an ion by the loss of three electrons. The ion has an electronic configuration [Ar]$3d^6$. The symbol of the ion is -

1. Fe^{3+}
2. Ni^{3+}
3. Co^{3+}
4. Mn^{+3}

102.

Overlap of which of the following atomic orbitals would be maximum to form the strongest covalent bond.

1. 1s-2s (σ)
2. 1s-2p (σ)
3. 2p-2p (π)
4. 2p-2p (σ)

103.

Benzoic acid gives benzene on being heated with X and phenol gives benzene on being heated with Y. Therefore, X and Y are respectively

1. Sodalime and copper
2. Zn dust and NaOH
3. Cu and sodalime
4. Sodalime and zinc dust

104.

Equivalent conductances of NaCl, HCl and C_2H_5COONa at infinite dilution are 126.45, 426.16 and $91\Omega^{-1}\,cm^2$. The equivalent conductance of C_2H_5COOH is

1. $201.28\ \Omega^{-1}\,cm^2$
2. $390.71\ \Omega^{-1}\,cm^2$
3. $698.28\ \Omega^{-1}\,cm^2$
4. $540.48\ \Omega^{-1}\,cm^2$

105.

Find the mole of K_2SO_4 to be dissolved in 12 moles water to lower its vapor pressure by 10 mm of Hg at a temperature at which vapor pressure of pure water is 50 mm of Hg is

1. 3 mol
2. 0.5 mol
3. 1 mol
4. 2 mol

106.

Jahn-Teller effect is not observed in high spin complexes of

1. d^7
2. d^8
3. d^4
4. d^9

107.

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

108.

Standard enthalpy of vaporisation $\Delta vapH^\circ$ for water at $100^\circ C$ is 40.66 kJ mol^{-1}. The

internal energy of vaporisation of water at $100^\circ C$ (in kJ mol^{-1}) is

(Assume water vapour to behave like an ideal gas)

1. +37.56
2. -43.76
3. +43.76
4. +40.66

109.

The correct order of 'S—O' bond length is:

1. $SO_3^{2-} > SO_4^{2-} > SO_3 > SO_2$
2. $SO_3^{2-} > SO_4^{2-} > SO_2 > SO_3$
3. $SO_4^{2-} > SO_3^{2-} > SO_2 > SO_3$
4. $SO_4^{2-} > SO_3^{2-} > SO_3 > SO_2$

110.

Which of the following hydrides is most acidic

(1) H_2Te

(2) H_2Se

(3) H_2O

(4) H_2S

111.

The compound X on heating gives a colourless gas. The residue is dissolved in water to obtain Y. Excess of CO_2 is bubbled through an aqueous solution of Y, Z is formed. Z on gentle heating gives back X. The compound X is-

1. $CaCO_3$

2. Na_2CO_3

3. $CaSO_4.2H_2O$

4. K_2CO_3

112.

Find the work done if 1g H_2 gas at S.T.P is expanded to twice of its initial volume?

1. 22.4 L atm

2. 5.6 L atm

3. 11.2 L atm

4. 44.8 L atm

113.

Borax bead test is responded by:

1. divalent metals

2. heavy metals

3. light metals

4. metal which forms coloured metaborates

114.

MY and NY_3, two nearly insoluble salts, have the same K_{sp} values of 6.2×10^{-13} at room temperature. Which statement would be true in regard to MY and NY_3?

1. The molar solubility of MY in water is less than that of NY_3.

2. The salts MY and NY_3 are more soluble in 0.5 M KY than in pure water

3. The addition of the salt of KY to a solution of MY and NY_3 will have no effect on their solubilities

4. The molar solubilities of MY and NY_3 in water are identical.

115.

What is the pH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed?

1. 12.65

2. 2.0

3. 7.0

4. 1.04

116.

Two possible stereo-structures of $CH_3CHOH.COOH$, which are optically active, are called

1. Diastereomers

2. Atropisomers

3. Enantiomers

4. Mesomers

117.

In which of the following compounds, nitrogen exhibits the highest oxidation state?

1. N_2H_4
2. NH_3
3. N_3H
4. NH_2OH

118.

