

Botany - Section A

1.

A woman receives her X chromosomes from:

1. Her mother only
2. Her father only
3. Both her mother and father
4. Mitochondria of mother only

2.

An inferior ovary:

1. is situated on the receptacle above the perianth and androecium.
2. is positioned below the sites of attachment for perianth and androecium.
3. forms a hypanthium.
4. is positioned below the receptacle.

3.

What is another name for thymine?

1. 5 – bromouracil
2. 3 – bromouracil
3. 3 – methyl uracil
4. 5 – methyl uracil

4.

Select the incorrect statement

- (1) India has more than 50,000 genetically different strains of rice
- (2) India has 100 varieties of mango
- (3) The genetic variation in *Rauwolfia vomitoria* can be in terms of concentration and potency of reserpine
- (4) The tropical rainforest initially covered 14% of the land surface of earth, but now they cover only 6% of the land area

5.

Which of the following organelles is not correct matched with its feature?

	Organelle	Feature
1.	Smooth endoplasmic reticulum	Synthesis of steroidal hormones in animals
2.	Golgi apparatus	Formation of glycoproteins and glycolipids
3.	Lysosomes	Rich in alkaline hydrolases
4.	Elaioplasts	Store oils and fats

6.

Match the items in Column 'A' and Column 'B' and choose correct answer:

Column A	Column B
(i) Lady bird	(A) Methanobacterium
(ii) Mycorrhiza	(B) Trichoderma
(iii) Biological control	(C) Aphids
(iv) Biogas	(D) Glomus

The correct answer is:

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

7.

Choose the incorrect match regarding population interactions.

	Species A	Species B
1. Amensalism	—	—
2. Parasitism	+	—
3. Commensalism	+	0
4. Mutualism	+	+

8.

The microtubules from the opposite poles of the spindle attach to the pair of homologous chromosomes in

1. Metaphase - I
2. Prophase - I
3. Metaphase
4. Metaphase - II

9.

Gametophyte in the pteridophytes is

- (i) Small, inconspicuous.
- (ii) Long lived, unicellular.
- (iii) Mostly photosynthetic thalloid or saprophytic.
- (iv) Short lived, haploid.

How many statements are correct w.r.t. gametophyte?

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

10.

The correct sequence of phases in cell cycle is:

1. $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$
2. $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$
3. $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$
4. $S \rightarrow G_1 \rightarrow G_2 \rightarrow M$

11.

The pollen grain represents

1. Male gamete
2. Male gametophyte
3. Microsporophyll
4. Microsporangium

12.

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.

13.

Match the columns with respect to the process of translation:

Column-I

- a. UTR
- b. rRNA
- c. mRNA code
- d. tRNA

Column-II

- (i) Catalyst
- (ii) Template
- (iii) Reads the genetic code
- (iv) For efficiency

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

14. Which one of the following elements in plants is not remobilized?
1. Calcium
 2. Potassium
 3. Zinc
 4. Phosphorus
15. The enzymes of Krebs cycle where $\text{NADH} + \text{H}^+$ are produced are
1. Isocitrate dehydrogenase succinate dehydrogenase and malic dehydrogenase.
 2. Succinate thiokinase, succinate dehydrogenase and aconitase
 3. Isocitrate dehydrogenase, α – ketoglutaric dehydrogenase, malic dehydrogenase
 4. Isocitrate dehydrogenase, α – ketoglutaric dehydrogenase and succinate dehydrogenase.
16. The phytohormone which promotes rapid internode elongation in deep water rice plant is
1. Gibberellins
 2. Ethylene
 3. Auxin
 4. Cytokinin
17. In G_2 phase of cell cycle
1. RNA synthesis stops.
 2. DNA replicates.
 3. Deoxyribonucleotide synthesis begins.
 4. Tubulin protein synthesis takes place.
18. In the dicot root the vascular cambium originates from :
1. Tissue located below the phloem bundles and a portion of pericycle tissue above protoxylem.
 2. Cortical region
 3. Parenchyma between endodermis and pericycle
 4. Intrafascicular and interfascicular tissue in a ring
19. What is true for individuals of same species?
1. Live in same niche
 2. Live in same habitat
 3. Interbreeding
 4. Live in different habitat
20. Maximum nutritional diversity is found in the group.
1. Fungi
 2. Animalia
 3. Monera
 4. Plantae
21. The hilum is a scar on the:
1. Fruit, where it was attached to the pedicel
 2. Fruit, where style was present
 3. Seed, where micropyle was present
 4. Seed, where funicle was attached
22. Which enzyme/s will be produced in a cell in which there is a nonsense mutation in the lac Y gene?
1. Lactose permease
 2. Transacetylase
 3. Lactose permease and transacetylase
 4. β -galactosidase

