Botany - Section A

1.

Which of the following is/are essential for imbibitions to take place?

I. Water potential gradient between the absorbent and the liquid imbibed

II. Affinity between the adsorbant and the liquid

1. Only II

2. Only I

3. Both I and II

4. None

2.

In the monosporic embryo sac of a flowering plant, the number of nuclei that get surrounded by cell walls and thus are organized into cells is:

1. 5

2. 6

3. 7

4. 8

3.

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

1. Avery, MacLeod , and McCarty who repeated the transformation experiments of Griffith, and chemically characterized the transforming principle.

2. Garrod, who postulated that Alcaptonuria, or black urine disease, was due to a defective enzyme.

3. Beadle and Tatum, who used a mutational and biochemical analysis of the bread mold *Neurospora* to extablish a direct link between genes and enzymes.

4. Meselson and Stahl who showed that DNA is replicated semiconservatively.

4.

Which of the following taxonomic categories contains organisms least similar to one another?

1. Class

2. Genus

3. Family

4. Species

5.

The following cell undergoing mitosis, is at :

1. Early prophase

2. Late prophase

3. Transition to metaphase

4. Early metaphase

6.

Mycorrhiza does not help the host plant in:

1. Enhancing its phosphorus uptake capacity

2. Increasing its tolerance to drought

3. Enhancing its resistance to root pathogens

4. Increasing its resistance to insects

7.

Which one of the following trait is only expressed in the presence of identical allele?

1. Yellow seed

2. Inflated pod

3. Green pod

4. Green seed

8.

The symptoms due to toxicity of elements are difficult to identify as
1. Toxicity of micronutrients lead to the deficiency of macronutrients express the symptoms.
2. Deficiency of macronutrient leads to the toxicity micronutrients.
3. Toxicity of macronutrient leads to the deficiency of micronutrient.
4. More than one option is correct.

9.

Select the Incorrect statement frorn the following.

1. Nostoc performs oxygenic photosynthesis.

2. During photorespiration, O_2 is first utilized in chloroplast and CO_2 is released in mitochondria.

3. In a chloroplast, lumen of thylakoids always have least number of protons during photophosphorylation .

4. In the plants like sugarcane and Amaranthus, primary CO_2 acceptor is phosphoenol pyruvate.

10.

Rate of the diffusion of substances is affected by, all, except

1. Gradient of concentration

2. Temperature but not pressure

3. Density

4. Both temperature and pressure

11.

Which of the following is a disease caused by prion?
1. Kala-azar
2. Parkinson’s disease
3. Creutzfeldt-Jacob disease
4. Gas gangrene

12.

Which statement concerning ATP synthesis is true?

1. ATP can be synthesized through substrate level phosphorylation, photophosphorylation and oxidative phosphorylation.

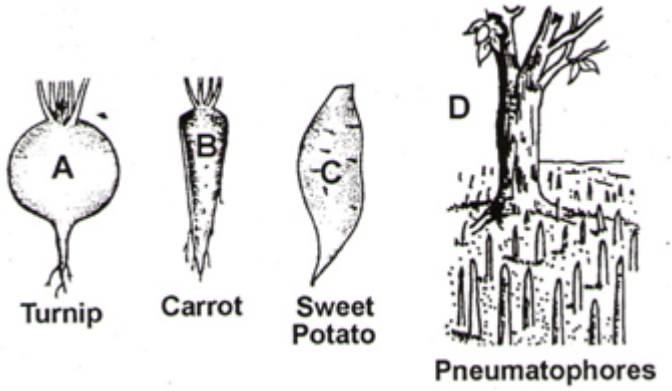
2. The proton-motive force is the establishment of proton gradients and electrochemical potentials across the inner membrane of mitochondria.

3. Proton-motive force is essential for back flow of H^+ from outer chamber of matrix of mitochondria through proton channel (F0) of $F_0 - F_1$ particle to produce ATP.

4. All

13.

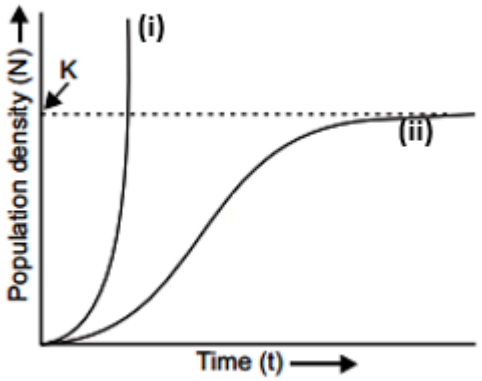
Which of the following is incorrect about A, B, C and D –



1. Tap roots of carrot, turnip and adventitious root of sweet potato, get swollen and store food.
2. Pneumatophores help to get oxygen for respiration.
3. Pneumatophore is found in the plants that grow in sandy soil.
4. A, B and C are underground roots but D grows vertically upwards.

14.

Study the population growth curves shown in the above diagram.



Which option is the best for curve (i) and (ii)

	Type of (i) curve	Type of (ii) curve	Status of food & space for curve (i)	Status & space for curve (i)
1.	Logistic curve	Exponential curve	Unlimited	Limited
2.	Exponential curve	Logistic curve	Unlimited	Limited
3.	Logistic curve	Exponential curve	Limited	Unlimited
4.	Exponential curve	Logistic curve	Limited	Unlimited

15.

In order to increase the yield of sugarcane crop, which of the following plant growth regulators should be sprayed ?

1. Ethylene

2. Auxins

3. Gibberellins

4. Cytokinins

16.

What type of pollination takes place in Vallisneria ?

1. Pollination occurs in submerged condition by water.

2. Flowers emerge above surface of Water and pollination occurs by insects.

3. Flowers emerge above water surface and pollen is carried by wind.

4. Male flowers are carried by water currents to female flowers at surface of water.

17.

Which statement is wrong for Krebs' cycle?
1. There are three points in the cycle where NAD^+ is reduced to NADH + H^+
2. There is one point in the cycle where FAD^+ is reduced to $FADH_2$
3. During conversion of succinyl Co-A to succinic acid, a molecule of GTP is synthesised
4. The cycle starts with condensation of acetyl group (acetyl Co-A) with pyruvic acid to yield citric acid

18.

Which one of the following organisms is correctly matched with its three characteristics?
1. Pea: C_3 pathway, Endospermic seed, Vexillary aestivation
2. Tomato: Twisted aestivation, Axile placentation, Berry
3. Onion: Bulb, Imbricate aestivation, Axile placentation
4. Maize : C_3 pathway, Closed vascular bundles, Scutellum

19.

Moss sporophyte does not possess
1. Elaters

2. Seta

3. Foot

4. Columella.

20.

Which cell organelle principally performs the function of packaging materials, to be delivered either to the intra-cellular targets or secreted outside the cell?
1. Rough endoplasmic reticulum
2. Golgi apparatus
3. Smooth endoplasmic reticulum
4. Lysosomes

21.

Restriction endonuclease generated DNA fragments separated by gel electrophoresis and blot transferred onto a membrane filter are probed with radioactive DNA fragment. This procedure is called
1. Gene cloning
2. The southern blotting technique
3. Northern blotting
4. Western blotting

22.