Considering the state of hybridization of carbon atoms, find out the molecules among the following which is linear.

1. $CH_3-C\equiv C-CH_3$
2. $CH_2=CH-CH_2-C\equiv CH$
3. $CH_3-CH_2-CH_2-CH_3$
4. $CH_3-CH=CH-CH_3$

119.

Which one of the following statements for the order of a reaction is incorrect?

1. Order is not influenced by the stoichiometric coefficient of the reactants
2. Order of reaction is the sum of power to the concentration terms of reactants to express the rate of reaction
3. Order of reaction is always the whole number
4. Order can be determined by experiments only

120.

What is the number of moles of O-atom in 126 amu of HNO_3?

1. 2
2. $\frac{2}{N_A}$
3. 6
4. $\frac{6}{N_A}$

121.

The correct order of temperature of a real gas is:

(I) Boyle's temperature

(II) Critical temperature

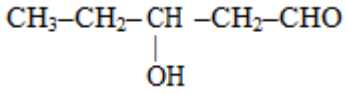
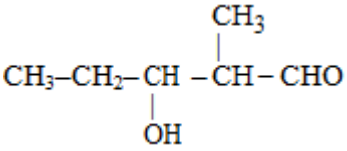
(III) Inversion temperature

1. III > I > II
2. I > II > III
3. II > I > III
4. I > III > II

122.

CH_3–CH_2–CHO + dil NaOH----> X

The product in the above reaction is

1. CH_3-CH_2COOH
2. $CH_3-CH_2-CH_2COOH$
3. 
4. 

123.

m–Bromotoluene is prepared by –

1. Bromination of toluene
2. Friedel Craft's reaction of bromobenzene with CH_3Cl
3. Bromination of nitrobenzene and subsequent replacement of $-NO_2$ group with ethyl group
4. Bromination of aceto–p–toluidine followed by hydrolysis and deamination

124.

Which of the following alcohols is expected to have the lowest pKa value ?

1. Ethanol
2. 2-Fluoro ethanol
3. 2,2,2-Trifluoroethanol
4. 2-Chloroethanol

125.

Incorrect statement about carbohydrates is

1. Maltose is a reducing sugar.
2. The carbohydrates are stored in the animal body as glycogen.
3. Amylopectin constitutes about 15-20% Of starch.
4. Cellulose is composed of only β-D- glucose units.

126.

Soil erosion can be prevented by

1. Overgrazing
2. Removal of vegetation
3. Afforestation (Plantation)
4. Increasing bird population

127.

Boric acid on heating at $150^{\circ}C$ gives:

1. B_2O_3
2. $H_2B_4O_7$
3. HBO_2
4. $H_2\,BO_3$

128.

In S_N1 (substitution, nucleophilic unimolecular) reaction the racemization take place. It is due to

1. Inversion of configuration
2. Retention of configuration
3. Conversion of configuration
4. Both (1) and (2)

129.

The van der Waals forces are greatest in

1. Neon
2. Argon
3. Krypton
4. Xenon

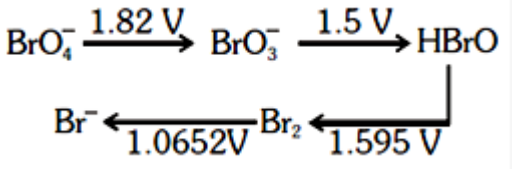
130.

Which of the following is correctly matched:-

1. $Fe^{+3} > Fe^{+2} > Fe^{+}$ Order of atomic radius
2. O > C > B > N - Order of ionisation energy
3. $O^{-2} < O^{-} < O < O^{+}$- Increasing order of Z_{eff}
4. O < N < F < Ne - Order of electron affinity

131.

Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below:



Then the species undergoing disproportionation is:-

1. BrO_3^-
2. BrO_4^-
3. Br_2
4. HBrO

132.

Which of the following is the correct order of increasing field strength of ligands to form coordination compounds?

1. $SCN^- < F^- < CN^- < C_2O_4^{2-}$

2. $F^- < SCN^- < C_2O_4^{2-} < CN^-$

3. $CN^- < C_2O_4^{2-} < SCN^- < F^-$

4. $SCN^- < F^- < C_2O_4^{2-} < CN^-$

133.