23.

In ETS, complex V is

1. ATP synthase
2. NADH dehydrogenase
3. Cytochrome c oxidase
4. Cytochrome bc_1 complex

24.

Which one plant factor affect the photosynthesis process?

1. CO_2 Concentration
2. Light
3. Availability of water in the soil
4. Amount of chlorophyll

25.

Match the following micro-organisms to the related products

Column - I

Column - II

- | | |
|------------------|-------------------------------|
| a. Swiss cheese | (i) <i>Monascus</i> |
| b. Statin | (ii) <i>Propionibacterium</i> |
| c. Butyric acid | (iii) <i>Trichoderma</i> |
| d. Cyclosporin A | (iv) <i>Clostridium</i> |

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

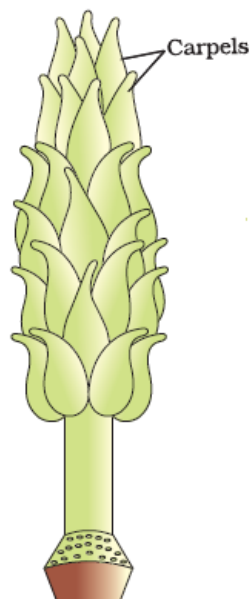
26.

A type of placentation in which placenta forms a ridge along the ventral suture of ovary and ovules are borne on this ridge forming two rows

1. Parietal
2. Marginal
3. Basal
4. Free central

27.

Recognise the diagram and choose the correct option:-



1. Hibiscus, multicarpellary syncarpous pistil
2. Multicarpellary syncarpous pistil of papaver
3. Multicarpellary apocarpous gynoecium of Michelia
4. Monocarpellary gynoecium

28.

What percent of 'ab' type of gamete produced by a pea plant of genotype AaBb?

1. 25%
2. 50%
3. 75%
4. 100%

29.

Which of these is the primary component of the phloem sap?

1. Fructose
2. Sucrose
3. Glucose
4. Sulphuric Acid

30. Bacillus, Coccus, Vibrio, and Spirillum are four basic shapes of:-
1. Bacteria
 2. PPLO
 3. Mycoplasma
 4. Both (2) and (3)
31. The plastid which stores protein is known as
1. Amyloplast
 2. Chloroplast
 3. Elaioplast
 4. Aleuroplast
32. Select the incorrect match w.r.t. the given taxonomic categories of wheat.
1. Genus - Triticum
 2. Family - aestivum
 3. Order- Poales
 4. Class - Monocotyledonae
33. How many sex chromosomes does a normal human baby inherit from father?
1. One
 2. Two
 3. Twenty three
 4. Forty six
34. Plants which show double carboxylation in two different types of cells in leaves
1. Also show photorespiration
 2. Lack PEPcase enzyme
 3. Also show Kranz anatomy
 4. Show Calvin cycle in mesophyll cells
35. All the given statements are correct w.r.t fate of ammonia, except
1. Glutamine and asparagine are two most important amides in plants
 2. α -ketoglutaric acid provides carbon skeleton for the process of reductive amination process
 3. Amides are transported through sieve tubes
 4. Glutamic acid is the main amino acid that provides NH_2 group during transamination process
36. Which statement is incorrect w.r.t photoperiodism in plants?
1. The site of perception of light/dark duration is cotyledons or embryo.
 2. It depends on duration of light/dark.
 3. Critical exposure of light/dark is required.
 4. When there is no correlation between exposure to light duration and induction of flowering response, plants are called day neutral plants.
37. Which of the following plants produce(s) chasmogamous and cleistogamous flowers?
1. *Viola* (Common pansy)
 2. *Oxalis*
 3. *Commelina*
 4. All of the above

Botany - Section B

38.

