Botany - Section A

1.

Pneumatophores are seen in:

1. *Rhizophora*
2. Banyan tree
3. Carrot
4. Turnip

2.

Plastids used in storing proteins are called as:

1. Amyloplasts
2. Aleuroplasts
3. Elaioplasts
4. Chromoplasts

3.

Consider the following statements:

l. Accessory pigments enable a wider range of light to be utilized for photosynthesis.

ll. The reaction center of PSI is P680 and that of PSII is P700.

lll. The stroma lamellae membranes lack both PSII and NADP reductase.

Which of the above statements are true?

1. l and ll only
2. l and lll only
3. ll and lll only
4. l, ll and lll

4.

Which of the following is a recessive trait for a character chosen by Mendel in garden pea?

1. Violet flower colour
2. Yellow pod colour
3. Axial flower position
4. Tall stem height

5.

According to Erwin Chargaff, for a double stranded DNA

1. The ratios between Adenine and Thymine, and , Guanine and Cytosine are constant and equals one.

2. The ratios between Adenine and Thymine, and , Guanine and Cytosine are constant but is not equal to one.

3. The ratios between Adenine and Guanine, and , Thymine and Cytosine are constant and equals one.

4. The ratios between Adenine and Guanine, and , Thymine and Cytosine are constant but is not equal to one.

6.

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

	Microbe	Product	Application
1.	Clostridium butylicum	Lipase	Removal of oil stains
2.	Trichoderma polysporum	Cyclosporin A	Immunosuppressive drug
3.	Monascuspur pureus	Statins	Lowering of blood cholesterol
4.	Streptococcus	Streptokinase	Removal of clot from blood vessel

7.

A pollen tube liberates male gametes into

1. Degenerating synergid
2. Intact synergid
3. Antipodals
4. Egg

8.

Mendelian disorders are mainly determined by:
1. Alteration or mutation in a single gene.
2. Chromosomal gross structural changes.
3. Recombination between linked genes.
4. Jumping genes

9.

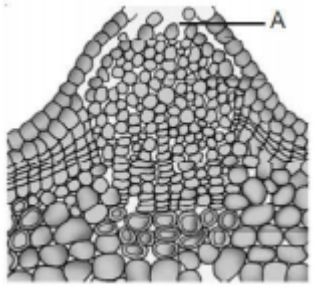
What is the main arena of all cellular activities of a cell?
1. Cell wall
2. Cell membrane
3. Nucleus
4. Cytoplasm

10.

Exploration of molecular , genetic and species level diversity for novel products of economic importance is known as
1. biopiracy
2. bioenergetics
3. bioremediation
4. bioprospecting

11.

In the given diagram, which is not related with (A) as indicated in the diagram?



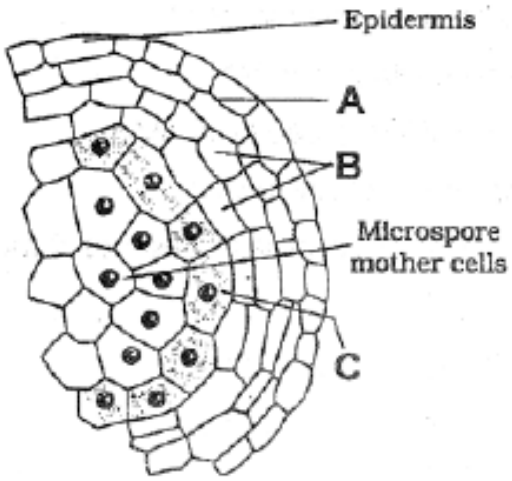
1. Complimentary cells.
2. Involved in the exchange of gases.
3. Lens-shaped opening called lenticels.
4. Found in herbaceous trees.

12.

Out of the following how many are micronutrient and macronutrient?
Cu, S, Ca, Zn, Mn, Mg, Cl, Fe, B

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

13.



The above given diagram is an enlarged view of one microsporangium of a matured anther. Identify A, B and C

1. A - Middle layer, B - Endothecium, C – Tapetum
2. A - Endothecium, B - Tapetum, C - Middle layer
3. A - Endothecium, B - Middle layer, C – Tapetum
4. A- Tapetum, B - Middle layer, C – Endothecium

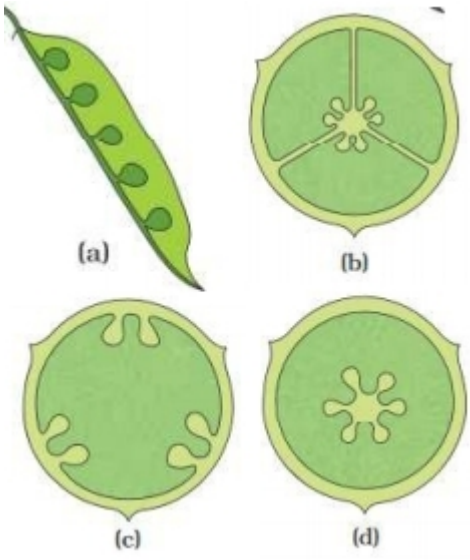
14.

If due to mutation, both the strands of DNA start transcribing, which of the following will not be the consequence of this?

1. Complicate the genetic information transfer machinery
2. One segment of DNA would code for two different protein
3. Will prevent translation
4. Will result in polyploidy

15.

Placentations given below in the diagrams are



1. a - Basal, b- Axile, c- Free central, d - Parietal
2. a - Marginal, b- Axile, c- Basal, d - Superfecial
3. a - Marginal, b- Free central, c- Basal, d - Axile
4. a - Marginal, b- Axile, c- Parietal, d - Free central

16.

Which is the incorrect statement regarding fungi?

1. Wheat rust causing agent is Puccinia.
2. Penicillium is a source of antibiotics.
3. The cell wall of fungi are composed of peptidolycan.
4. Fungi prefer to grow in warm and humid places.

17.

'Resource partitioning' is an important mechanism which promotes

1. Competitive release
2. Co-existence
3. Competitive exclusion
4. Antibiosis

18.

Statement -1: In animals mitotic cell division is only seen in the diploid somatic cells.
Statement-2: In plants mitotic division takes place in both haploid & diploid cells.

Option :
1. Both statements 1 & 2 are correct.
2. Only statement 1 is correct.
3. Only statement 2 correct.
4. Both statements 1 & 2 are incorrect.

19.

Verhulst-Pearl logistic growth
(a) Occurs when resources are unlimited
(b) Is expressed as $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
(c) Exhibits sigmoid curve
(d) Is characterized by the function of carrying capacity

1. All are correct
2. Only (a) & (b) are correct
3. Only (a) is incorrect
4. Only (b) & (c) are incorrect

20.

A store house of collected plant specimens that are dried, pressed and preserved on sheets is known as
1. Flora
2. Manual
3. Herbarium
4. Botanical garden

21.

Proton gradient develops across the thylakoid membrane due to all, except
1. Splitting of water towards lumen side
2. $NADP^+$ reduction towards stroma side
3. Movement of protons from lumen to stroma side by PQ
4. Release of H^+ from stroma to lumen side by a H-carrier

22.

In which step of glycolysis does water form?
1. Fructose 1,6 –bisphosphate $\rightarrow$ Glyceraldehyde-3-phosphate

2. 1,3 bisphosphoglyceric acid $\rightarrow$ 3-phosphoglyceric acid

3. 2-phosphoglycerate $\rightarrow$ Phosphoenolpyruvate

4. Phosphoenolpyrespruvate $\rightarrow$ Pyruvic acid

23.

The fate of pyruvic acid during Aerobic respiration is

1. Lactic acid fermentation

2. Alcoholic fermentation

3. Oxidative decarboxylation

4. Photophosphorylation

24.

Which plant hormone was isolated by F.W. Went from tips of coleoptiles of oat seedlings?

1 Auxin

2 Zeatin

3 Gibberellin

4 Abscisic acid

25.

Which of the following is **correct** for mycorrhiza?