The number of primary amines of formula $C_4H_{11}N$ are

1. 1

2. 3

3. 4

4. 5

134.

Which of the following pairs will not produce dihydrogen gas ?

1. Cu + HCl (dil.)

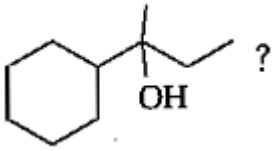
2. Fe + H_2SO_4

3. Mg + steam

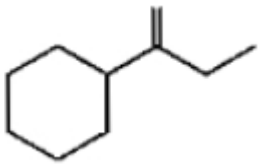
4. Na + alcohol

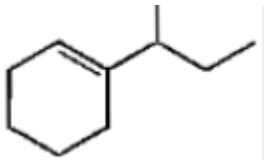
135.

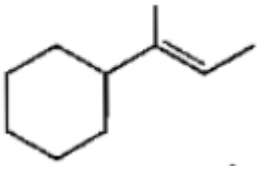
Which of the following is not the product of dehydration of

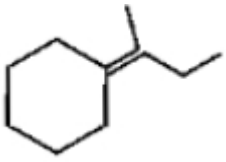


?

1. 

2. 

3. 

4. 

Chemistry - Section B

136.

The mass of a unit cell of CsCl corresponds to:-

1. $8Cs^+$ and Cl^-

2. $1Cs^+$ and $6Cl^-$

3. $1Cs^+$ and $1Cl^-$

4. $4Cs^+$ and Cl^-

137.

The rate of reaction triples when temperature change from $20^{\circ}C\ to\ 50^{\circ}C$. Calculate energy of activation for the reaction.

1. $28.81\ \text{kJ}\ \text{mol}^{-1}$
2. $38.51\ \text{kJ}\ \text{mol}^{-1}$
3. $18.81\ \text{kJ}\ \text{mol}^{-1}$
4. $8.31\ \text{kJ}\ \text{mol}^{-1}$

138.

Which of the following complexes is used as an anticancer agent ?

1. $\text{mer}-[\text{Co}(\text{NH}_3)_3\ \text{Cl}]$
2. $\text{Cis}-[\text{PtCl}_2(\text{NH}_3)_2]$
3. $\text{Cis}-\text{K}_2[\text{Pt}\ \ \text{Cl}_2\ \text{Br}_2]$
4. $\text{NH}_2\ \text{CoCl}_4$

139.

When 20 g of naphthoic acid ($C_{11}H_8O_2$) is dissolved in 50g of benzene (K_f = 1.72 K kg mol^{-1}), a freezing point depression of 2K is observed. The van't Hoff factor (i) is–

1. 0.5
2. 1
3. 2
4. 3

140.

According to Freundlich adsorption isotherm, at high pressure, the value of $\frac{x}{m}$ is

1. Directly proportional to the pressure
2. Inversely proportional to the pressure
3. Directly proportional to the square of the pressure
4. Independent of pressure

141.

Which of the following statements is correct?

1. The rate of reaction cannot be understood from Ellingham diagram
2. During the formation of metal oxide ΔS becomes negative and ΔG becomes positive resulting in a positive slope
3. There is an abrupt change in the slope of Ellingham line when change in phase $(s \rightarrow l)$ or $(l \rightarrow g)$ takes place.
4. All the above.

142.

Which one of the following is diamagnetic in nature?

1. La^{3+}
2. Lu^{3+}
3. Ce^{4+}
4. All of these

143.

The geometry of H_2S and its dipole moment are:

1. Angular (distorted tetrahedral) and non-zero
2. Angular and zero
3. Linear and zero
4. Linear and non-zero

144.

The artificial sweetener stable at cooking temperature and does not provide calories is-

1. Saccharin
2. Aspartame
3. Sucralose
4. Alitame

145.

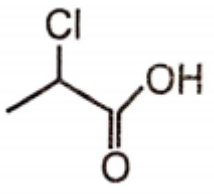
Which of the following is a polyamide?