Which of the following is the correct sequence of events of interphase:-

a. cells metabolically active

b. Duplication of the chromosome but chromosome number remains constant

c. M phased

d. Synthesis of protein [Tubulin]

1. $a \rightarrow b \rightarrow c \rightarrow d$

2. $a \rightarrow d \rightarrow b \rightarrow c$

3. $a \rightarrow b \rightarrow d \rightarrow c$

4. $a \rightarrow c \rightarrow d \rightarrow b$

23.

Read the following four statements (a-d), find out the **incorrect** option w.r.t. lactic acid bacteria

a. In our stomach, they play beneficial role by checking disease causing microbes.

b. LAB produce acids that coagulate and completely digest the milk proteins.

c. Improves the nutritional quality by increasing the amount of riboflavin.

d. Require suitable temperature for their multiplication.

1. a & b

2. a & c

3. b & c

4. b & d

24.

The main enzyme of transcription

1. DNA dependent DNA polymerase

2. DNA dependent RNA polymerase

3. RNA dependent RNA polymerase

4. RNA dependent DNA polymerase

25.

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

1. Abaxial

2. Adaxial

3. Upper

4. Ventral

26.

Oxidative phosphorylation is the formation of-

1. ATP in Anaerobic respiration

2. ATP in aerobic respiration

3. ATP in glycolysis

4. ATP in fermentation

27.

Which of the following is not an invasive weed?

1. Parthenium
2. Lantana
3. Eicchornia
4. Clarias

28.

Dikaryon phase appears during sexual reproduction of

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

29.

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

1. Castor
2. Coconut
3. Pea
4. Maize

30.

Alfred Hershey and Martha Chase unequivocally proved that DNA is genetic material by using

1. Bacteriophage
2. Cyanophage
3. Fungi
4. Vicia faba

31.

Chromosome component in the person affected from Klinefelter syndrome will be

1. 44 + XX
2. 44 + XXY
3. 44 + XY
4. 44 + XO

32.

In which stage of mitosis, shape of chromosomes is best studied?

1. Prophase
2. Metaphase
3. Anaphase
4. Telophase

33.

In a person suffering from sickle-cell anaemia, the template strand of sickle-cell Hb(s) gene has a specific nitrogenous base sequence that codes for valine amino acid. The base sequence on template strand is

1. 5’-CAC-3’
2. 5’-GAG-3’
3. 3’-CAG-5’
4. 3’-CAC-5’

34.

Select the correctly matched pair w.r.t plastids

1. Amyloplast – Stores fats and oils
2. Aleuroplast – Stores proteins
3. Elaioplast – Stores starch
4. Chromoplast – Contains chlorophylls

35.

Barnacles growing on the back a whale, a type of population interaction, is an example of

1. Competition

2. Mutualism

3. Amensalism

4. Commensalism

Botany - Section B

36.

If the DNA content of an onion tip cell is 2C at the end of the M-phase, what would be its DNA content at the end of the S-phase?

1. C

2. 2C

3. 3C

4. 4C

37.

In biological world each organism has evolved its own mechanism of reproduction, which depends upon?
1. Habitat
2. Internal physiology
3. Size of organism
4. Both 1 and 2

38.

Pusa komal is disease resistance variety of?

1. Cauliflower

2. Brassica

3. Cowpea

4. Chilli

39.

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

40.

Histones are:
1. Positively charged and basic amino acids
2. Negatively charged and basic proteins
3. Positively charged and acidic proteins
4. Not found in bacteria

41.

If ‘N’ is the population density at time t, then its density at time ‘t+1’ will be
1. $\mathrm{N_{t+1} = N_t \times [(B + I) - (D + E)]}$
2. $\mathrm{N_{t+1} = N_t + [(B + I) - (D + E)]}$
3. $\mathrm{N_{t+1} = N_t + [(B + I) + (D + E)]}$
4. $\mathrm{N_{t+1} = N_t \times [(B + I) + (D + E)]}$

42.

Which is not true for haplodiploid sex determination?

1. It is reported in the honeybee.

2. In this male produces sperms by meiosis.

3. They do not have fathers and thus cannot have sons.

4. In this unfertilized egg develops as a male by means of parthenogenesis.

43.

Read the following statements carefully
A. Lipid component of the plasma membrane mainly consists of phosphoglycerides.
B. Polar molecules can pass through the lipid bilayer of plasma membrane, therefore they do not require carrier proteins to facilitate their transport.
C. Secondary wall is capable of growth and it is formed on the outer side of the cell
D. Quasi fluid nature of lipid enables lateral movement of proteins within the overall lipid bilayer of plasma membrane
E. Middle lamella glues the different neighbouring cells together

How many statements are incorrect?

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

44.

Read the following statements and choose the option which is true for them.
Statement-I : During conversion of succinic acid to fumaric acid in Krebs cycle, one molecule of FAD is synthesized.
Statement-II : There are three steps in the Krebs cycle where CO_2 is released.

1. Only statement I is correct.
2. Only statement II is correct.
3. Both the statements I and II are correct.
4. Both the statements I and II are incorrect.

45.

C_4 and CAM plants have many similarities, like

1. Secondary CO_2 fixation by Rubisco
2. Scotoactive stomata
3. Primary CO_2 fixation by PEPCase in bundle sheath
4. Presence of Kranz anatomy

46.

According to Alexander Von Humboldt's species area relationship formula
log S = log C + Z log A
What does Z show :-

1. Species richness
2. Regression coefficient
3. Intercept
4. Area

47.

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

	Column I		Column Il
A	UV rays	i	Biomagnification
B	Biodegradable organic matter	ii	Eutrophication
C	DDT	Iii	Snow blindness
D	Phosphates	iv	BOD

The correct match is :-

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

48.

Standing crop is :

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

1. (i) and (iv)

2. (i) and (iii)

3. (ii) and (iv)

4. only (iv)

49.

Montreal Protocol was signed to control emission of

1. Biogas

2. Heavy metals in water bodies

3. Ozone-depleting substances

4. Greenhouse gas

50.

Double fertilization includes

1. Endosperm and embryo development

2. Ovules and ovary maturation

3. Syngamy and triple fusion

4. Porogamy and chalazogamy

Zoology - Section A

51.

Which human male accessory reproductive duct receives a duct from the seminal vesicle?

1. Rete testis

2. Vas deferens

3. Epididymis

4. Urethra

52.

DNA damage leading to neoplastic transformation can be brought about by ionizing radiations like :
1. UV rays
2. Gamma rays
3. Infrared waves
4. Radio waves

53.

Consider the following statements:

I. A motor neuron along with the muscle fibres connected to it constitute a motor unit

II.The neurotransmitter released at the neuro-muscular junction is Acetylcholine.

III.Myosin head has ATPase activity

Which of the above statements are true?

1. I and II only

2. I and III only

3. II and III only

4. I, II and III

54.

Mark the correct statement
1. Electrical synapses are more common in our neural system than chemical synapses
2. The new potential in post synaptic neuron may be either excitatory or inhibitory
3. Hypothalamus is the major coordination centre for sensory and motor signaling
4. The tracts of nerve fibres that connect two cerebral hemispheres are called corpora quadrigemina.

55.