Virus free plants can be obtained by :-

1. Only apical meristem.
2. Only axillary meristem.
3. Apical and axillary meristem.
4. Embryo culture.

39.

The organelles formed by the process of packaging in the golgi apparatus is

1. Double membrane organelle.
2. Possess single circular DNA molecule
3. Rich in hydrolases
4. Able to occupy up to 90 percent volume of the cell

40.

The option incorrect for water hyacinth is

1. Introduced in India because of its beautiful flowers and shape of leaves.
2. Drains oxygen from water, which leads to death of fishes.
3. Found growing wherever there is running water.
4. Grow faster than our ability to remove them.

41.

Choose the **odd** one out w.r.t structure formed in the different organisms during suspended phase

1. Bacteria, fungi - Thick wall spores
2. Higher plants - Seed, vegetative propagules
3. Zooplanktons - Diapause stage
4. Ectothermic organisms - Torpid state during favourable season

42.

The evolution of C_4 photosynthetic system is probably one of the strategies for

1. Maximising the availability of CO_2 and minimising the loss of H_2O
2. Minimising the loss of O_2 and maximising the availability of H_2O
3. Minimising the availability of CO_2 and maximising the loss of H_2O
4. More than one option is correct

43.

In ETS the number of ATP molecules synthesized depends on

- 1 O_2
- 2 Substrate
- 3 Electron donor
- 4 Proton gradient

44.

ABA induces :-

1. Seed dormancy
2. Syngamy
3. Parthenocarpy
4. Germination

45.

Reduction of nitrogen to ammonia by living organisms is called:-

1. Industrial N_2 fixation
2. Electrical N_2 fixation
3. Biological nitrogen fixation
4. Denitrification

46.

- I. Higher latitude $\xrightarrow{\text{Biodiversity increases}}$ Lower latitude
(Poles) (Equator)
- II. Higher latitude $\xrightarrow{\text{Biodiversity decreases}}$ Lower latitude
(Poles) (Equator)
- III. Higher altitude $\xrightarrow{\text{Biodiversity increases}}$ Lower altitude
(Mountain top) (Sea level)
- IV. Higher altitude $\xrightarrow{\text{Biodiversity decreases}}$ Lower altitude
(Mountain top) (Sea level)

Which of the matches above is/are correct?

1. I and III
2. I and II
3. II and III
4. III and IV

47.

The ecological pyramid of numbers in pond ecosystem is :-

1. Inverted
2. Upright
3. May be upright or inverted
4. First upright then inverted

48.

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

Column-I

Column-II

- | | |
|---------------------------------|---------------------|
| A. UV rays | i. Biomagnification |
| B. Biodegradable organic matter | ii. Eutrophication |
| C. DDT | iii. Snow blindness |
| D. Phosphates | iv. BOD |

The correct matches is :-

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

49.

Asexual reproduction does not involve the formation of

1. Buds
2. Zygote
3. Gemmules
4. Spores

50.

Sex of progeny is determined by female parent in

1. *Drosophila*
2. Bird
3. Human
4. Grasshopper

Zoology - Section A

51.

Progesterone alone or in combination with estrogen can also be used as contraceptives by females as injections or implants under their skin. When used in this manner, they:

1. do not affect the release of the ovum
2. induce a foreign body reaction leading to rejection of the implanted blastocyst
3. can cause increased risk of ectopic pregnancy
4. have a much longer effective period

52.