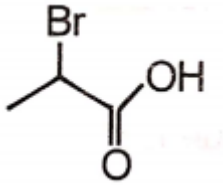
1. Teflon
2. Nylon – 6,6
3. Terylene
4. Bakelite

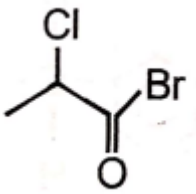
146.

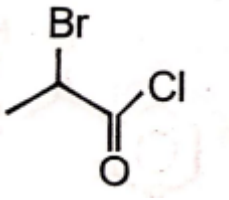
$CH_3 - CH_2 - COOH \xrightarrow[(ii)H_2O]{(i)Br_2/PCl_3} (major\ product)^{(A)}$

compound (A) is

1. 

2. 

3. 

4. 

147.

The number of S=O bonds in $H_2S_2O_8$ is

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

148.

Which of the following on reaction with cyclohexanol gives best yield cyclohexene?

1. conc. H_3PO_4
2. conc.HCl
3. conc.HBr
4. all of these

149.

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

1. 2×10^{-3}
2. 2.5×10^{-3}
3. 3×10^{-3}
4. 4.5×10^{-3}

150.

Most stable carbanion species is/are

$CH_3^-, CH_2Cl^-, CHCl_2^-, CCl_3^-$

1. CCl_3^-
2. CH_3^-
3. CH_2Cl^-
4. $CHCl_2^-$

Physics - Section A

151.

If the stationary proton and α-particle are accelerated through same potential difference, the ratio of de Broglie's wavelength will be

1. 2:1
2. 1:1
3. $2\sqrt{2}$:1
4. none of these

152.

An electric dipole with dipole moment $\vec{p} = \left(3\hat{i} + 4\hat{j}\right) \times 10^{-30}\ C - m$ is placed in an electric field $\vec{E} = 4000\hat{i}(N/C)$. An external agent turns the dipole slowly until its electric dipole moment becomes $\left(-4\hat{i} + 3\hat{j}\right) \times 10^{-30}\ C - m$. The work done by the external agent is equal to :–

1. 4×10^{-28} J
2. -4×10^{-28} J
3. 2.8×10^{-26} J
4. -2.8×10^{-26} J

153.

Two particles X and Y having equal charges, after being accelerated through the same potential difference, enter a region of uniform magnetic field and describe circular paths of radii R_1 and R_2 respectively. The ratio of the mass of X to that of Y is

1. $\left(\frac{R_1}{R_2}\right)^{1/2}$
2. $\frac{R_2}{R_1}$
3. $\left(\frac{R_1}{R_2}\right)^{2}$
4. $\frac{R_1}{R_2}$

154.

A body with an initial temperature θ_1 is allowed to cool in a surrounding that is at a constant temperature of $\theta_0 (\theta_0 < \theta_1)$. Assume that Newton's law of cooling is obeyed. Let k = constant. The temperature of the body after time is

1. $(\theta_1 - \theta_0)e^{-kt}$
2. $(\theta_1 - \theta_0)\ \ln(kt)$
3. $\theta_0 + (\theta_1 - \theta_0)e^{-kt}$
4. $\theta_1 e^{-kt} - \theta_0$

155.

A small coin is kept at distance r from the centre of a gramophone disc rotating at angular speed ω. The minimum coefficient of friction for which coin will not slip is

1. $\frac{r\omega^2}{g}$
2. $\frac{g}{r\omega^2}$
3. $\frac{r^2\omega^2}{g}$
4. $\frac{r\omega}{g}$

156.

If a particle in S.H.M. has time period 0.1 s and amplitude of 6 cm. Its maximum velocity is

1. 120π cm/s
2. 0.6π cm/s
3. π cm/s
4. 6 cm/s

157.

Which of the following is not true for damped oscillations with time period T and initial amplitude a?

1. Angular frequency is slightly less than the natural frequency.
2. Force remains constant in time interval t = 0 to $t = \frac{T}{8}$.
3. If amplitude after time t is $\frac{a}{N}$, then the amplitude after time 2t is $\frac{a}{N^2}$.
4. Total mechanical energy is exponentially decreasing.

158.

In a charged capacitor, the energy resides

1. In positive charge
2. Both in positive and negative charge
3. In the electric field between the plates
4. Around the edge of the capacitor plates

159.