Find the incorrect statement.
1. Gene therapy is a genetic engineering technique used to treat disease at molecular level by replacing defective genes with normal genes
2. Calcitonin is a medically useful recombinant product in the treatment of infertility
3. Bt toxin is biodegradable insecticide obtained from Bacillus thuringiensis
4. Trichoderma sp. is a biocontrol agent for fungal diseases of plants

56.

Lymph differs from blood in possessing

1. More proteins and less waste products

2. Less proteins and more waste products

3. More proteins and more waste products

4. Less proteins and less waste products

57.

When the sinoatrial node generates an action potential which stimulates both the atria to undergo a simultaneous contraction. it is called atrial systole. This causes the flow of blood into the ventricles and is responsible for_____ filling of ventricles

1. 70 percent

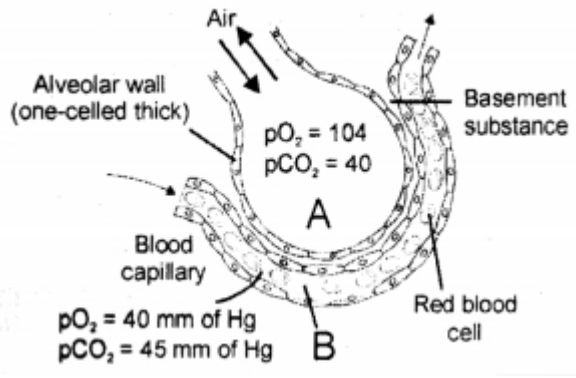
2. 30 percent

3. 50 percent

4.More than 80 percent

58.

Given below a diagram of a section of an alveolus with a pulmonary capillary
Which of the following is a correct statement for diffusion of gases?



1. Diffusion of O_2 and CO_2
from A to B or B to A takes place with the same rate.

2. O_2 will diffuse faster from A to B than CO_2
from B to A

3. Only O_2 will diffuse from A to B not CO_2
from B to A

4. Only CO_2 will diffuse from B to A, not O_2
from A to B

59.

Which of the following is not a characteristic feature regarding protein energy malnutrition, marasmus?

(1) It is produced by a simultaneous deficiency of proteins and calories

(2) It is found in infant less than a year of age

(3) Patient shows wasting of muscles, thining of limbs, failure of growth and brain development

(4) Some fat is left under the skin of patient,extensive oedema and swelling of body parts are seen

60.

Unlike placental Mammals, both Monotremes (Parofotherian) and Marsupials
1. Have some embryonic development outside the Mother uterus.
2. Lack Mammary gland.
3. Lack body hairs.
4. Lay eggs

61.

Which of the statement is incorrect w.r.t. melatonin hormone?

1. Regulate diurnal variation

2. Influence metabolism

3. Secreted by pineal body

4. Non-influence pigmentation

62.

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

63.

Which of the following is/are controlled by the human brain ?

a. Balance of the body

b. Circadian rhythm of the body

c. Human behaviour

d. Functioning of heart and kidneys

1. Only d

2. a and d

3. a,b and c

4. a,b,c,d

64.

A peptide hormone which causes dilation of blood vessels and decreases blood pressure is
1. Aldosterone
2. Adrenaline
3. Vasopressin
4. Atrial Natriuretic factor

65.

Which of the following organic compounds is the main constituent of Lecithin?

1. Arachidonic acid

2. Phospholipid

3. Cholesterol

4. Phosphoprotein

66.

Given below are four statements pertaining to separation of DNA fragments using Gel electrophoresis. Identify the incorrect statements.

(a) DNA is negatively charged molecule and so it is loaded on gel towards the Anode terminal.

(b) DNA fragments travel along the surface of the gel whose concentration does not affect movement of DNA.

(c) Smaller the size of DNA fragment, larger is the distance it travels through it.

(d) Pure DNA can be visualized directly by exposing to UV radiation.

Choose correct answer from the options given below:

1. (a), (c) and (d)

2. (a), (b) and (c)

3. (b), (c) and (d)

4. (a), (b) and (d)

67.

Which of the following match is correct?
1. Emphysema : reduction of surface area of alveoli and bronchi
2. Pneumonia : occupational disease with asbestos
3. Silicosis : inflammation of alveoli
4. Asthma : excessive secretion of bronchial mucus

68.

Several hormones like hCG, hPL, oestrogen, progesterone are produced by
1.ovary
2. placenta
3. Fallopian tube
4. pituitary

69.

Consider the statements given below regarding contraception and answer as directed thereafter
A. Medical Termination of Pregnancy (MTP) during first trimester is generally safe
B. Generally, chances of conception are nil until mother breast-feeds the infants upto two year
C. Intrauterine devices like copper-T are effective contraceptives
D. Contraception pills may be taken up to one week after coitus to prevent conception
Which two of the above statements are correct?
1. B,C
2. C, D
3. A, C
4. A, B

70.

What is true about Nereis, scorpion, cockroach and silver fish ?
1. They all possess dorsal heart
2. None of them is aquatic
3. They all belong to the same phylum
4. They all have jointed paired appendages

71.

Areolar connective tissue joins
1. integument to the muscles
2. bones to the muscles
3. bones to the bones
4. fat body to the muscles

72.

Which one of the following represents a palindromic sequence in DNA?
1. 5' - GAATTC - 3'
   3' - CTTAAG - 5'

2. 5' - CCAATG - 3'
   3' - GAATCC - 5'

3. 5' - CATTAG - 3'
   3' - GATAAC - 5'

4. 5' - GATACC - 3'
   3' - CCTAAG - 5'

73.

Read the following four statements (A-D) about certain mistakes in two of them

(A) The first transgenic buffalo, Rosie produced milk which was human alpha-lactal bumin enriched.
(B) Restriction enzymes are used in isolation of DNA from other macro-molecules.
(C) Downstream processing is one of the steps of rDNA technology.
(D) Disarmed pathogen vectors are also used in transfer of r-DNA into the host.

Which are the two statements having mistakes?
1. Statement (B) and (C)
2. Statement (C) and (D)
3. Statement (A) and (C)
4. Statement (A) and (B)

74.

Which contraceptive method is highly effective but has very poor reversibility?

1. lUDs
2. Implants
3. Injectables
4. Sterilization

75.

Which of the following statements is not true regarding active acquired immunity :-

1. It is species non specific

2. It is antigen specific

3. It shows slow but long lasting effect

4. It is used in prophylaxis

76.

During the process of micturition:-

1. Urinary bladder → Contracts
Urethral sphincter → Contracts

2. Urinary bladder → Contracts
Urethral sphincter → Relaxes

3. Urinary bladder → Relaxes
Urethral sphincter → Contracts

4. Urinary bladder → relaxes
Urethral sphincter → Relaxes

77.

In the given four statements (a-d), select the options, which includes all the correct ones only:-

(a) Fibula does not participate in knee joint formation.

(b) Tarsal bones are much larger and stronger than carpal bones because they have to support and distribute body weight.

(c) Scapula situated dorsally in thoracic region between $2^{nd}\ and\ 7^{th}$ rib.

(d) Two half of the pelvis girdle meet dorsally to form the pubic symphysis containing fibrous cartilage.

1. Statement (a), (b), (c)

2. Statement (a), (c), (d)

3. Statement (b), (c), (d)

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

78.

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

1. Protein, sex corticoids

2. Steroid, mineralocorticoids

3. Short peptides, mineralocorticods

4. Steroid, glucocorticoids

79.