1. Absorbs nitrogen and water only

2. Helps in nitrogen fixation and hence, regarded as fertilizer

3. Absorb and store N, P, K, and Ca

4. Restricted to gymnospermous plants only

26.

Neutral solutes directly pass through the lipid bilayer of plasma membrane because

1. Plasma membrane has special carrier for them
2. They are lipid soluble
3. They have specific hydrophilic areas for their passage
4. They consume ATP

27.

In ferns, fertilization does not involve:

1. Archegonia
2. Water
3. Pollen tube
4. Flagellated antherozoids

28.

The unmodified (functioning) allele which represents the original phenotype is the (a) allele and the modified allele is (b) the (c) allele.

1. (a) Recessive, (b) generally, (c) dominant
2. (a) dominant, (b) always, (c) recessive
3. (a) dominant, (b) generally, (c) recessive
4. (a) recessive, (b) always, (c) dominant

29.

Movement of water and mineral in cell wall & intercellular space is called as:-

1. Symport
2. Antiport
3. Symplast
4. Apoplast

30.

Which of the given can be used as an immunosuppressive agent in organ transplant patients?

1. Statins
2. Cyclosporin A
3. Streptokinase
4. Amylase

31.

The longest phase of the cell cycle is

1. G_2 phase
2. S phase
3. M phase
4. Interphase

32.

In which of the following set of plants, symbiotic association of cyanobacteria is present?

1. *Cycas, Pinus*
2. *Lichens, Pinus*
3. *Lichens, Pisum*
4. *Cycas, Azolla*

33.

The cell wall resembles a soapbox in the organism of which of the given kingdom according to Whittaker's classification system?

1. Monera
2. Protista
3. Fungi
4. Plantae

34.

Avery et. al. found that transformation is affected by

1. Protease
2. RNase
3. DNase
4. Lipase

35.

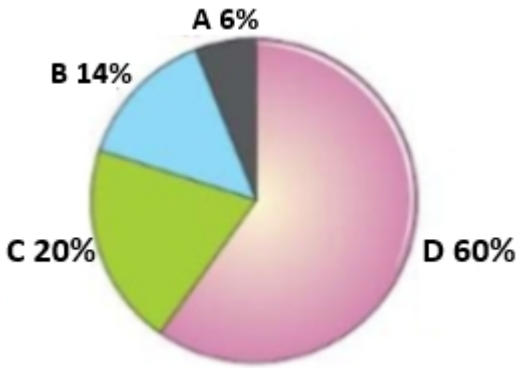
Which of the following is not related to meiosis phase of the cell cycle?

1. Recombination
2. Crossing over
3. DNA replication
4. Sister chromatid separation

Botany - Section B

36.

The following pie chart shows the relative contribution of radiatively active gases to greenhouse effect. The contribution of N_2O is shown by:



1. A
2. B
3. C
4. D

37.

How many of the following is responsible for seed dormancy?
(1) Abscissic acid.
(2) Phenolic acid.
(3) Para ascorbic acid.
(4) Hard seed coat.
(5) Immature embryo.
(6) GA_3

Options

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

38.

Read the following statements:

(a) F_0 part of ATPase is associated with breakdown of proton gradient

(b) A H-carrier contributes in creation of proton gradient

(c) Movement of electrons in ETS is coupled to pumping of protons into the lumen

(d) Formation of NADPH + H^+ is related with the creation of proton gradient

How many of the above statements are correct?

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

39.

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 utilization of its benefits.
4. To convert forest to agricultural land so as to feed the growing human population.

40.

Regarding competition find out the wrong statement

1. Unrelates species could compete for the same resource

2. In competition fitness of one species is lowered in presence of other species

3. Abingdon tortoise became extinct due to competitor starfish

4. Balanus led to exclusion of Chathamalus from rocky coasts of Scotland

41.

Morphology of chromosomes and shape of chromatid is best observed at:-

1. Metaphase, Anaphase

2. Prophase, Metaphase

3. Anaphase, Telophase

4. Only telophase

42.

There is a clear division of labour within the chloroplast. The membrane system is responsible for

1 Trapping of light energy

2 Conversion of CO_2 into glucose

3 Consumption of ATP and NADPH

4 Providing site for dark reaction

43.

Choose incorrect match

1. Chloroplast - Thylakoid

2. Golgi bodies - Cristae

3. Mitochondria - Oxisome

4. Centriole - Microtubules

44.

Pyramid of numbers in a grassland ecosystem is

1. Spindle-shaped

2. Upright

3. Urn shaped

4. Inverted

45.

I : Zoospores are the most common asexual reproductive structures in algae

II :Algae and fungi always require water for fertilization always.

1. Both I & II are correct and II is the correct explanation of I

2.Both I & II are correct but the II is not the correct explanation of I

3. I is a correct statement but II is not correct.

4. Both I & II are incorrect statements.

46.

Which of the following statements are correct about Amazon rainforests?

(I) They are called lungs of the plants.

(II) They harbor millions of species.

(III) They are the largest tropical forest in South America and have the highest biodiversity on earth.

(IV) They are cut and cleared for cultivating soybeans or for conversion to grassland for raising beef cattle.

1. II, III and IV

2. I, II and III

3. I and II

4. I, II, III and IV

47.

The embryo sac of an Angiosperm is made up of
1. 3 cells and 3 nuclei
2. 7 cells and 8 nuclei
3. 8 cells and 8 nuclei
4. 7 cells and 7 nuclei

48.

Nitrate assimilation is the process in plant in which

1. N_2 is converted into NH_3
2. NH_3 is converted into N_2
3. NO_2^- is converted into NO_3^-
4. NO_3^- is converted into NO_2^-

49.

50% of the male gametes have only autosomes and the rest 50% have both autosomes and one sex chromosomes in

1. Grasshopper
2. Drosophila
3. Birds
4. Butterflies

50.

Better-yielding semi-dwarf varieties of rice are

1. Shakti and Rattan
2. Sonalika and Kalyan Sona
3. Atlas-66 and Protina
4. Jaya and Ratna

Zoology - Section A

51.

Homeothermy is exhibited by:

1. All amniotes
2. Birds and Mammals
3. All deuterostomes
4. Reptiles and Mammals

52.

In a surface ECG the QRS complex represents:

1. Atrial depolarization
2. Atrial repolarization
3. Ventricular depolarization
4. Ventricular repolarization

53.

All the following are secreted by the anterior pituitary except:-

1. Prolactin
2. Somatotropin
3. Vasopressin
4. Gonadotropins

54.

"Saheli" is a(n)

1. NGO working for female child rights
2. Mid-wife working in villages to help in child immunization
3. A national helpline number for prevention of crimes against women
4. Oral contraceptive for females

55.

Which of the following glands secretes the hormone melatonin?
1. anterior pituitary gland.
2. melanocytes.
3. pineal gland.
4. suprachiasmatic nucleus of hypothalamus.

56.

Androgenic steroids in females are secreted by:
1. pineal gland
2. Testes
3. Adrenal cortex
4. Hypothalamus

57.

The right atria of the human heart receives:

1. Oxygenated blood
2. Deoxygenated blood
3. Arterial blood
4. Venous blood

58.

What happens to the majority of the follicles during the phase from birth to puberty?

1. They get invested by multiple layers of granulosa cells
2. They enlarge in size and then get dormant
3. They undergo atresia or degeneration
4. They cluster together at one end of the ovary

59.

Mark the incorrect match

	Secretion	Composition
1.	Pancreatic juice	Amylases,lipases, Nucleases, procarboxypeptidases
2.	Bile	Bilirubin, bile salts, cholesterol, phospholipids.
3.	Succus entericus	Amylases, dipeptidases, lipases, nucleosidases
4.	saliva	Amylases, Lysozyme, K^+, HCO_3^-

60.

A fall in glomerular filtration rate (GFR) activates

1. Adrenal cortex to release aldosterone.
2. Adrenal medulla to release adrenaline.
3. Posterior pituitary to release vasopressin.
4. Juxtaglomerular cells to release rennin.

61.