In LC oscillation, the current in the circuit when the total energy is stored in the form of magnetic energy is- $(where\ q_0\ is\ maximum\ charge\ stored\ by\ capacitor)$

1. $Zero$
2. $\frac{q_0}{\sqrt{Lc}}$
3. $\frac{q_0}{LC}$
4. $q_0\sqrt{LC}$

160.

Work done in increasing the current through a solenoid from 0 to 2 A is 20 J. Work done in increasing the current from 4 to 6 A is

1. 100 J
2. 60 J
3. 80 J
4. 120 J

161.

In a region, a uniform electric field E and a uniform magnetic field B exist parallel to each other. If a charged particle enters perpendicular to the fields, then the path of the particle will be

1. Circle
2. Straight line
3. Helix of uniform pitch
4. Helix of non-uniform pitch

162.

A travelling wave pulse is given by $\mathrm{y}=\frac{20}{4+(\mathrm{x}+4\mathrm{t})^2}\left(\mathrm{m}\right)$, then

1. The pulse is travelling along negative *x* axis
2. The speed of pulse is 4 m/s
3. The amplitude of pulse is 5 m
4. All of these

163.

An electron in Bohr's hydrogen atom has angular momentum $\frac{2h}{\pi}$. The energy of the electron is

1. -3.4 eV
2. -0.64 eV
3. -0.85 eV
4. -10.25 eV

164.

3 moles of a monoatomic gas does 150 J work when it expands isobarically. Then change in its internal energy will be

1. 100 J
2. 225 J
3. 400 J
4. 450 J

165.

A: Carnot engine is most efficient among all heat engines working between the same source and sink

R: The efficiency of the heat engine is independent of the nature of the working substance.

1 If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark(1)

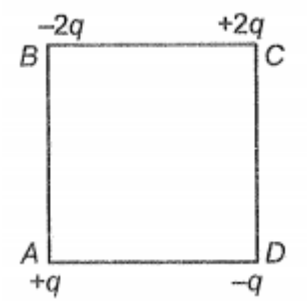
2 If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark(2)

3 If Assertion is a true statement but Reason is false, them mark (3)

4 If both Assertion and Reason are false statements, then mark (4)

166.

Four charges are arranged at the corners of a square ABCD as shown in the figure. The force on a positive charge kept at the center of the square is



1. Zero
2. Along diagonal AC
3. Along diagonal BD
4. Perpendicular to the side AB

167.

What is the percentage increase in the resistance of a wire when it is stretched so that its length increases by 30%? (Assume that there is no change in the temperature and the volume of the wire)

1. 60%
2. 15%
3. 69%
4. Zero

168.

In an intrinsic semiconductor, the intrinsic carrier concentration is $2 \times 10^{19}/m^3$. On doping with "B", the hole concentration becomes $4 \times 10^{22}/m^3$. Then the electron concentration in the doped semiconductor is

1. $10^{16}/m^3$
2. $2 \times 10^{16}/m^3$
3. $4 \times 10^{16}/m^3$
4. $2 \times 10^{19}/m^3$

169.

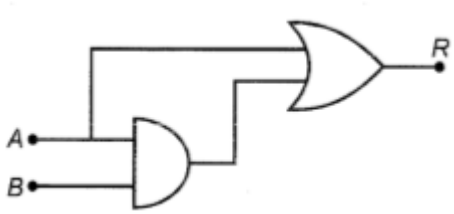
One of the refracting surfaces of a prism is silvered. A ray is an incident at an angle 60°, such that it retraces its path. The angle of the prism is-

($\mu = \sqrt{3}$)

1. 30°
2. 45°
3. 60°
4. 75°

170.

A combination of logic gates is shown in the circuit. If A is at 0 V and B is at 5 V, then the potential of R is:



1. 0 V
2. 5 V
3. 10 V
4. Any of these

171.

The frequency of incident light falling on a metal plate is doubled. The maximum kinetic energy of the emitted photoelectron is:

1 Unchanged

2 Doubled

3 More than double

4 Less than double

172.

A small tiny water droplet is falling towards earth at a uniform speed of 1 cm/s. When 27 such identical droplets combine together to form a bigger drop, then with what uniform velocity will this bigger drop fall?