Select the option with incorrect combination of the structure with its location and function :-

	Structure	Location	Function
(1)	Corpora quadrigemina	Mid brain	Visual and auditory reflexes
(2)	Thalamus	Wrapped by cerebrum	Major co-ordinating centre for sensory & motor signalling
(3)	Limbic system	Inner part of cerebral hemisphere	Emotions, sexual behaviour and motivation
(4)	Wernick's area	Frontal lobe	Sensory auditory area

1. (1)

2. (2)

3. (3)

4. (4)

80.

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

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

81.

Which of the following statements is true for cockroaches?

1. The total number of ovarioles are five in both ovaries
2. The larval stage is called naiad
3. Anal styles are absent in females
4. They are ureotelic

82.

Which of the following is a correct match w.r.t. members listed and corresponding taxon?

1. Earthworm, silkworm, hookworm – Annelida
2. Sea hare, sea lily, sea urchin – Echinodermata
3. Cuttle fish, devil fish, apple snail – Mollusca
4. Sea horse, flying fish, dog fish – Chondrichthyes

83.

Select the **correct** match

I	**II**
(i) Loop of Henle	(a) 70-80% reabsorption
(ii) Collecting Duct	(b) Conditional reabsorption of Na^+
(iii) PCT	(c) Renal medulla
(iv) DCT	(d) Allows passage of urea

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

84.

Choose the **correct** statement

1. ADH deficiency leads to diabetes mellitus
2. Kidneys produce urine more concentrated than initial filtrate
3. A healthy human produces 5L urine per day
4. Ascending limb of loop of Henle is permeable to water

85.

Vomiting is an emetic reflex which is regulated by

1. Hypothalamus
2. Superior colliculi of midbrain
3. Medulla oblongata
4. Pons

Zoology - Section B

86.

The similarities between the eyes of an octopus and of a mammal are a result of:

1. Convergent evolution
2. Divergent evolution
3. Saltation
4. Retrograde evolution

87.

Hisardale a new breed of sheep developed in Punjab by crossing Bikaneri ewes and Merino rams is an example of

1. Outcrossing
2. Cross-breeding
3. Interspecific hybridisation
4. Outbreeding

88.

The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called

1. natural selection
2. convergent evolution
3. non- random evolution
4. adaptive radiation

89.

Which of the following sequences best represents the pathway of an action potential through the Heart's conduction system?

(i) Sino-atrial (SA) node

(ii) Purkinje fibres

(iii) Bundle of His

(iv) Atrio-ventricular (AV) node

(v) Right and left bundle branches

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

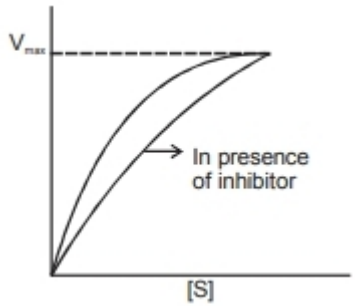
90.

Partial pressure of CO_2 in alveoli of lungs

1. Equal to that in the deoxygenated blood.
2. More than that in thee deoxygenated blood.
3. Less than that in the deoxygenated blood.
4. More than that of CO_2 in alveoli.

91.

Which of the following statement is correct regarding the given graph?



1. Permanent binding of inhibitor with enzyme.
2. Km remains the same.
3. It represents inhibition of succinate dehydrogenase by malonate.
4. It represents inhibition of cytochrome oxidase by cyanide.

92.

Neurohypophysis store and release hormones which are actually synthesised by hypothalamus and are transported axonally here. Which of the following hormones belong to this category?
1. Glucocorticoid gonadotropins
2. FSH, LH
3. Oxytocin, Vasopressin
4. TSH, ACTH

93.

Which one is the most abundant protein in the animal world?

1. Collagen

2. RUBISCO

3.Trypsin

4. Insulin

94.

Chylomicrons are protein-coated small fat globules formed in

1. Lumen of intestine

2. Lacteals of villi

3. Cells of mucosa

4. Blood vessels of villi

95.

In the given diagram identify A, B, C :-

	(A)	(B)	(C)
(i)	Tropomyosin	F-Actin	Troponin
(ii)	Troponin	Tropomyosin	F-Actin
(iii)	F-Actin	Tropomyosin	Troponin
(iv)	Tropomyosin	Troponin	F-Actin

1. 1

2. 2

3. 3

4. 4

96.

Choose the incorrect statement

1. Photoreceptors in the human eye are depolarized in darkness while hyperpolarized during bright light

2. Hypothalamus regulates the body temperature

3. Rhodopsin which is present in rods, a type of photoreceptor cells is a derivative of vitamin C

4. Eustachian tube equalizes pressure on either side of the eardrum

97.

Which of the following is incorrect w.r.t different hominids, their cranial capacities and characteristics?

	Hominid	Cranial capacity	Characteristics
1	*Homo habilis*	650-800	Herbivorous, tool-maker
2	*Homo erectus*	900 cc	Discovered fire, ate meat
3	Neanderthal man	1400 cc	Used hides as clothing and had burial customs
4	*Australopithecus* africans	700 cc	Bipedal, used stone tools

98.

Which type of natural selection is said to have occurred when more individuals acquire peripheral character value at both ends of the distribution curve?

1. Stabilising selection
2. Balancing selection
3. Disruptive selection
4. Directional selection

99.

Which of the following in not associated with the secretion of milk in mammary glands?

1. Mammary duct
2. Mammary lobes
3. Mammary alveoli
4. Glandular cells

100.

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

Chemistry - Section A

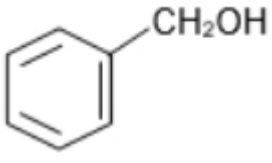
101.

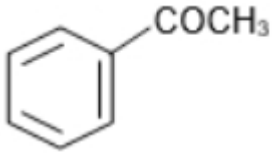
Which of the following is a redox reaction?

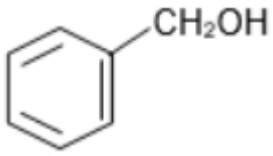
1. $NaCl + KNO_3 \rightarrow NaNO_3 + KCl$
2. $CaC_2O_4 + 2HCl \rightarrow CaCl_2 + H_2C_2O_4$
3. $Mg(OH)_2 + 2NH_4Cl \rightarrow MgCl_2 + 2NH_4OH$
4. $Zn + 2AgCN \rightarrow 2Ag + Zn(CN)_2$

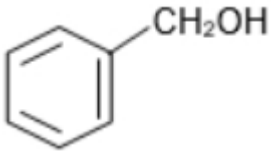
102.

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

1.  $\xrightarrow{K_2Cr_2O_7}$

2.  $\xrightarrow[(ii)\,H_3O^+]{(i)\,NaOCl}$

3.  $\xrightarrow{PCC}$

4.  $\xrightarrow{KMnO_4/H^+}$

103.

Which one of the elements has the highest ionization energy?

1. $[Ne]3s^23p^1$

2. $[Ne]3s^23p^2$

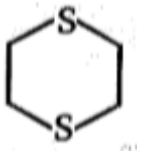
3. $[Ne]3s^23p^3$

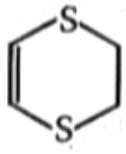
4. $[Ar]3d^{10}4s^24p^2$

104.