Consider the following statements:

I. Ori is responsible for the copy number of the linked DNA.

II. Transformation is a process through which a piece of DNA is introduced into a host bacterium.

III. Bacteriophages have very high copy numbers of their genome within the bacterial cell.

Which of the above statements are true?

1. I and II only
2. I and III only
3. II and III only
4. I, II, and III

53.

Consider the following characters:

I. Small organic molecules

II. Difficult to remove without denaturing the enzyme

III. Haem is an example

The above characters are of which of the following co-factors of an enzyme?

1. Metal ions
2. Prosthetic groups
3. Co-enzymes
4. Apoenzymes

54.

An acromion process is characteristically found in the -

1. Skull of frog
2. Sperm of mammals
3. Pelvic girdle of mammals
4. Pectoral girdle of mammals

55.

In lactational amenorrhoea, there is no ovulation or menstruation during the period of intense lactation following parturition, due to high level of prolactin, which?

1. Inhibits the release of gonadotropins
2. Inhibits the release of estrogen and progesterone
3. Stimulate the release of FSH and LH
4. Stimulates the release of estrogen and progesterone

56.

Perhaps the biggest reason for the enormous success of Arthropods is?

1. Chitinous exoskeleton
2. Diverse appendages
3. Respiration by tracheoles
4. Internal fertilization

57.

A person with Addison disease _____.

1. is unable to replenish blood glucose levels under stressful conditions
2. develops dramatically more male features
3. develops a rounded face and edema
4. has overgrowth of hands and face

58.

The greater the number of blood vessels dilated, the _____.

1. higher the blood pressure
2. lower the blood pressure
3. faster the heartbeat
4. slower the heartbeat

59.

Which part of the ear determines the pitch of the sound?

1. Reissner's membrane.
2. Basilar membrane.
3. Tectorial membrane.
4. Hair cells.

60.

Select the true statement(s)

- A. Growth factors are hormones secreted by several non-endocrine tissues.
- B. Estradiol is synthesised and secreted mainly by growing ovarian follicles.
- C. Catecholamines stimulate the breakdown of glycogen.
- D. Adrenal cortex secrete androgen like hormone.

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

61.

Which of the following bone of the skull is not present in pair?

1. Temporal bone
2. Sphenoid bone
3. Zygomatic bone
4. Maxillary bone

62.

Haemolytic disease of the newborn (HDN) may occur in the fetus of a second pregnancy if

1. The mother is Rh^+ and the baby is Rh^-
2. The mother is Rh^+ and the baby is Rh^+
3. The mother is Rh^- and the baby is Rh^-
4. The mother is Rh^- and the baby is Rh^+

63.

Choose the nematode which infects the roots of tobacco plants causing a great reduction in yield.

1. *A. tumefaciens*
2. *M. incognita*
3. *S. typhimurium*
4. *B. thuringiensis*

64.

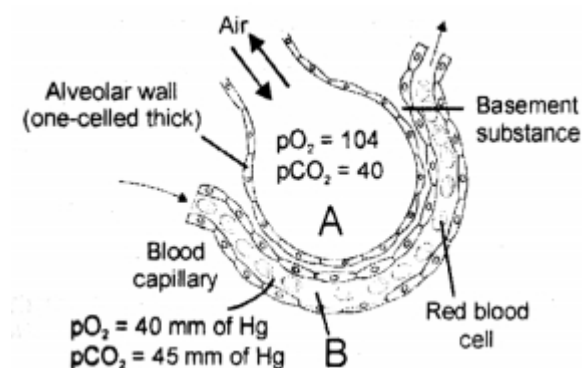
The first movement of foetus and appearance of hair on the head are usually observed during

1. 3rd month
2. 5th month
3. 3rd and 5th month respectively
4. 4th and 6th month respectively

65.

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

66.

Select true statement

1. In fishes kidney excrete uric acid
2. Ammonia is 100,000 times less toxic than urea
3. Protonephridia are the excretory structure in planaria
4. Most terrestrial reptiles excrete ammonia

67.

Which of the following set of animals belong the phylum hemichordate?