1. 27 cm/s
2. 9 cm/s
3. 3 cm/s
4. 81 cm/s

173.

If at a pressure of 10^6 dyne/cm^2, one gram of nitrogen occupies 2×10^4 c.c. volume, then the average energy of a nitrogen molecule in erg is:-

1. 14×10^{-13}
2. 10×10^{-12}
3. 10^6
4. 2×10^6

174.

Suppose you are riding a bike with a speed of 20 m/s due east relative to a person A who is walking on the ground towards the east. If your friend B walking on the ground due west measures your speed as 30 m/s due east, find the relative velocity between two reference frames A and B:-

1. The velocity of A w.r.t B is 5 m/s towards the east
2. The velocity of A w.r.t B is 5 m/s towards the west
3. The velocity of A w.r.t B is 10 m/s towards the east
4. The velocity of A w.r.t B is 10 m/s towards the west

175.

A uniform disc of mass m and radius R is rolling down a rough inclined plane which makes an angle 30° with the horizontal. If the coefficients of static and kinetic friction are each equal to μ and the only forces acting are gravitational and frictional, then the magnitude of the frictional force acting on the disc is:-

1. (mg/3) upwards
2. (mg/3) downwards
3. (mg/6) upwards
4. (mg/6) downwards

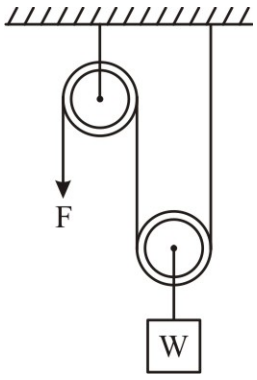
176.

A rigid body rotates with an angular momentum L. If its kinetic energy is halved, the angular momentum becomes,

1. L
2. L/2
3. 2L
4. L/$\sqrt{2}$

177.

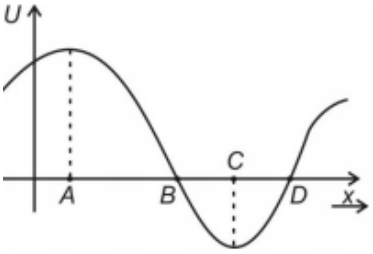
In the diagram shown, force F acts on the free end of the string. If the weight W moves up slowly by distance h, then work done on the weight by the string holding it is: (Pulley and string are ideal)



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

178.

The given diagram represents the potential energy curve of a particle in a field. The particle will be in equilibrium at position:



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

179.

The height from the surface of the earth at which value of g becomes one-fourth of that on the earth's surface will be: (R is the radius of the earth)

1. 2.45 R
2. 1.45 R
3. R
4. $\frac{5}{6}$R

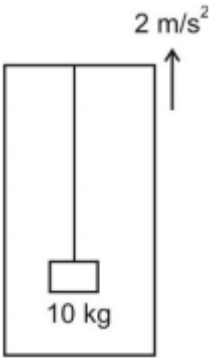
180.

A body is projected with a velocity of $\left(3\hat{i}-4\hat{j}\right)m/s$. The maximum height attained by projectile is (g = 10 ms^{-2})

1. 0.8 m
2. 8 m
3. 4 m
4. 0.4 m

181.

One end of a light steel wire is fixed to the ceiling of an elevator moving up with an acceleration of 2 m/s^2 and a load of 10 kg hangs from the other end. If cross-sectional area of wire is 2 mm^2, the longitudinal strain in wire is (g = 10 m/s^2, Y = 2×10^{11} N/m^2)



1. 2.5×10^{-5}
2. 3.0×10^{-4}
3. 2.0×10^{-5}
4. 2.5×10^{-4}

182.

A calorie is a unit of heat (energy in transit) and it equals about 4.2 J where$1\ J = 1\ kg\ m^2 s^{-2}$. Suppose we employ a system of units in which the unit of mass equals $\alpha\ kg$, the unit of length equals β m, the unit of time is γ s. Then the magnitude of calorie in terms of new units is:

1. $4.\ 2\alpha^{-2}\beta^{-2}\gamma^2$
2. $4.\ 2\alpha^{2}\beta^{-2}\gamma^2$
3. $4.\ 2\alpha^{-1}\beta^{-2}\gamma^2$
4. $4.\ 2\alpha^{-1}\beta^{2}\gamma^{-2}$

Physics - Section B

183.