The phylum which was earlier considered as a subphylum under chordata but now placed as a separate phylum, in non-chordates is

1. Urochordata
2. Hemichordata
3. Cephalochordata
4. Vertebrata

62.

Which of the following muscles act involuntarily?

(a) Striated muscles

(b) Smooth muscles

(c) Cardiac muscles

(d) Skeletal muscles

1. (a) & (b)
2. (b) & (c)
3. (c) & (d)
4. (a) & (d)

63.

What happens to the volume of the pulmonary cavity when there is an increase in the volume of the thoracic chamber?

1. It decreases
2. It increases
3. It remains the same
4. First decreases and then increases

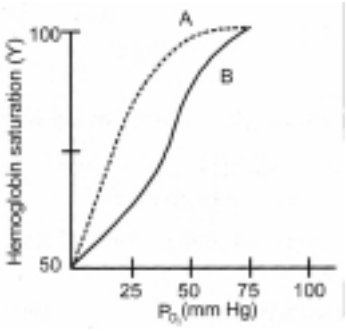
64.

DNA fragments separated by gel electrophoresis are shown. Mark the correct statement :

1. Band 3 contains more positively charged DNA molecules than band 1.
2. Band 3 indicates more charge density than bands 1 and 2.
3. Band 1 has longer DNA fragment than bands 2 and 3.
4. All bands have equal length and charges but differ in base composition.

65.

Oxygen haemoglobin dissociation curves are represented as A and B. Select the incorrect interpretation



1. Curve B has increased ability to unload O_2 in tissues, w.r.t. curve A.

2. The shift in a curve from B to A is associated with decreased P50 value.

3. At elevated temperature the curve will shift from B to A.

4. Shift in a curve from A to B is associated with decreased O_2 carrying capacity of haemoglobin.

66.

Read the following statements:-

(a) Human liver is the largest endocrine gland of the body having two lobes.
(b) Hepatic lobules are the structural and functional units of the liver and contain hepatocytes which are arranged in a chord-like manner.
(c) Glisson's capsule is covering of each lobule and is made up of connective tissue.
(d) Bile juice is formed and secreted by hepatocytes and is stored in a liver sinusoid.

Out of these which statements are correct and incorrect?

1. Statements a and b are correct while c & d are incorrect.

2. Statements a and d are correct while b & c are incorrect.

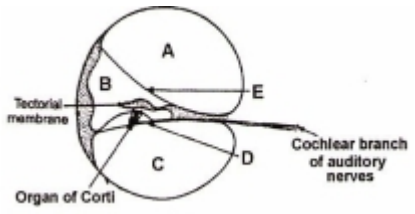
3. Statements b & c are correct while a & d are incorrect.

4. Statements b and d are correct while a & c are incorrect.

67.

___A___ is a major coordinating centre for sensory and motor signaling present in the forebrain of central nervous system. Here 'A' is
1. Association area
2. Thalamus
3. Pons
4. Hypothalamus

68.



Go through the above sectional view of Cochlea. Identify A to E –

1. A – Scala vestibule, B – Scala media, C – Scala tympani, D – Basilar membrane, E – Reissner's membrane

2. A – Scala media, B – Scala vestibule, C – Scala tympani, D – Basilar membrane, E – Reissner's membrane

3. A – Scala tympani, B – Scala media, C – Scala vestibule, D – Basilar membrane, E – Reissner's membrane

4. A – Scala vestibule, B – Scala media, C – Scala tympani, D – Reissner's membrane, E – Basilar membrane

69.

The Indian government has set up an organization that makes decisions regarding the validity of GM research and the safety of introducing GM organisms for public services. The organization is

1. GEAC

2. IBC

3. MOEF

4. FDA

70.

Seminal plasma consists of the secretions of

1. Seminal vesicles

2. Prostate glands

3. Bulbourethral glands

4. All of these

71.

Hashish and marijuana are hallucinogenic substances extracted from

1 *Papaver somniferum*

2 *Cannabis sativa*

3 *Erythroxylon*

4 *Claviceps purpura*

72.

Sponge cells, separated by straining pieces of sponge through a fine net, can reaggregate and grow into a sponge. This experiment indicates that sponges have

1. Acellular level of organisation

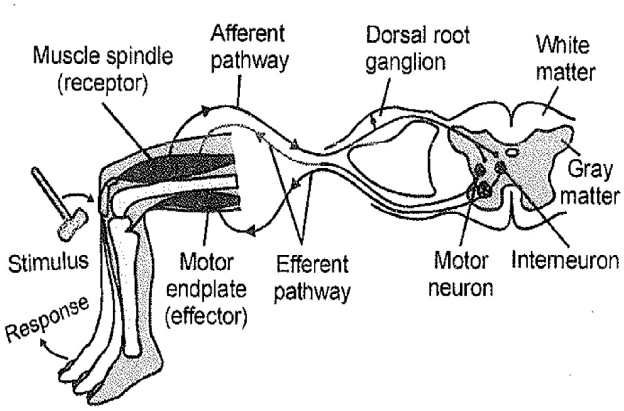
2. Tissue grade level of organisation

3. Cellular level of organisation

4. Organ level of organisation

73.

Which type of reflex is represented by the following diagram when the doctor taps the knee with rubber headed hammer? Which of the following is absent in this reflex (Muscle spindle, Interneuron, Afferent pathway, Efferent pathway)?



1. Simple reflex, muscle spindle

2. knee jerk reflex, interneuron

3. Monosynaptic reflex, muscle spindle

4. Polysynaptic, interneuron

74.

Which of the follwing is a secondary lymphoid organ?

1. Thymus

2. Kidney

3. Bone marrow

4. Spleen

75.

When a skeletal muscle contracts

1. H-zone increases in length

2. A band decreases in length

3. I-bands get reduced

4. H-zone remains unaffected

76.

Which of the following statements is incorrect regarding test-tube baby?

1. Early embryo (with upto 8 blastomeres) is transferred into the fallopian tube

2. Embryo with more than 8 blastomeres is transferred into the uterus

3. ICSI method is also considered as type of IVF

4. Ovum gets implanted in the fallopian tube and further development occurs in the uterus

77.

How many of the following statements are true regarding follicle stimulating hormone?

(i) FSH secreted by anterior pituitary cells, is called gonadotropin

(ii) Its target organs are the ovaries and testes

(iii) In the ovaries, it stimulates the secretion of ovarian hormones

(iv) In the testes, it stimulates the production of sperm

1. Only (i), (ii), (iii)

2. Only (ii), (iii), (iv)

3. (i), (ii), (iii), (iv)

4. Only (i), (iii)

78.

Cry II Ab and *Cry I* Ab produce toxins when introduced into plants which help to control against

1. Cotton boll worm and cotton borer respectively

2. Corn borer and cotton boll worm respectively

3. Cotton boll worm and corn borer respectively

4. Tobacco bud worm and Nematoda respectively

79.

Secondary metabolites Abrin and Ricin are

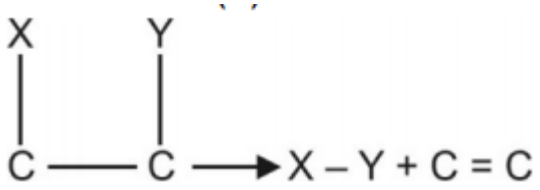
1. Alkaloids

2. Drugs

3. Lectins

4. Toxins

80.

The reaction,  is catalyzed by a/an

1. Transferase
2. Hydrolase
3. Lyase
4. Isomerase

81.

Skeletal muscle fibres are

1. Branched, spindle shaped and uninucleated
2. Striped, multinucleated and unbranched
3. Unbranched, involuntary and cylindrical in shape
4. Voluntary, unbranched and uninucleated

82.

Choose the incorrect match w.r.t. total number of following structures in cockroach

1. Spiracles – 10 pairs
2. Gastric caecae – 6-8
3. Malpighian tubules – 100-150
4. Ommatidia – 2000

83.

The enzyme known as molecular scissors in genetic engineering is

1. DNA ligase
2. Transferases
3. DNA polymerase
4. Restriction endonuclease

84.