1. Balanoglossus, Saccoglossus
2. Salpa, Doliolum
3. Petromyzon, Myxine
4. Dentalium, Chaetopleura

68.

Identify the incorrect statement regarding the blood vascular system of cockroach:

1. Blood vessels are poorly developed and open into hemocoel
2. The hemolymph is composed of colorless plasma and hemocytes
3. Heart lies along the mid-ventral line of thorax and abdomen
4. Blood from sinuses enter heart through ostia

69.

Which of the following epithelium their main function is to provide protection against chemical and mechanical stresses?

1. Simple epithelium.
2. Compound epithelium.
3. Columnar epithelium.
4. Cuboidal Epithelium

70.

Read the following statements about cancer and mark the incorrect ones

(i) Ionising radiations like x-rays and UV rays and non-ionizing radiations like gamma rays cause DNA damage leading to neoplastic transformation.

(ii) CT scan uses non-ionizing radiations to accurately detect pathological and physiological changes in the living tissue.

(iii) Antibodies against cancer-specific antigens are also used for detection of certain cancers.

(iv) Some of the chemotherapeutic drugs are specific for certain cancers.

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

71.

Urinary excretion is equivalent to

GF = Glomerular filtration.

TR = Tubular reabsorption.

TS = Tubular secretion.

1. $GF + TR + TS$
2. $GF - (TR + TS)$
3. $GF - TR + TS$
4. $GF - TS + TR$

72.

Which of the following conditions will stimulate parathyroid gland to release parathyroid hormone ?

1. Fall in active Vitamin D levels
2. Fall in blood Ca^{+2} levels
3. Fall in bone Ca^{+2} levels
4. Rise in blood Ca^{+2} levels

73.

Which one of the following is the correct matching of the events occurring during menstrual cycle?

	Column I	Column II
1.	Ovulation	LH and FSH attain peak level and sharp fall in the secretion of progesterone
2.	Proliferative phase	Rapid regeneration of myometrium and maturation of Graafian follicle
3.	Development of corpus luteum	Secretory phase and increased secretion of progesterone
4.	Menstruation	Breakdown of myometrium and ovum not fertilized

74.

The part of the fallopian tube closest to the ovary is:-

1. Ampulla
2. Infundibulum
3. Cervix
4. Isthmus

75.

Open circulatory system is present in ?

1. Nereis
2. Ascidia
3. Octopus
4. Branchiostoma

76.

Process of conversion of complex food substances to simple absorbable form is called :-

1. Assimilation
2. Deamination
3. Digestion
4. Absorption

77.

Read the following statements:-

- (1) Lymph is devoid of RBC
- (2) Exchange of nutrients, gasses etc, between blood and the tissue cell always occur through the lymph
- (3) Tissue fluid is also called as lymph.
- (4) Lymph is a colourless fluid containing all types of WBCs which are responsible for the immune response of the body.

How many statements are correct?

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

78.

Brain stem consists except one :-

1. Pons
2. Medulla
3. Midbrain
4. Cerebellum & Cerebrum

79.

The trigger for activation of the toxin of *Bacillus thuringiensis* is

1. Acidic pH of the stomach of the insect
2. Alkaline pH of the gut of Bollworm
3. Neutralising pH of the toxin in the gut
4. The increase in temperature of the toxin in the gut

80.

The primary structure of a polypeptide has

1. Interchain disulphide bonds
2. Peptide bonds
3. H-bonds
4. Glycosidic bonds

81.

DNA from *Agrobacterium tumefaciens* can be extracted through use of enzyme

1. Chitinase
2. Cellulase
3. Lysozyme
4. DNase

82.

Vital capacity is

1. $RV + TV + IRV$
2. $ERV + RV$
3. $TV + ERV + RV$
4. $ERV + TV + IRV$

83.

Read the following statements

Statement-A: The retina contains ganglion cells, bipolar cells and photoreceptor cells arranged in sequence from inside to outside.

Statement-B: Light induces potential difference in photoreceptor cells that generates action potential in bipolar cells through ganglion cells

Choose the correct option.