A 1 m long metallic rod is rotating with an angular frequency of 400 rad/s about an axis normal to the rod passing through its one end. The other end of the rod is in contact with a circular metallic ring. A constant and uniform magnetic field of 0.5 T parallel to the axis exists everywhere. The emf induced between the center and the ring is:

1. 200 V

2. 100 V

3. 50 V

4. 150 V

184.

The electric field part of an electromagnetic wave in vacuum is- $\vec{\mathrm{E}} = (3.1\ \mathrm{N/C})\ \cos\ \left[(1.8\ \mathrm{rad/m})\mathrm{y} + (5.4 \times 10^{8}\ \mathrm{rad/s})\mathrm{t}\right]\hat{k}$.

What is the frequency of the wave?

1. $5.7 \times 10^{7}\ Hz$
2. $9.3 \times 10^{7}\ Hz$
3. $8.6 \times 10^{7}\ Hz$
4. $7.5 \times 10^{7}\ Hz$

185.

Two wires A and B of same material have radii in the ratio 2 : 1 and lengths in the ratio 4 : 1. The ratio of the normal forces required to produce the same change in the lengths of these two wires is

1. 1 : 1

2. 2 : 1

3. 1 : 2

4. 1 : 4

186.

During negative β-decay

(1) Neutron converts into proton

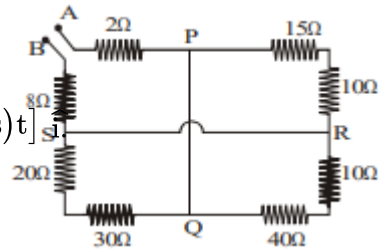
(2) Proton converts into neutron

(3) Neutron to proton ratio increases

(4) None of these

187.

The equivalent resistance between points A and B is-



1. 32.5Ω

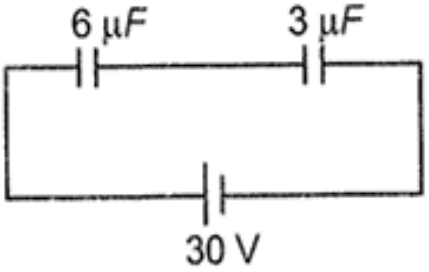
2. 22.5Ω

3. 2.5Ω

4. 42.5 Ω

188.

Two capacitor of capacitance $6\ \mu F$ and $3\ \mu F$ are connected in series with battery of 30 V. Charge on $3\ \mu F$ capacitor at steady state is-



1. $3\ \mu C$
2. $1.5\ \mu C$
3. $60\ \mu C$
4. $900\ \mu C$

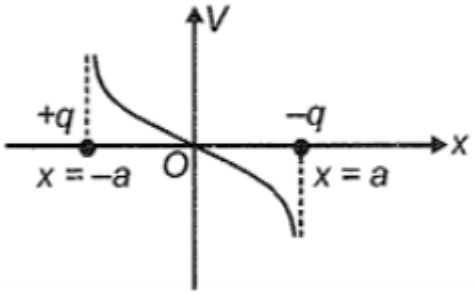
189.

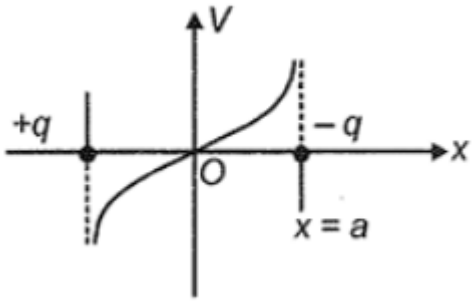
Each of the two identical magnets, when suspended alone, makes 30 oscillations per minute at a place. The number of oscillations per minute, if they are fixed at right angles(to form a cross) and allowed to oscillate in the same field will be approximately