Concentration of urine depends upon which organ :

1. Bowman's capsule
2. Length of Henle's loop
3. P.C.T.
4. Network of capillaries arising from glomerulus

85.

Which pair is correct :

1. Sweat = temperature regulation
2. Saliva = sense of food taste
3. Sebum = sexual attraction
4. Humerus = Hind leg

Zoology - Section B

86.

Which of the following endocrine glands is under the direct neural regulation of the hypothalamus?
1. Pineal
2. Thymus
3. Posterior pitutary
4. Adrenal medulla

87.

Vestibular apparatus is composed of
I. Semi-circular canals.
II. Otolith organs.
III. Organ of corti.
IV. Crista and macula.

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

88.

Recombinant DNA technology has allowed the production of __A__ of pathogen in bacteria or yeast. Here A is:-
1. Pro-toxin.
2. Anti-bodies.
3. Antigenic polypeptide.
4. Antigenic polysaccharide.

89.

Myosin filaments are:-

1. thin filament

2. found only in I band

3. absent from H zone

4. attached to M line

90.

An example of gene therapy is

1. Preparation of two DNA sequences corresponding to A and B chain of human insulin and introducing them in the plasmids of E. coli to produce insulin chains

2. lntroduction of a functional ADA c-DNA (using retroviral vector) in the lymphocytes which are subsequently returned to the patient

3. Bt-toxin gene transferred from the bacteria into the host plant

4. Using Agrobacterium vectors, nematode specific genes are introduced into host plant for RNA interference

91.

The practice of mating of animals within the same breed but having no common ancestors on either side of their pedigree for 4-6 generations is called

1. Inbreeding

2. Outcrossing

3. Cross-breeding

4. Interspecific hybridisation

92.

Virus-infected cells secrete proteins called interferon which protect non-infected cells from further viral infection. This comes under

1 Physical barrier

2 Physiological barrier

3 Cellular barrier

4 Cytokine barrier

93.

In a mm^3 of blood, the maximum number and minimum number of cells would be respectively

1. WBCs, RBCs

2. RBCs, WBCs

3. RBCs, Platelets

4. Platelets, WBCs

94.

Match the lung volumes given in column I with their respective values in column II.

Column-I	Column-II
a. Tidal volume	(i) 1000 mL
b. Residual volume	(ii) 2500-3500 mL
c. Inspiratory reserve volume	(iii) 1200 mL
d. Expiratory reserve volume	(iv) 500 mL

1. a(i), b(ii), c(iii), d(iv)

2. a(i), b(iv), c(ii), d(iii)

3. a(ii), b(iii), c(i), d(iv)

4. a(iv), b(iii), c(ii), d(i)

95.

Which one of the following biomolecules is correctly characterised ?
1. Palmitic acid - an unsaturated fatty acid with 18 carbon atoms
2. Adenylic acid - adenosine with a glucose phosphate molecule
3. Alanine amino acid - Contains an amino group and an acidic group anywhere in the molecule
4. Lecithin - a phosphorylated glyceride found in cell membrane

96.

A fall in glomerular filtration rate (GFR) activates -
1. Adrenal cortex to release aldosterone
2. Adrenal medulla to release adrenaline
3. Posterior pituitary to release vasopressin
4. Juxta glomerular cells to release renin

97.

In present times the origin of life is not possible from inorganic compounds due to :
1. Raw material not available
2. High conc. Of O_2 in atmosphere
3. Decrease in temperature
4. Excess of pollution

98.

On Galapagos island Darwin observed variation in beaks of birds (Darwin's finches) and he concluded :
1. Inter species variation
2. Intraspecies variation
3. Natural selection according to food
4. Inheritance of acquired characters

99.

Industrial melanism is example of :
1. Natural selection
2. Mutation
3. Racial difference
4. Predation

100.

Which one is obtained by S. Miller in his experiments on origin of life before 1953 :
1. Simple sugars
2. Amino acids
3. Nucleotide
4. Peptides

Chemistry - Section A

101.

$Cr_2O_7^{2-} + X \xrightarrow{H^+} Cr^{3+} + H_2O$ + oxidized product of X, X in the above reaction cannot be

1. $C_2O_4^{2-}$

2. Fe^{2+}

3. SO_4^{2-}

4. S^{2-}

102.

Combustion of glucose takes place according to the equation, $C_6H_{12}O_6 + 6O_2 \rightarrow 6\,CO_2 + 6H_2O$, $\Delta H = -72$ kcal. How much energy will be required for the production of 1.6 g of glucose (Molecular mass of glucose = 180 g)

1. 0.064 kcal

2. 0.64 kcal

3. 6.4 kcal

4. 64 kcal

103.

Which of the following order(s) is correct for the size?

(a) $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$

(b) $Al^{3+} < Mg^{2+} < Li^{+} < K^{+}$

(c) $Fe^{4+} < Fe^{3+} < Fe^{2+} < Fe$

(d) $Mg > Al > Si > P$

1. (a), (b) & (c)
2. (b), (c) & (d)
3. (a), (c)
4. (a), (b), (c) & (d)

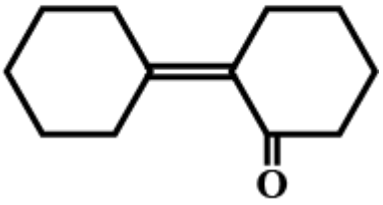
104.

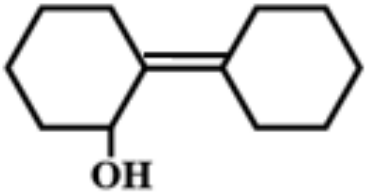
In the reaction $M + O_2 \rightarrow MO_2$ (superoxide) the metal is -

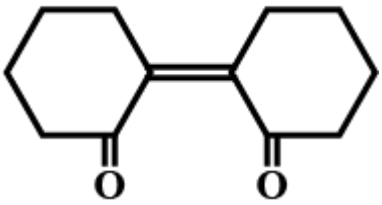
1. Li
2. Na
3. K
4. Ba

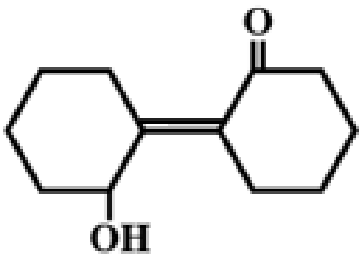
105.

What is the product formed when cyclohexanone undergoes aldol condensation followed by heating?

1. 

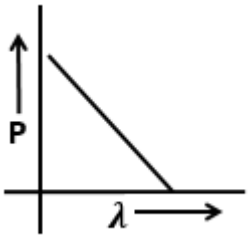
2. 

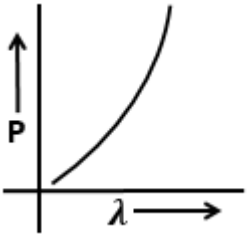
3. 

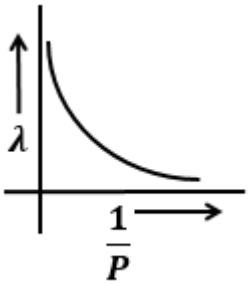
4. 

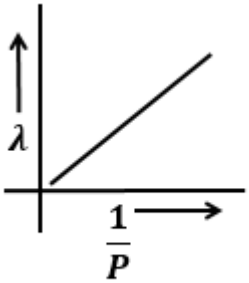
106.

Which of the following graphs correctly represents the variation of particles' momentum with de-Broglie wavelength?

1. 

2. 

3. 

4. 

107.

Maximum –I effect is exerted by the group

1. C_6H_5-
2. $-OCH_3$
3. $-CI$
4. $-NO_2$

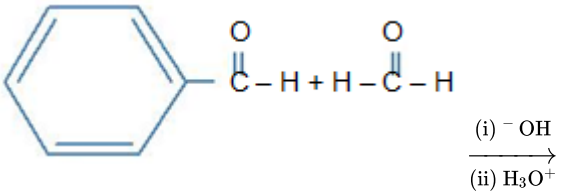
108.