1. Only A is correct
2. Only B is correct
3. Both A and B are correct
4. Both A and B are incorrect

84.

Choose the incorrect match w.r.t disease, pathogen and its symptoms

	Disease	Pathogen	Symptoms
1.	Amoebiasis	<i>Entamoeba coli</i>	Internal bleeding Blockage of intestinal passage
2.	Filariasis	<i>Wechereria bancrofti</i>	Swelling of lymphatic vessels of lower limbs
3.	Malaria	<i>Plasmodium falciparum</i>	High fever with chills recurring every three days
4.	Pneumonia	<i>Haemophilus influenzae</i>	Fever, cough, headache, alveoli filled with fluid

85.

Which of the following do **not** belong to category of brush border enzymes?

1. Lactase, nucleotidase
2. Aminopeptidase, sucrase
3. Procarboxypeptidase, steapsin
4. Nucleosidase, maltase

Zoology - Section B

86.

During catalytic cycle of an enzyme—

1. Enzyme alter its shape to fit the substrate molecule.
2. Substrate alter its shape to get fit into the enzyme molecule.
3. Both enzyme and substrate changes its shape during transition state.
4. Enzyme and substrate are rigid molecular structure and it never changes its shape.

87.

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

1. Artificial hybridisation
2. Cross breeding
3. Selected animal should be mated with unrelated superior animals of the same breed
4. Selected animal should be mated with unrelated superior animals of the different breed

88.

Match column I and column II w.r.t cranial capacity

Column I	Column II
a. Homo erectus	(i) 650 - 800 cc
b. Homo sapiens	(ii) 1650 cc
c. Cro-Magnon man	(iii) 1400 cc
d. Homo habilis	(iv) 900 cc

Choose the correct option

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

89.

The process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography is called

1. Divergent evolution.
2. Adaptive radiation.
3. Adaptive convergence.
4. Parallel evolution.

90.

Find out the correct match from the following table:-

	Column-I	Column-II	Column-III
(i)	Radula	Rasping organ	Pila
(ii)	Hooks suckers	and Taenia	Annelida
(iii)	Tube feet	Asterias; Dentalium	Echinodermata
(iv)	Comb plates	Pleurobrachia; Aurelia	Ctenophora

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

91.

Which of the following is not a correct combination of the hormone with its source organ and target organs:-

	Hormone	Source organ	Target organ
1.	Somatostatin	Hypothalamus	Adenohypophysis
2.	FSH	Ovary	Uterus
3.	TSH	Adenohypophysis	Thyroid
4.	ACTH	Pituitary gland	Adrenal cortex

92.

In nucleic acid the bond between the phosphate and hydroxyl group of sugar is

1. Hydrogen bond
2. Glycosidic bond
3. Ester bond
4. Peptide bond

93.

Which one of the following disorder of bones is characterized by microarchitectural deterioration of the bone, increased fragility, and prone to fracture?

1. Osteoarthritis
2. Gouty arthritis
3. Osteoporosis
4. Rheumatoid arthritis

94.

Find out the **incorrectly** matched pair w.r.t. structure and its function as mentioned below

1. Eustachian tube - Maintains air pressure in tympanic cavity
2. Cornea - Controls amount of light entering into eyeball, called the diaphragm of eye
3. Cristae in ampulla - Detect rotational motion
4. Semicircular canals - Help in maintaining dynamic equilibrium, not in hearing

95.

Assisted reproductive technology, IVF involves the transfer of:-

1. Ovum into fallopian tube
2. Zygote into uterus
3. Zygote into fallopian tube
4. Embryo with 16 blastomeres into fallopian tube

96.

In Porifera which type of fertilization takes place?

1. Self & external
2. Self & Internal
3. Cross & external
4. Cross & Internal

97.

RNA interference (RNAi) inhibits

1. DNA replication
2. Neither transcription nor translation of specific genes
3. Transcription of all genes
4. Translation of specific mRNAs

98.