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

105.

One of the essential alpha-amino acids is:

1. Lysine

2. Glycine

3. Serine

4. Proline

106.

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

1. Zero

2. First

3. Second

4. More than zero but less than first

107.

Which one of the following is not a common component of photochemical smog?

1. Ozone

2. Acrolein

3. Peroxyacetyl nitrate

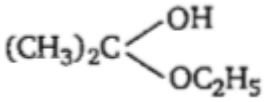
4. Chlorofluorocarbons

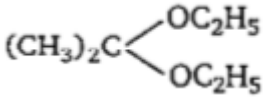
108.

Acetone is treated with excess ethanol in the presence of hydrochloric acid. The product obtained is

1. $CH_3\,CH_2\,CH_2 - \overset{\overset{O}{\|}}{C} - CH_3$

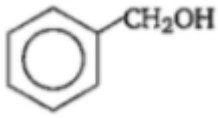
2. $CH_3\,CH_2\,CH_2 - \overset{\overset{O}{\|}}{C} - CH_2\,CH_2\,CH_3$

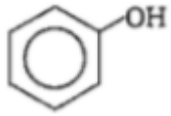
3. 

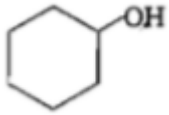
4. 

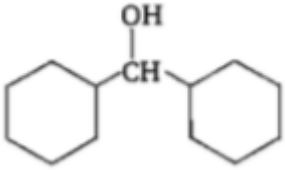
109.

Which one of the following is most acidic?

1. 

2. 

3. 

4. 

110.

The osmotic pressure of 5% (mass-volume) solution of cane sugar at 150°C (mol. mass of sugar = 342) is

1. 4 atm

2. 5.07 atm

3. 3.55 atm

4. 2.45 atm

111.

The colour of hydrogen is –

1. Blue

2. Yellow

3. Orange

4. No colour

112.

Alkali metals dissolve in liquid ammonia to give a blue colored solution which is due to the presence of

1. M^- atoms

2. M^+ ions

3. Solvated anions

4. Solvated electrons

113.

Which of the following has maximum bond strength-

1. O_2

2. O_2^+

3. O_2^-

4. O_2^{2-}

114.

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

115.

The equivalent conductance of $\frac{M}{32}$ solution of a weak monobasic acid is 8.0 mho $cm^2$and at infinite dilution is 400 mho cm^2. The dissociation constant of this acid is

1. 1.25×10^{-5}
2. 1.25×10^{-6}
3. 6.25×10^{-4}
4. 1.25×10^{-4}

116.

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. $[CrCl.(H_2O)_5]Cl_2.H_2O$

117.

Which of the following hydride is most acidic?

1. $H_2\,Te$
2. $H_2\,Se$
3. H_2S
4. H_2O

118.

$SO_2 + H_2S \rightarrow$ product. The final product is:

1. $H_2O + S$
2. $H_2\,SO_4$
3. $H_2\,SO_3$
4. $H_2S_2O_3$

119.

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

120.

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

121.

Which of the strong oxidizing agent among the following?

1. Tl^{3+}
2. Ga^{3+}
3. In^{3+}
4. Al^{3+}

122.

Coordination number is maximum in

1. $\left[Co\left(\ NH_3\right)_6\right]^{+3}$
2. $\left[Cr\left(C_2O_4\right)_3\right]^{3-}$
3. $\left[CoCl_3\left(H_2O\right)_3\right]$
4. All of the above have the same coordination number

123.

Iodoform test is not given by

1. $CH_3COOH_2COOC_2H_5$

2. CH_3COCH_3

3. $CH_3CH_2COCH_3$

4. $CH_3CH_2CHOHC_2H_5$

124.

What is $[H^+]$ of a solution that is 0.1M HCN and 0.2 M NaCN:-

(K_a for HCN = 6.2×10^{-10})

1. 3.1×10^{10}

2. 6.2×10^{5}

3. 6.2×10^{-10}

4. 3.1×10^{-10}

125.

The correct order of tendency to get oxidize is

1. $HClO_4 > HClO_3 > HClO_2 > HOCl$

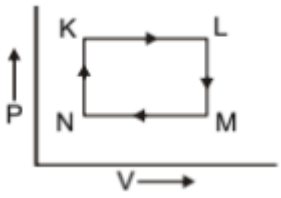
2. $HOCl > HClO_2 > HClO_3 > HClO_4$

3. $HClO_2 > HOCl > HClO_3 > HClO_4$

4. $HClO_3 > HClO_4 > HOCl > HClO_2$

126.

The pair of isochoric among the transformation of state is:



1. K to L and L to M

2. L to M and N to K

3. L to M and M to N

4. M to N and N to K

127.

The effect that makes 2,3–dimethyl-2-butene more stable than 2-butene is

1. Resonance

2. Hyperconjugation

3. Steric effect

4. Inductive effect

128.

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

129.

At what concentration of CH_3COOH will the $[H^+]$ obtained will be same as that obtained from 10^{-2} M HCOOH,
$\left(Ka\left(CH_3\,COOH\right) = 10^{-5},\ Ka\left(HCOOH\right) = 10^{-4}\right)$

1. 10 M

2. 5 M

3. 10^{-1} M

4. 6 M

130.

Which concept contradicts the Bohr Model of an atom?

1. Rutherford Model

2. Heisenberg's Uncertainty Principle

3. J.J. Thomson Model

4. Photoelectric Effect

131.

What is the increasing ionic character of the following compounds?

$N-H,\ F-H,\ C-H$ and $O-H$

1. $N-H>\ F-H\ >\ C-H>\ O-H$

2. $F-H>N-H>C-H\ >O-H$

3. $O-H>C-H>F-H>N-H$

4. $F-H>O-H>N-H>C-H$

132.

$\text{Benzene} + CH_3\,Cl \xrightarrow{AlCl_3} C_6H_5\,CH_3$

Mechanism & intermediate involve in the above reaction is/are

1. Aromatic electrophilic substitution & carbocation

2. Aromatic Nucleophilic substitution & carbanion

3. Aromatic free radical substitution & Free radical

4. Carbene based substitution reaction & Carbene

133.

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

1. Nucleophilic addition reaction

2. Electrophilic addition reaction

3. Nucleophilic substitution reaction

4. Electrophilic substitution reaction

134.

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.

135.

A compound A when reacted with PCl_5 and then with ammonia gave B. B when treated with bromine and caustic potash produced C. C on treatment with $NaNO_2$ and HCl at $0^\circ C$ and then boiling produced ortho-cresol. Compound A is:

1. *o*-Toluic acid

2. *o*-Chlorotoluene

3. *o*-Bromotoluene

4. *m*-Toluic acid

Chemistry - Section B

136.

Melamine plastic crockery is a copolymer of:

1. HCHO and melamine

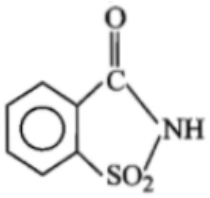
2. HCHO and ethylene

3. Melamine and ethylene

4. none of the above

137.

Which is correct about saccharin?