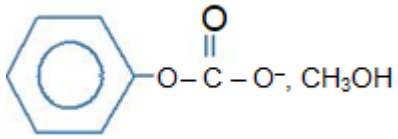
Which one of the following gases is liberated when ethyl alcohol is heated with methyl magnesium iodide?

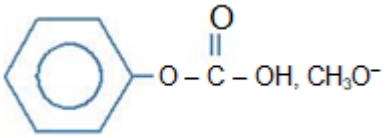
1. Methane
2. Ethane
3. Carbon dioxide
4. Propane

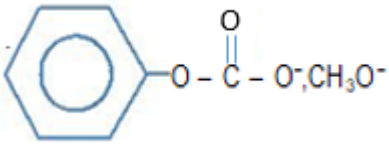
109.

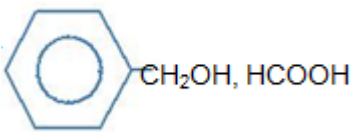
What are the products of the following crossed Cannizzaro reactions



1. 

2. 

3. 

4. 

110.

$A(C_3H_9N)$ reacts with benzenesulfonyl chloride to give an insoluble salt in alkali. The compound (A) is

1. $CH_3CH_2CH_2NH_2$
2. $CH_3NHCH_2CH_3$
3. $CH_3-\overset{CH_3}{\underset{|}{N}}-CH_3$
4. Any of these

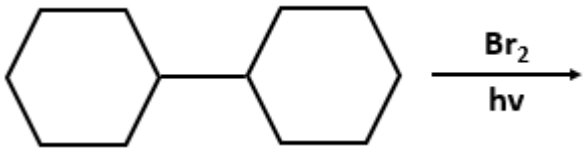
111.

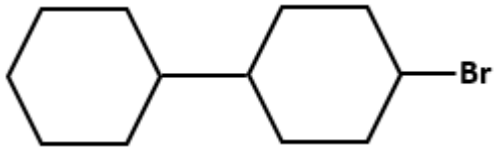
The oxidation number of phosphorus in $\mathrm{Ba}\left(\mathrm{H}_2\,\mathrm{PO}_2\right)_2$ is :

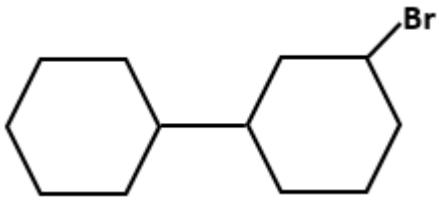
1. -1
2. +2
3. +3
4. +3

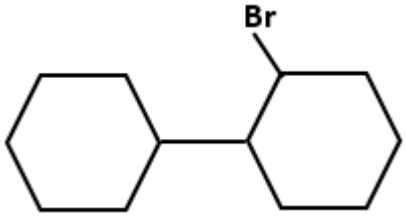
112.

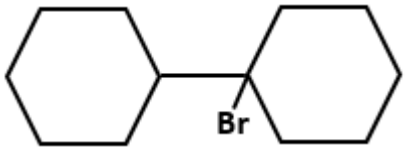
Major product for the reaction is -



1. 

2. 

3. 

4. 

113.

An acid among the following is-

1. $\mathrm{B(OH)_3}$
2. $\mathrm{Al\,(OH)_3}$
3. $\mathrm{Fe\,(OH)_3}$
4. None of the above

114.

An ideal gas expands isothermally from $10^{-3} m^3$ *to* $10^{-2}\ m^3$ at 300 K against a constant pressure of $10^5\ Nm^{-2}$. The work done by the gas is:

1. +270 kJ
2. -900 J
3. +900 kJ
4. -900 kJ

115.

Which of the following is not alcohol?

1. CH_2=$CHCH_2OH$
2. CH_2OHCH_2OH
3. $C_6H_5CH_2OH$
4. C_6H_5OH

116.

Which can be used for removing both temporary and permanent hardness of water?

1. $NaHCO_3$
2. Boiling
3. $Ca(OH)_2$
4. $Na_6P_6O_{18}$

117.

The correct acidic nature order is

1. $HClO_2$ < $HClO_3$ <$HClO_4$
2. H_3PO_4 < H_3PO_3 <H_3PO_2
3. CH_4 <NH_3 <H_2O<HF
4. All of these

118.

Which halogen gives O_2 with hot conc. NaOH is

1. F_2
2. Cl_2
3. Br_2
4. l_2

119.

The correct IUPAC name of $\left[Pt(en)_2Cl(ONO)\right]^{++}$ is

1. Chlorodiethylenediaminenitritoplatinum(IV) ion
2. Bis(ethylenediamine)chloronitro-o-platinum(IV) ion
3. Chloridobis (ethylenediamine) nitritoplatinum(IV) ion
4. Chlorodiethylenediaminenitro-o-platinum(IV) ion

120.

For S_N1 reaction, preferred solvent will be

1. Water
2. Benzene
3. Ether
4. Toluene

121.

Which of the following has the highest magnetic moment?

1. $K_4\left[Fe(CN)_6\right]$
2. $\left[Fe(H_2O)_6\right]SO_4$
3. $K_3\left[Fe(CN)_6\right]$
4. $\left[Co(NH_3)_6\right]SO_4$

122.

Smog is essentially caused by the presence of

1. O_2, O_3

2. O_2 , N_2

3. Oxide of N and S

4. O_3, N_2

123.

A fuel cell develops an electrical potential from the combustion of butane at 1 bar and 298 K

$C_4H_{10}(g) + 6.5O_2(g) \rightarrow 4\,CO_2(g) + 5H_2O(l);$

What is E° of a cell? given $\Delta G = -2746 kJ/mole$

1. 4.74 V

2. 0.547 V

3. 4.37 V

4. 1.09 V

124.

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

1. O_2^+

2. O_2^-

3. O_2^{2-}

4. O_2^{2+}

125.

A gas X at 1 atm is bubbled through a solution containing a mixture of 1M Y^-
and 1M Z^- at 25 ^oC . If the reduction potential of Z>Y>X, then

1. Y will oxidize X and not Z
2. Y will oxidize Z and not X
3. Y will oxidize both X and Z
4. Y will reduce both X and Z

126.

At STP the density of CCl_4 vapor in g/L will be nearest to

1. 8.67

2. 6.87

3. 3.67

4. 4.26

127.

ln which of the following molecules/ions, all the bonds are unequal?

1. SF_4

2. SiF_4

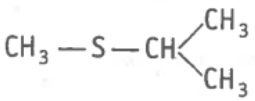
3. XeF_4

4. BF_4^-

128.

Which type of structural isomerism compounds is shown below

$CH_3 - S - CH_2 - CH_2 - CH_3$ and



1. Tautomer

2. Positional isomer

3. Functional isomerism

4. Ring Chain isomerism

129.

$$\underset{\text{Ethyl acetate}}{CH_3COOC_2H_5} + H_2O \xrightarrow{H^+} \underset{\text{Acetic acid}}{CH_3COOH} + \underset{\text{Ethyl alcohol}}{C_2H_2OH}$$

The above reaction is an example of ?

1. Pseudo-first-order reaction
2. First-order reaction
3. Second order reaction
4. Third-order reaction

130.

How does the surface tension of liquid vary with an increase in temperature?

1. Remains same
2. Decreases
3. Increases
4. No regular pattern is followed

131.

K_a for CH_3COOH is 1.8×10^{-5} and K_b for NH_4OH is 1.8×10^{-5}. The pH of ammonium acetate will be

1. 7.005
2. 4.75
3. 7.0
4. Between 6 and 7

132.

At 500 K, equilibrium constant, K_c, for the following reaction is 5.

$$\frac{1}{2}H_2(g) + \frac{1}{2}I_2(g) \rightleftharpoons HI(g)$$

What would be the equilibrium constant K_c for the reaction?

$$2\,HI(g) \rightleftharpoons H_2(g) + I_2(g)$$

1. 0.04
2. 0.4
3. 25
4. 2.5

133.