The hormones that attain peak level towards the middle of menstrual cycle are

- LH
- FSH
- Estrogen
- Progesterone

Choose the correct option

- a only
- a, b and c
- a and b only
- a, b and d

99.

Hardy-Weinberg equilibrium can be disrupted by presence of all except

- Genetic drift
- Random mating
- Non-random mating
- Mutations

100.

Choose the incorrect match

- | | |
|--------------------------------------|----------------------|
| 1. Flippers of penguins and dolphins | Convergent evolution |
| 2. Marsupials of Australia | Adaptive radiation |
| 3. Darwin's finches | Natural selection |
| 4. Lemur and spotted cuscus | Divergent evolution |

Chemistry - Section A

101.

The order of increasing energies of the orbitals follows:

- 3s, 3p, 4s, 3d, 4p
- 3s, 3p, 3d, 4s, 4p
- 3s, 3p, 4s, 4p, 3d
- 3s, 3p, 3d, 4p, 4s

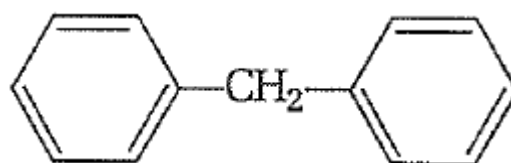
102.

In BrF_3 molecule, the lone pairs occupy equatorial positions to minimize:

- Lone pair-bond pair repulsion
- Bond pair-bond pair repulsion
- Lone pair-lone pair repulsion and lone pair-bond pair repulsion
- Lone pair-lone pair repulsion

103.

The molecular formula of diphenyl methane



is $\text{C}_{13}\text{H}_{12}$

How many structural isomers are possible when one of the hydrogen is replaced by a chlorine atom?

- 6
- 4
- 8
- 7

104.

pH of a 0.1 (M) mono basic is found to be 2. Hence osmotic pressure at given temperature T is-

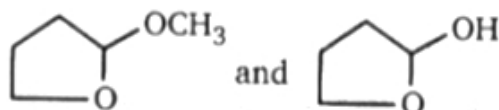
1. 0.1 RT
2. 0.11RT
3. 1.1RT
4. 0.01RT

105.

Which of the following is most basic?

1. $\text{Ce}(\text{OH})_3$
2. $\text{Lu}(\text{OH})_3$
3. $\text{Yb}(\text{OH})_3$
4. $\text{Tb}(\text{OH})_3$

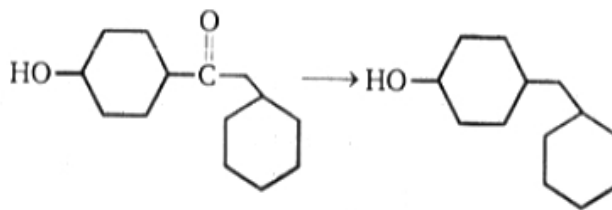
106.



Above compounds can be differentiated by following reagent:

1. 2-4 DNP (Brady reagent)
2. Tollen's reagent
3. Bromine water reagent
4. NaHSO_3

107.



The above reduction can be best carried out by:

1. Clemmensen reduction
2. Wolff-Kishner reduction
3. NaBH_4
4. None of these

108.

The reactivity order of alkyl halides depends upon:

1. Nature of alkyl group only
2. Nature of halogen atom only
3. Nature of both alkyl group and a halogen atom
4. None of the above

109.

An example of a sigma bonded organometallic compound is

1. Ruthenocene
2. Grignard's reagent
3. Ferrocene
4. Cobaltocene

110.

Which of the following compounds will not undergo Friedel-Craft's reaction easily?

1. Cumene
2. Xylene
3. Nitrobenzene
4. Toluene

111.

When a gas undergoes adiabatic expansion, it gets cooled due to

1. Loss of energy
2. Fall in pressure
3. Decrease in velocity
4. Energy increase during doing work

112.

The BF_3 is a planar molecule whereas NF_3 is pyramidal because:

1. B – F bond is more polar than N – F bond.
2. Boron atom is bigger than nitrogen atom.
3. Nitrogen is more electronegative than boron.
4. BF_3 has no lone pair but NF_3 has a lone pair of electrons.