1. It is 

2. It is 550 times sweeter than sugar

3. It is used as a sweetening agent

4. All of the above

138.

For the equilibrium of the reaction, HgO(s) $\rightleftharpoons$ Hg(g) + $\frac{1}{2}$ O_2(g), k_P for the reaction at total pressure of P is:

1. $K_P=\frac{2}{3^{3/2}}p^{3/2}$

2. $K_P=\frac{2}{3^{1/2}}p^{1/2}$

3. $K_P=\frac{1}{3^{2/3}}p^{3/2}$

4. $K_P=\frac{1}{3^{2/3}}p$

139.

Leaching of Ag_2S is carried out by heating it with a dilute solution of:

1. NaCN only

2. HCl

3. NaOH

4. NaCN in presence ofO_2

140.

The rate constant, the activation energy and the Arrhenius parameter of a chemical reaction at 25°C are $3.0\ \times 10^{-4}\ s^{-1}$, $104.4\ kJ\ mol^{-1}$and $6.0\ \times 10^{14}\ s^{-1}$ respectively the value of the rate constant as T$\rightarrow \infty$ is :

1. $2.0\times\ 10^{18}\ s^{-1}$

2. $6.0\times\ 10^{14}s^{-1}$

3. ∞

4. $3.6\times\ 10^{30}\ s^{-1}$

141.

Xenon crystallizes in face center cubic lattice and the edge of the unit cell is 620 pm, then the radius of the Xenon atom is-

1. 219.20 pm

2. 438.5 pm

3. 265.5 pm

4. 536.94 pm

142.

Which one of the following electrolytes has the same value of Van't Hoff factor (i) as that of $Al_2(SO_4)_3$ (if all are 100% ionized)?

1. K_2SO_4

2. $K_3[Fe(CN)_6]$

3. $Al(NO_3)_3$

4. $K_4[Fe(CN)_6]$

143.

Actinoids exhibit more number of oxidation states than lanthanoids. The main reason for this is :

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

2. Greater metallic character of the lanthanoids than that of the corresponding actinoids

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

4. More active nature of the actinoids

144.

Which is low spin complex :

1. $\mathrm{Fe\,(CN)_6^{3-}}$

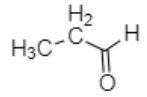
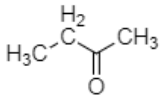
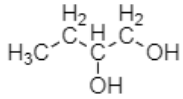
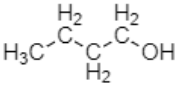
2. $\mathrm{Co\,(NO_2)_6^{3-}}$

3. $\mathrm{Mn\,(CN)_6^{3-}}$

4. All

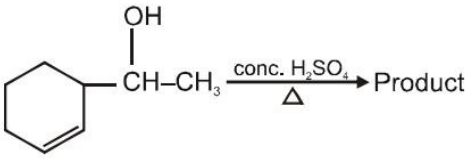
145.

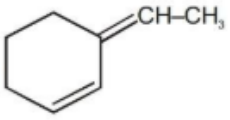
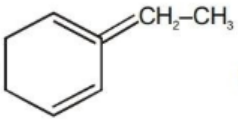
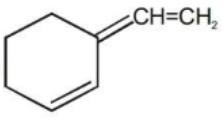
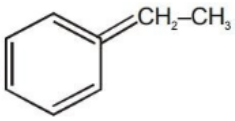
Alkaline hydrolysis of $C_4H_8Cl_2$ gives a compound (A) which on heating with NaOH and I_2produces a yellow precipitate of CHI_3.The compound (A) should be.

1. 
2. 
3. 
4. 

146.

The main product of following reaction will be :-



1. 
2. 
3. 
4. 

147.

The coagulation values in millimoles per liter of the electrolytes used for the coagulation of As_2S_3 are given below

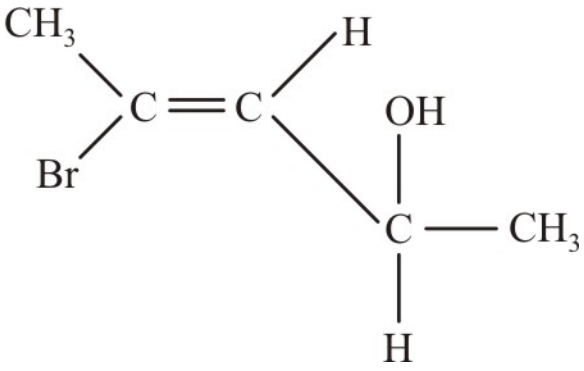
(I) (NaCl)=52 (II) ($BaCl_2$)=0.69 (III) ($MgSO_4$)=0.22

The correct order of their coagulating power is

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

148.

The compound, whose stereochemical formula is shown below, exhibits A-geometrical isomers and B-optical isomers



The values of A and B are

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

149.

The correct order of ease of hydrolysis is

1. $CCl_4 < SiCl_4 < PCl_5 < AlCl_3$
2. $AlCl_3 < CCl_4 < PCl_5 < SiCl_4$
3. $CCl_4 < AlCl_3 < PCl_5 < SiCl_4$
4. $CCl_4 < AlCl_3 < SiCl_4 < PCl_5$

150.

Which of the following oxyacid contains both P-H and P-P bond simultaneously?

1. $H_4P_2O_5$

2. $H_4P_2O_7$

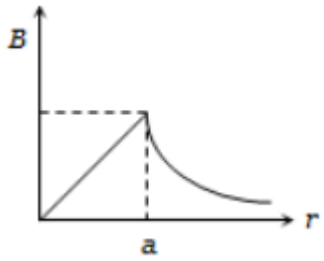
3. $H_4P_2O_6$

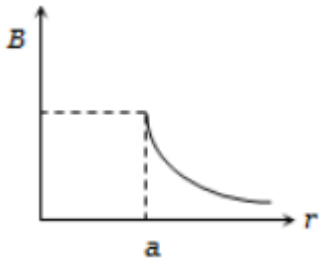
4. None

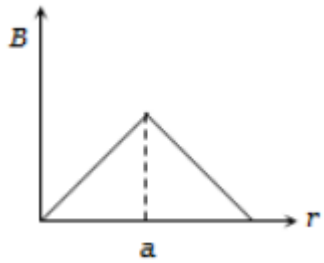
Physics - Section A

151.

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

1. 

2. 

3. 

4. 

152.

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

153.

The displacement of a particle is given by $y = 5 \times 10^{-4} \sin\left(100t - 50x\right)$, where *x* is in meter and *t* is in sec. Find out the velocity of the wave **:**

1. 5000 *m*/*sec*

2. 2 *m*/*sec*

3. 0.5 *m*/*sec*

4. 300 *m*/*sec*

154.

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

155.

To break a wire, a force of $10^6\ N/m^2$ is required. If the density of the material is $3 \times 10^3\ kg/m^3$, then the length of the wire which will break by its own weight will be :

1. 34 m

2. 30 m

3. 300 m

4. 3 m

156.

How many NAND gates are used to form AND gate?

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

157.