In comparison to a 0.01 M solution of glucose, the depression in the freezing point of a 0.01 M $MgCl_2$ solution is .....

1. The same
2. About twice
3. About three times
4. About six times

134.

$$C_{12}H_{22}O_{11} \xrightarrow[H_2O]{?} 2C_6H_{12}O_6$$

The enzyme used for the above conversion is

1. Amylase
2. Lactase
3. Maltase
4. Peptidase

135.

$(CH_3)_3CCH_2CH(Br)C_6H_5$ is -

1. Secondary benzyl halide
2. Secondary alkyl halide
3. Primary alkyl halide
4. Secondary allyl halide

Chemistry - Section B

136.

The rate constant of a particular reaction has the dimensions of a frequency. What is the order of the reaction?

1. Zero
2. First
3. Second
4. Fractional

137.

The unit cell dimensions of a cubic lattice (edges a, b, c and the angles between them, $\alpha,\ \beta,\ \gamma$) are

1. a=b=c, $\alpha = \beta = \gamma = 90^\circ$
2. a=b≠c, $\alpha = \beta = \gamma = 90^\circ$
3. a=b=c, $\alpha = \gamma = 90^\circ,\ \beta \neq 90^\circ$
4. a≠b≠c, $\alpha = \beta = 90^\circ,\ \gamma \neq 90^\circ$

138.

$$\overset{\overset{H}{|}}{CH_2} - \overset{\overset{Cl}{|}}{CH_2} \xrightarrow[alc.]{NaOH} CH_2 = CH_2$$

The most probable mechanism for this reaction is-

1. E_1
2. E_2
3. $E1_{CB}$
4. α elimination

139.

The addition of non-metals like B and C to the interstitial sites of a transition metal increases -

1. Ductility.
2. Melting Point.
3. Shining.
4. Conductivity.

140.

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

I. (NaCl)= 52,

II. ($BeCl_2$) = 0.69

III. ($MgSO_4$) = 0.22

The correct order of their coagulating power is

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

141.

Which one of the following pairs is isostructural (i.e., having the same shape and hybridization)?

1. $[BCl_3 \text{ and } BrCl_3]$
2. $[NH_3 \text{ and } NO_3^-]$
3. $[NF_3 \text{ and } BF_3]$
4. $[BF_4^- \text{ and } NH_4^+]$

142.

Correct IUPAC name of the given compound is

1. Pent-1-en-3yne
2. Pent-1-ene-4yne
3. Pent-4-yn-1-ene
4. Pent-1-en-4-yne

143.

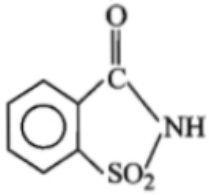
$C_2H_4 \xrightarrow{O_3/\ Zn\ /H_2O_2} \text{Product (A)}$

Product (A) can give

1. Haloform test
2. Aldol condensation
3. Cannizzaro reaction
4. Both (A) & (B)

144.

Which is correct about saccharin?



1. It is
2. It is 550 times sweeter than sugar
3. It is used as sweetening agent
4. All of the above

145.

The correct statement among the following is-

1 SO_2 bleach by reduction

2 Cl_2 bleaches by oxidation

3 O_3 bleaches by oxidation

4 All of the above

146.

Which of the following elements is present as the impurity to the maximum extent in the pig iron?

1. Phosphorus
2. Manganese
3. Carbon
4. Silicon

147.

The ratio of $\frac{K_p}{K_c}$ for the reaction

$CO\left(g\right) + \frac{1}{2}O_2\left(g\right) \rightleftharpoons CO_2\left(g\right)$ is

1. $(RT)^{1/2}$
2. $(RT)^{-1/2}$
3. RT
4. 1

148.

Preservation of fruits against bacterial action by adding sugar is an example of

1. Exosmosis
2. Reverse-osmosis
3. Diffusion
4. Capillary action

149.

Which of the following sets forms the biodegradable polymer?

1. $H_2N\ -\ CH_2-COOH$ and

$H_2N-(CH_2)_5-COOH$

2. $HO\ -CH_2-CH_2-OH$ and

$HOOC-C_6H_4-COOH$

3. $C_6H_5-CH=CH_2$ and

$CH_2=CH-CH=CH_2$

4. $CH_2=CH-CN$ and

$CH_2=CH-CH=CH_2$

150.

Which of the following complex ions is diamagnetic in nature?

1. $\left[Ni\left(CN\right)_4\right]^{2-}$

2. $\left[CuCl_4\right]^{2-}$

3. $\left[CoF_6\right]^{3-}$

4. $\left[NiCl_4\right]^{2-}$

Physics - Section A

151.

Two chambers of different volumes, one containing m_1 g of a gas at pressure P_1 and other containing m_2 g of the same gas at pressure P_2 are joined to each other. If the temperature of the gas remains constant, the common pressure reached is:

1. $\frac{m_1P_1+m_2P_2}{m_1+m_2}$

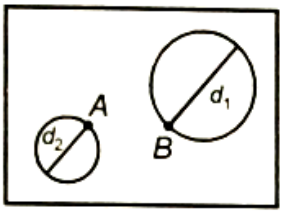
2. $\frac{m_1P_2+m_2P_1}{m_1+m_2}$

3. $\frac{m_1P_2+\left(P_1+P_2\right)}{m^2_1+m_2}$

4. $\frac{\left(m_1+m_2\right)P_1P_2}{m_1P_2+m_2P_1}$

152.

Two holes are cut into a metal sheet. The diameter of the two holes are d_1 and d_2 $(d_1\ >\ d_2)$. If the temperature of the metal sheet is increased, then which of the following distances increases?



1. d_1

2. d_2

3. AB

4. All of these

153.

A charge - Q is moving vertically upwards. If it enters a magnetic field directed towards the south, then the force on the charged particle will be towards:

1. North

2. South

3. East

4. West

154.

A proton and an $\alpha-$particle started moving in a uniform magnetic field with the same magnitude of momentum. If their momenta are normal to the magnetic field, then the ratio of radii of the path of proton to that of $\alpha-$particle is

1. 2:1

2. 1:2

3. $1:\sqrt{2}$

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

155.

When an electron in a hydrogen-like atom jumps from a lower energy level to a higher energy level, its

1. Kinetic energy increases
2. Angular momentum decreases
3. de-Broglie wavelength associated with electron increases
4. Angular momentum remains constant

156.

The wavelength of the first-line in the Balmer Series of hydrogen spectrum is λ, then the wavelength of the second line in this series is:

1. $\frac{20}{27}\lambda$
2. $\frac{27}{20}\lambda$
3. $\frac{25}{27}\lambda$
4. $\frac{27}{25}\lambda$

157.

The vernier scale of a vernier callipers has 20 divisions and total length of the vernier scale is equal to 18 divisions of the main scale. If one division of the main scale is 1 mm, the least count of the instrument is:

1. 0.05 mm
2. 0.10 mm
3. 0.20 mm
4. 0.40 mm

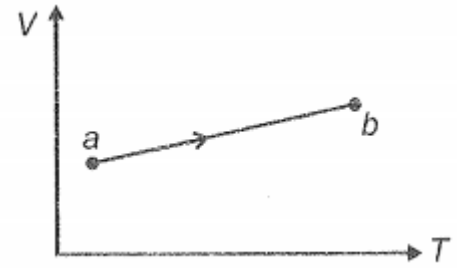
158.

The volume (V) of a nucleus is related to its mass (M) as:

1. $V \propto M$
2. $V \propto \frac{1}{M}$
3. $V \propto M^3$
4. $V \propto \frac{1}{M^3}$

159.

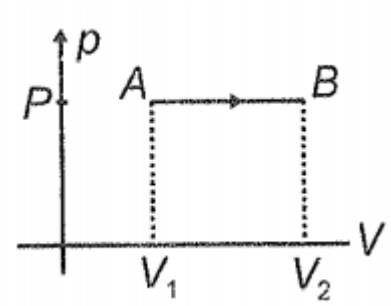
How does the pressure of an ideal gas change during the process shown in the diagram?