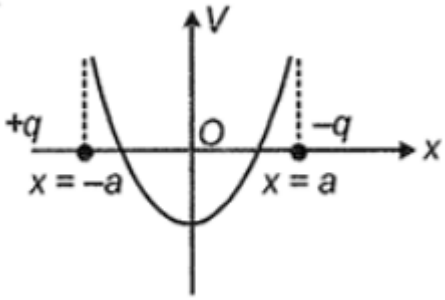
1. 25 oscillation/minute
2. 30 oscillation/minute
3. 60 oscillation/minute
4. 15 oscillation/minute

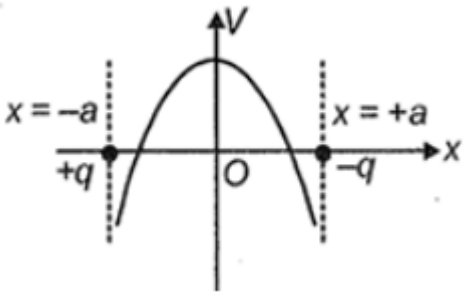
190.

A positive charge q and a negative charge -q are placed at x= -a and x= +a respectively. The variation of V along x-axis is represented by the graph-

1.


2.


3.


4.


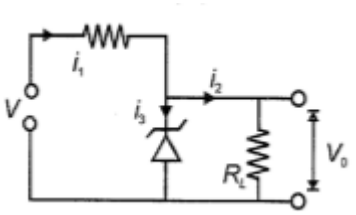
191.

The polarising angle for the material is 60°, then the refractive index of a material is

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

192.

A Zener diode is used to obtain a constant voltage. If applied voltage V changes, then (V is more than Zener voltage)



1. i_1 and i_2 change
2. i_2 and V_0 change and i_3 is constant
3. i_2 and V_0 don't change while i_3 changes
4. i_3 and V_0 don't change while i_2 changes

193.

Fundamental frequency of an open organ pipe is 200 Hz. If one end of the pipe is closed, its fundamental frequency becomes

1. 100 Hz
2. 200 Hz
3. 50 Hz
4. 400 Hz

194.

When a man sits on a boat of length 2 m and breadth 1 m floating on a lake, the boat sinks by 2 cm. The mass of the man is

1. 25 kg
2. 40 kg
3. 60 kg
4. 80 kg

195.

In uniform circular motion, speed of the particle is 2 m/s and radius of the circle is 2 m, then the value of centripetal and tangential acceleration are respectively

1. $2\ \mathrm{m/s^2}$, $2\ \mathrm{m/s^2}$
2. $2\ \mathrm{m/s^2}$, $1\ \mathrm{m/s^2}$
3. 0, $2\ \mathrm{m/s^2}$
4. $2\ \mathrm{m/s^2}$, 0

196.

An elevator whose floor to ceiling height is 12 m moves upward with an acceleration of $2.2\ \mathrm{m/s^2}$. After 1.5 seconds of start, a bolt falls from its ceiling. The time taken by the bolt to reach the floor is

1. 1 s
2. 2 s
3. $\sqrt{2}$ s
4. $\sqrt{3}$ s

197.

A circular disc X of radius R is made of an iron plate of thickness t. Another disc Y

of radius, 4R is made of iron plate of thickness $\frac{t}{4}$. The relationship between

their moment of inertia l_X and l_Y is

1. $I_Y = 64\ I_X$
2. $I_Y = 32\ I_X$
3. $I_Y = 16\ I_X$
4. $I_X = I_Y$

198.

Three blocks each of mass m are hanged vertically with the help of inextensible strings and ideal spring. Initially the system was in equilibrium. At any instant lowermost string is cut, then acceleration of block B just after cutting the string is-

1. g
2. $\frac{g}{2}$
3. $\frac{2g}{3}$
4. Zero

199.

The thickness of a pencil measured by using a screw gauge (least count 0.001 cm) comes out to be 0.802 cm. The percentage error in the measurement is:

1. 0.125%
2. 2.43%
3. 4.12%
4. 2.14%

200.

A mass m is attached to a thin wire and whirled in a vertical circle. The wire is most likely to break when:

1. inclined at an angle of 60^0 from vertical
2. the mass is at the highest point
3. the wire is horizontal
4. the mass is at the lowest point.

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