The average energy of molecule for each degree of freedom is

1. $\frac{3}{2}\mathrm{kT}$
2. $\frac{\mathrm{kT}}{2}$
3. $\frac{3}{4}\mathrm{kT}$
4. kT

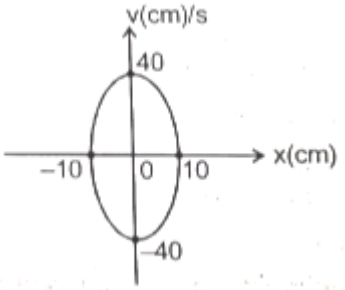
158.

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

1. $\pi^2\,\mathrm{ms}^{-2}$ and direction along the tangent to the circle
2. $\pi^2\,\mathrm{ms}^{-2}$ and direction along the radius towards the centre.
3. $\frac{\pi^2}{4}\ \mathrm{ms}^{-2}$ and direction along the radius towards the centre.
4. $\pi^2\,\mathrm{ms}^{-2}$ and direction along the radius away from the centre.

159.

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



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

160.

The angle of minimum deviation for a prism is 40° and the angle of the prism is 60°. The angle of incidence in this case will be -

1. 30°
2. 60°
3. 50°
4. 100°

161.

A long wire carrying a steady current is bent into a circular loop of one turn. The magnetic field at the centre of the loop is B. It is then bent into a circular coil of n turns. The magnetic field at the centre of this coil of n turns will be:

1. nB
2. n^2B
3. 2nB
4. $2n^2B$

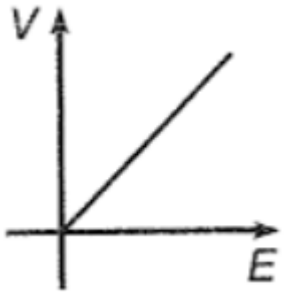
162.

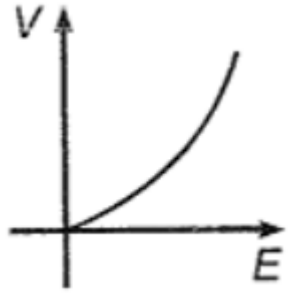
A rigid body rotates about a fixed axis with a variable angular velocity equal to $\alpha - \beta t$, at the time t, where α, β are constants. The angle through which it rotates before its stops

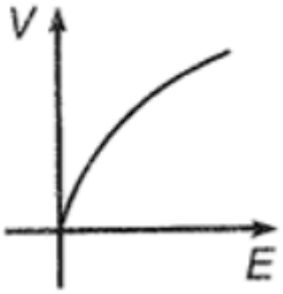
1. $\frac{\alpha^2}{2\beta}$
2. $\frac{\alpha^2-\beta^2}{2\alpha}$
3. $\frac{\alpha^2-\beta^2}{2\beta}$
4. $\frac{(\alpha-\beta)\alpha}{2}$

163.

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. 

164.

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

165.

A small square loop of wire of side '*l*' is placed inside a large square loop of side '*L*' (L≫l). If the loops are coplanar and their centres coincide, the mutual inductance of the system is directly proportional to:

1. L/l

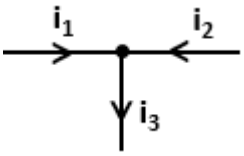
2. l/L

3. L^2/l

4. l^2/L

166.

If current i_1 = 3A sinωt and current i_2 = 4A cosωt, then i_3 is



1. $5A\sin(\omega t+53^\circ)$
2. $5A\sin(\omega t+37^\circ)$
3. $5A\sin(\omega t+45^\circ)$
4. $5A\sin(\omega t+30^\circ)$

167.

Two light sources are said to be coherent when their:

1. amplitudes are equal and have a constant phase difference.

2. wavelengths are equal.

3. intensities are equal.

4. frequencies are equal and have a constant phase difference.

168.

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

169.

A metal rod is placed on smooth horizontal surface at temperature $25^\circ C$. Now temperature of surroundings is increased up to $100^\circ C$, then during heating of rod

1. Mechanical strain developed in rod is nonzero

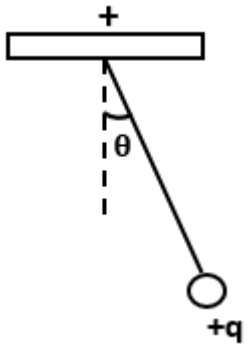
2. Mechanical stress developed in rod is nonzero

3. Length of rod will increase

4. All of these

170.

A pendulum oscillates with the time period T. The string, used in the pendulum, , is stretchable. The point to which it is attached is given a positive charge and the bob is also given positive charge q. The time period of the pendulum will



1. Increase
2. Decrease
3. Remain the same
4. May increase or decrease

171.

If y=a sin(bt-cx), where y and x represent length; t represents time, then which of the following has the same dimensions as that of $\frac{ab^2}{c}$?

1. $(\text{Speed})^2$
2. Momentum
3. Angle
4. Acceleration

172.

Three masses m, 2m, and 3m are thrown from the top of a tower such that m is thrown vertically upward with 10m/s, 2m is thrown horizontally with 15m/s and 3m is thrown vertically downward with 5m/s. The acceleration of centre of mass of the three-body system will be-

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

173.

Centre of mass of a system of particles

1. Depends on frame of reference
2. Does not depend on frame of reference
3. May change due to internal forces
4. All of these

174.

If a charging source supplies charges at constant potential (V), then work done by the charging source is W = qV and energy stored in the charged conductor is U = $\frac{1}{2}qV$. Remaining $\frac{1}{2}qV$ energy is wasted as

1. Heat
2. Light
3. Sound
4. All of these

175.

Three identical point masses each of mass 1 kg lie at three points (0, 0), (0, 0.2 m), (0.2 m, 0). The net gravitational force on the mass at the origin is

1. $6.67 \times 10^{-9}\left(\hat{i}+\hat{j}\right)$ N
2. $1.67 \times 10^{-9}\left(\hat{i}+\hat{j}\right)$ N
3. $1.67 \times 10^{-9}\left(\hat{i}-\hat{j}\right)$ N
4. $1.67 \times 10^{-9}\left(-\hat{i}-\hat{j}\right)$ N

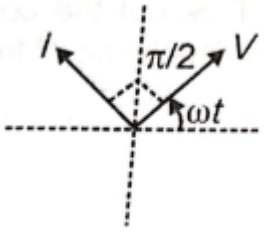
176.

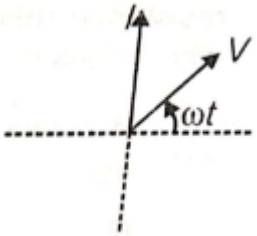
A car travels A to B with speed V_1 and returns to A with speed V_2. The average speed of the car V is

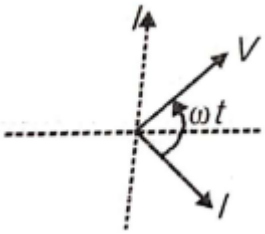
1. Zero
2. $\frac{V_1+V_2}{2}$
3. $\frac{2V_1V_2}{V_1+V_2}$
4. $\frac{V_1V_2}{2(V_1+V_2)}$

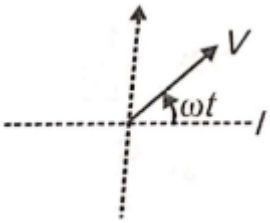
177.

The capacitor and a resistor are connected in series across a.c supply. Which of the following phasor diagrams may be correct?

1. 

2. 

3. 

4. 

178.