1. Pressure increases continuously
2. Pressure decreases continuously
3. Pressure first increases and then decreases
4. Pressure first decreases and then increases

160.

In the PV graph shown for an ideal diatomic gas, the change in the internal energy is:



1. $\frac{3}{2}\mathrm{P}\left(\mathrm{V}_2-\mathrm{V}_1\right)$
2. $\frac{5}{2}\mathrm{P}\left(\mathrm{V}_2-\mathrm{V}_1\right)$
3. $\frac{3}{2}\mathrm{P}\left(\mathrm{V}_1-\mathrm{V}_2\right)$
4. $\frac{7}{2}\mathrm{P}\left(\mathrm{V}_1-\mathrm{V}_2\right)$

161.

The dielectric constant of pure water is 81. Its permittivity will be: (in MKS units)

1. 1.02×10^{-13}
2. 8.86×10^{-12}
3. 7.17×10^{-10}
4. 7.8×10^{-10}

162.

An electric fan rotating at 1200 rpm is switched off. If the fan stops after 10 seconds, the number of revolutions completed by the fan before it stops is: (assume uniform retardation)

1. 100
2. 50
3. 40
4. 20

163.

A solid sphere of mass m and radius R is released from the top of an inclined plane such that it rolls down without slipping. If the coefficient of friction is μ and the angle of inclination is θ with the horizontal, then the force of friction acting on the body is:

1. $\mu \mathrm{mg} \cos\theta$
2. $\mathrm{mg} \sin\theta$
3. $\frac{\mathrm{mg}\sin\theta}{3}$
4. $\frac{2\mathrm{mg}\sin\theta}{7}$

164.

A wire of uniform cross-section has resistance of 20 Ω. The length of the wire is doubled by stretching and then the elongated wire is cut into four equal parts. The resistance of each part is

1. 20 Ω
2. 10 Ω
3. 5 Ω
4. 2.5 Ω

165.

The value of acceleration due to gravity at a height of 800 km from the surface of the earth (radius of the earth is 6400 km and value of acceleration due to gravity on the earth surface is 981 cm/s^2) is:

1. 775 cm/s^2
2. 872 cm/s^2
3. 981 cm/s^2
4. Zero

166.

A 50 kW dc generator produces a potential difference of 250 V. If the resistance of the transmission line is 1 Ω, what percentage of the original power is lost during transmission?

1. 80%
2. 40%
3. 20%
4. 10%

167.

When the emitter current increases by 10 mA, the base current increases by 0.4 mA. The value of voltage gain in the common emitter configuration of the amplifier will be:

(output and input resistance ratio is 50)

1. 1200
2. 1250
3. 150
4. 120

168.

The net charges on p-type semiconductor and n-type semiconductor are, respectively:

1. Positive, negative
2. Negative, positive
3. Positive, positive
4. Zero, zero

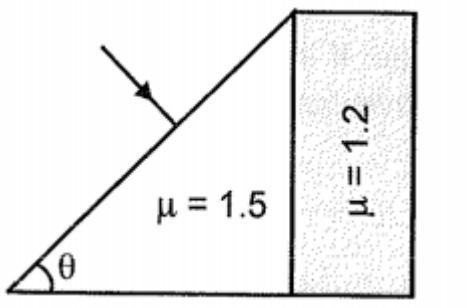
169.

A capacitor of capacity C is charged fully by a cell of emf $\frac{V}{2}$ and then it is disconnected and again connected with a cell of emf V (+ve plate of the capacitor with +ve terminal of cell and vice versa). The heat developed in connecting wire during charging by the second cell is:

1. $\frac{1}{2}CV^2$
2. $\frac{1}{4}CV^2$
3. $\frac{2}{3}CV^2$
4. $\frac{1}{8}CV^2$

170.

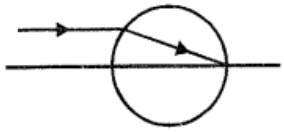
A glass slab is placed with the right-angled prism as shown in the figure. The possible value of θ such that light incident normally on the prism does not pass through the glass slab is:



1. 30°
2. 37°
3. 45°
4. Both (1) & (2)

171.

The following diagram shows a glass sphere of radius 10 cm with a paraxial incident ray. The refractive index of the material of the glass is:



1. 2
2. 1.5
3. 1.75
4. 1.3

172.

If the frequency of incident radiations is doubled, then which of the following will increase?

1. Kinetic energy of the electron
2. Photoelectric current
3. Stopping potential
4. Both (1) & (3)

173.

There is an orifice at some depth of the water tank. Absolute pressure at the level of the orifice in the water tank is 4 atmospheric pressure. The density of water is 10^3 kg /m^3 and 1 atm pressure = 10^5 N/m^2. The speed of water coming out of the orifice is:

1. 10 m/s
2. 20 m/s
3. $10\sqrt{6}$ m/s
4. $10\sqrt{2}$ m/s

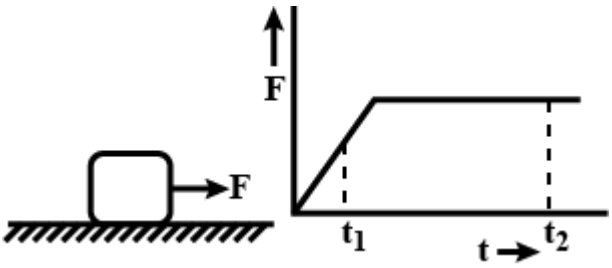
174.

The unit vector perpendicular to vectors $\vec{a} = \left(3\hat{i} + \hat{j}\right)$ and $\vec{b} = \left(2\hat{i} - \hat{j} - 5\hat{k}\right)$ is

1. $\pm\frac{\left(\hat{i}-3\hat{j}+\hat{k}\right)}{\sqrt{11}}$
2. $\pm\frac{\left(3\hat{i}+\hat{j}\right)}{\sqrt{11}}$
3. $\pm\frac{\left(2\hat{i}-\hat{j}-5\hat{k}\right)}{\sqrt{30}}$
4. None of these

175.

A particle is on a smooth horizontal plane. A force F is applied whose F-t graph is given. Then consider the following statements.



a. At time t_1, acceleration is constant.

b. Initially particle must be at rest.

c. At time t_2, acceleration is constant.

d. Initial acceleration is zero.

Select the correct statements:

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

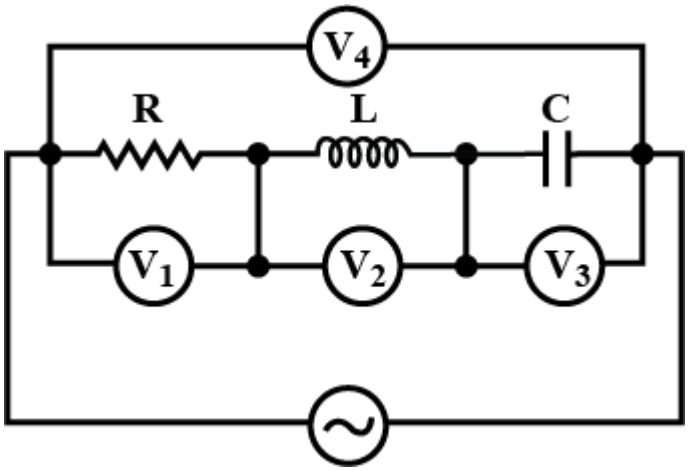
176.

A body starts from rest with uniform acceleration 'a'. Its velocity after n seconds is v. The displacement of the body in the last 3 s is: (assume the total time of journey from 0 to n second)

1. $\frac{v(6n-9)}{2n}$
2. $\frac{2v(6n-9)}{n}$
3. $\frac{2v(2n+1)}{n}$
4. $\frac{2v(n-1)}{n}$

177.