When the 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

179.

The amount of work to be done to form a soap bubble of radius R is:

(S = surface tension of soap bubble]

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

180.

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

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

181.

If the amplitude of the magnetic field is 3×10^{-6} T, then the amplitude of the electric field for an electromagnetic wave is:

1. 100 V m^{-1}
2. 300 V m^{-1}
3. 600 V m^{-1}
4. 900 V m^{-1}

182.

What is the shortest wavelength present in the Paschen series of spectral lines?

1. 818.9 nm
2. 779 nm
3. 500 nm
4. 1024 nm

183.

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

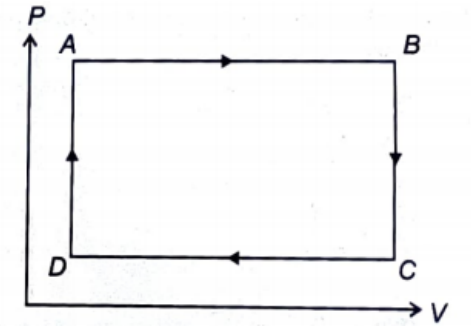
184.

In a transistor, the base is very lightly doped as compared to the emitter because by doing so

1. The flow across the base region is mainly because of electrons
2. The flow across the base region is mainly because of holes
3. Recombination is decreased in the base region
4. Base current is high

185.

The pressure and volume of a gas are changed as shown in the P-V diagram in this figure. The temperature of the gas will:



1. increase as it goes from A to B.
2. increase as it goes from B to C.
3. remain constant during these changes.
4. decrease as it goes from D to A.

Physics - Section B

186.

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

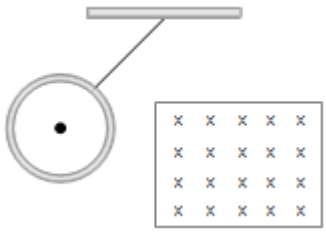
187.

A rigid body moves a distance of 10 m along a straight line under the action of a force of 5N. If the work done by this force on the body is 25 Joules, the angle which the force makes with the direction of motion of the body is:

1. 0°
2. 30°
3. 60°
4. 90°

188.

A metallic ring connected to a rod oscillates freely like a pendulum. If now a magnetic field is applied in horizontal direction so that the pendulum now swings through the field, the pendulum will



1. Keep oscillating with the old time period
2. Keep oscillating with a smaller time period
3. Keep oscillating with a larger time period
4. Come to rest very soon

189.

Four equal charges Q are placed at the four corners of a square of each side 'a'. Work done in removing a charge $-Q$ from its centre to infinity is

1. 0
2. $\frac{\sqrt{2}Q^2}{4\pi\varepsilon_0 a}$
3. $\frac{\sqrt{2}Q^2}{\pi\varepsilon_0 a}$
4. $\frac{Q^2}{2\pi\varepsilon_0 a}$

190.

The time period of the spring-mass system depends upon

1. the gravity of earth
2. the mass of block
3. spring constant
4. Both 2 & 3

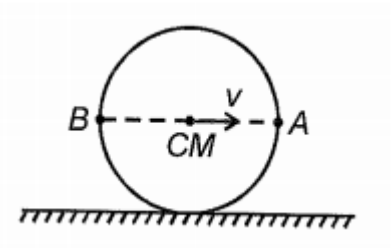
191.

A radionuclide decays 50% in 1 h. If the activity of the radionuclide is A_0 at a certain instant, then after two hours, the activity will become

1. $\frac{A_0}{2}$
2. $\frac{A_0}{4}$
3. $\frac{A_0}{8}$
4. $\frac{A_0}{16}$

192.

A solid sphere is rolling without slipping such that velocity of its centre of mass is v. Ratio of speed of points A & B at horizontal extremes is-



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

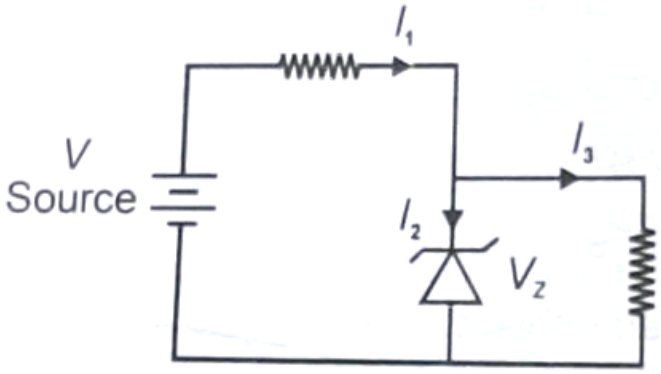
193.

A cell of emf 2V and internal resistance 1 Ω, is connected across a resistor of resistance 3 Ω. The voltage across the terminals of the cell will be

1. 1.5 V
2. 2.0 V
3. 1.39 V
4. 1.79 V

194.

A zener diode is shown in the following circuit diagram. When the source voltage fluctuates such that $V > V_z$,then



1. All the current I_1, I_2 and I_3 change
2. Only I_1, I_2 change and I_3 remains constant
3. Only I_1, I_3 change and I_2 remains constant
4. All the currents remain constant

195.

An object is placed in front of a concave mirror. The distance of object from the focus is 10 cm and the distance of the image from the focus is 40 cm. Then the focal length of the mirror is-

1. 20 cm
2. 10 cm
3. 40 cm
4. 30 cm

196.

Resolving power of compound microscope

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

197.

Which of the following statement/s is/are incorrect regarding the motion in a plane?

1. A body can't move on a curved path with constant acceleration.

2. The angle between acceleration and velocity can be 90°.

3. The angle between acceleration and velocity can be other than 90°.

4. All of the above.

198.

A point mass 'm' is moved in a vertical circle of radius 'r' with the help of a string. The velocity of the mass is $\sqrt{7gr}$ at the lowest point. The tension in the string at the lowest point is :

1. 6 mg

2. 7 mg

3. 8 mg

4. 1 mg

199.

A string tied on a roof bears a maximum tension of 50 kg-wt. The minimum acceleration that can be acquired by a man of 98 kg to descend will be [Take g=9.8 m/s^2]

1. 9.8 m/s^2

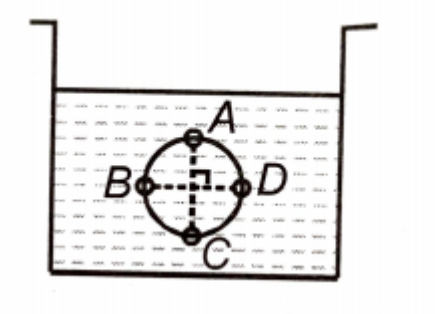
2. 4.9 m/s^2

3. 4.8 m/s^2

4. 5 m/s^2

200.

Figure shows a container filled with a liquid of density ρ. Four points A, B, C and D lie on the diametrically opposite points of a circle as shown. Points A and C lie on vertical line and points B and D lie on horizontal line. The incorrect statement is (p_A, p_B, p_C, p_D are absolute pressure at the respective points)



1. $p_D = p_B$

2. $p_A < p_B = p_D < p_C$

3. $p_D = p_B = \frac{p_C - p_A}{2}$

4. $p_D = p_B = \frac{p_C + p_A}{2}$

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