An ideal resistance R, ideal inductance L, ideal capacitance C, and AC voltmeters V_1, V_2, V_3 and V_4 are connected to an AC source as shown. At resonance:



1. $\text{Reading in } V_3 = \text{Reading in } V_1$
2. $\text{Reading in } V_1 = \text{Reading in } V_2$
3. $\text{Reading in } V_2 = \text{Reading in } V_4$
4. $\text{Reading in } V_2 = \text{Reading in } V_3$

178.

Power supplied to a particle of mass 2 kg varies with time as $P = \frac{3t^2}{2}$ Watt where t is in seconds. If the velocity of a particle at t = 0 is v = 0, the velocity of the particle at t = 2 s will be:

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

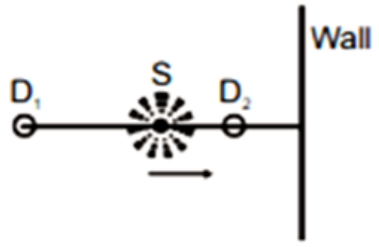
179.

Choose the correct option:

1. The radiation in increasing order of frequency are radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays.
2. The wavelength of colours in increasing order is violet, indigo, green, yellow, orange and red.
3. The speed of light is maximum in vacuum.
4. All options are correct.

180.

A source of sound with frequency n = 2000 Hz moves along a line at right angles to the wall with a velocity $v_s = 0.33$ m/s. Two stationary detectors D_1 and D_2 are placed on the path of the source as shown in the figure. The velocity of the sound in air is v = 330 m/s. Then:



1. Only D_1 records beats
2. Only D_2 records beats
3. Both D_1 and D_2 record beats
4. Neither D_1 nor D_2 record beats

181.

The shape of the graph between the time period of a simple pendulum and its length is:

1. Straight line
2. Parabolic
3. Hyperbolic
4. Elliptical

182.

A dipole with an electric dipole moment $\vec{p}$ is located at a distance r from a long thread charged uniformly with a linear charge density λ. Find the force F acting on the dipole if the vector $\vec{p}$ is oriented along the thread:

1. $\frac{p\lambda}{2\pi\varepsilon_0 r^2}$
2. $\frac{p\lambda}{2\pi\varepsilon_0 r}$
3. $\frac{p}{2\pi\varepsilon_0 r\lambda}$
4. Zero

183.

Young's Modulus depends upon

1. Stress applied on material
2. Strain produced in material
3. Temperature of material
4. All of these

184.

A magnet is brought near a coil in two ways (i) rapidly (ii) slowly. The induced charge will be:

1. More in case (i)
2. More in case (ii)
3. Equal in both the cases
4. More or less according to the radius of the coil

185.

Eddy currents are induced when:

1. a metal block is kept in a changing magnetic field.

2. a metal block is kept in a uniform magnetic field.

3. a coil is kept in a uniform magnetic field.

4. current is passed in a coil.

Physics - Section B

186.

A stone is dropped from a height h. It hits the ground with a certain momentum p. If the same stone is dropped from a height 100% more than the previous height, the momentum when it hits the ground will change by:

1. 68%

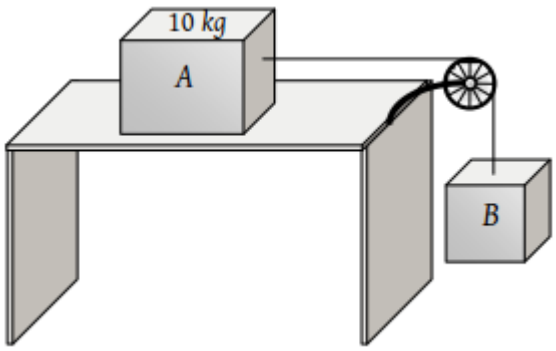
2. 41%

3. 200%

4. 100%

187.

If the mass of block A = 10 kg, coefficient of static friction = 0.2, coefficient of kinetic friction = 0.2, then the minimum mass of block B to start the motion is:



1. 2 kg

2. 2.2 kg

3. 4.8 kg

4. 200 g

188.

Work done to carry a negatively charged body in direction of the electric field: (assuming no other force is acting on the body)

1. is always negative.

2. maybe negative.

3. is always positive.

4. maybe zero.

189.

The possible value of magnetic susceptibility of a diamagnetic material can be :

1. -2.45

2. 0.75

3. -0.5

4. 1.67

190.

In a series LCR circuit, the current through the ac source is 2 A. If resistor R has resistance 10 Ω, the average power dissipated in the circuit is:

1. 20 W

2. 30 W

3. 10 W

4. 40 W

191.

If the half-life of a radionuclide is two hours, the fraction decayed in four hours will be:

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

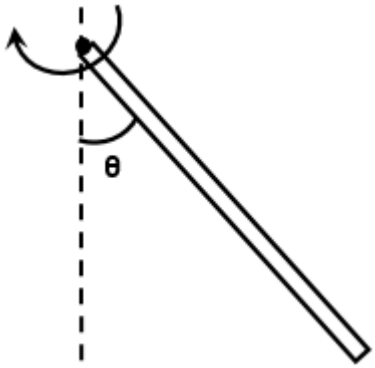
2. $\frac{1}{2}$

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

4. $\frac{1}{8}$

192.

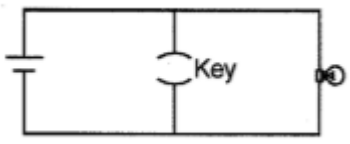
A uniform rod having length *l* is hinged at one end and is free to rotate in the vertical plane. The rod is released from the position making an angle θ with the vertical. The acceleration of the free end of the rod at the instant it is released is:



1. $\frac{3g\sin\theta}{4}$
2. $\frac{3g\cos\theta}{2}$
3. $\frac{3g\sin\theta}{2}$
4. $\frac{3g\cos\theta}{4}$

193.

The circuit shown below is an electrical analogue for which of the following logic gates?



1. AND gate
2. OR gate
3. NOT gate
4. NOR gate

194.

A convex mirror of focal length *f* forms an image which is $\left(\frac{1}{n}\right)$ times the length of the object. The distance of the object from the mirror is:

1. (n−1)f
2. $\left(\frac{n-1}{n}\right)$f
3. $\left(\frac{n+1}{n}\right)$f
4. (n+1)f

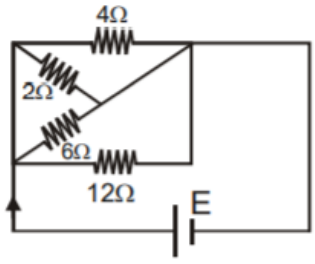
195.

A block weighs 5 N in air, 4.5 N in a liquid of specific gravity 0.5. Its weight in water will be:

1. 3.5 N
2. 4.0 N
3. 2.5 N
4. 3.0 N

196.

For the given circuit, the value of the resistance in which the maximum heat is produced is:



1. 2 Ω
2. 6 Ω
3. 4 Ω
4. 12 Ω

197.

A body is projected at an angle of 30° with the horizontal with a speed of 30 m/s. What is the angle made by the velocity vector with the horizontal after 1.5 sec? (g = 10 m/s^2)

1. 0°
2. 30°
3. 60°
4. 90°

198.

A body of mass 2 kg moving with a velocity of 3 m/s collides with a body of mass of 1 kg moving with a velocity of 4 m/s in opposite direction. If the collision is head-on and completely inelastic, then the wrong statement is:

1. Both bodies move together with velocity (2/3) m/s.
2. The momentum of the system is 2 kg-m/s throughout.
3. The momentum of the system is 10 kg-m/s.
4. The loss of KE of the system is (49/3) J.

199.

What will be the angular width of central maxima in Fraunhofer diffraction when the light of wavelength 6000 $\mathring{A}$ is used and slit width is 12×10^{-5} cm?

1. 2 rad
2. 3 rad
3. 1 rad
4. 8 rad

200.

A body executes S.H.M. with an amplitude A. At what displacement from the mean position, is the potential energy of the body one-fourth of its total energy?

1. $\frac{A}{4}$
2. $\frac{A}{2}$
3. $\frac{3A}{4}$
4. Some other fraction of A

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