113.

For the reaction, $2\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{N}_2\text{O}$, at 298K ΔH is 164 kJ mol^{-1} . The ΔE of the reaction is

1. $166.5 \text{ kJ mol}^{-1}$
2. $161.5 \text{ kJ mol}^{-1}$
3. $164.0 \text{ kJ mol}^{-1}$
4. 169 kJ mol^{-1}

114.

When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from

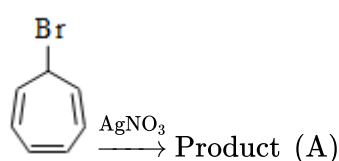
1. zero to +1 and zero to -5
2. zero to -1 and zero to +5
3. zero to -1 and zero to +3
4. zero to +1 and zero to -3

115.

What is the empirical formula of vanadium oxide, if 2.74 g of the metal oxide contains 1.53 g of metal?

1. V_2O_3
2. VO
3. V_2O_5
4. V_2O_7

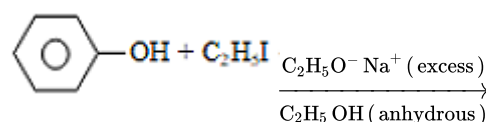
116.



Select the correct statement about product (A)

1. Product is aromatic
2. Product has high dipole moment
3. Product has less resonance energy
4. Both A and B

117.



1. c1ccccc1OCC
2. c1ccccc1I
3. CCOC(C)C
4. CCOC(C)C

118.

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

119.

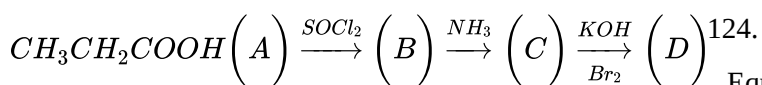
In which of the following reactions H_2O_2 acts as a reducing agent?

- a. $H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$
- b. $H_2O_2 - 2e^- \rightarrow O_2 + 2H^+$
- c. $H_2O_2 + 2e^- \rightarrow 2OH^-$
- d. $H_2O_2 + 2OH^- - 2e^- \rightarrow O_2 + 2H_2O$

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

120.

In a set of reactions propanoic acid yielded a compound (D) :



What is the structure of (D)

1. $CH_3CH_2CH_2NH_2$
2. $CH_3CH_2CONH_2$
3. $CH_3CH_2NHCH_3$
4. $CH_3CH_2NH_2$

121.

Boric acid is polymeric because of:

1. Its acidic nature
2. Presence of hydrogen bonds
3. Its monobasic nature
4. Its geometry

122.

In animals, the stored carbohydrates is

1. Starch
2. Glycogen
3. Sucrose
4. Fructan

123.

The geometry and magnetic property of $[NiCl_4]^{2-}$, respectively, are

1. Tetrahedral, Paramagnetic
2. Tetrahedral, Diamagnetic
3. Square planar, Paramagnetic
4. Square planar, Diamagnetic

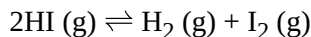
Equivalent conductance of saturated $BaSO_4$ solution is $400 \text{ ohm}^{-1} \text{ cm}^2 \text{ equivalent}^{-1}$ and its specific conductance is $8 \times 10^{-5} \text{ ohm}^{-1} \text{ cm}^{-1}$; hence solubility product K_{sp} of $BaSO_4$ is

1. $4 \times 10^{-8} \text{ M}^2$
2. $1 \times 10^{-8} \text{ M}^2$
3. $2 \times 10^{-4} \text{ M}^2$
4. $1 \times 10^{-4} \text{ M}^2$

125. B.O.D is connected with
- (1) Organic matter
 - (2) Microbes
 - (3) Both
 - (4) None
126. Which of the following is responsible for turning moist starch iodide paper blue when it is brought in contact with O_3 ?
1. Liberation of iodine
 2. Liberation of O_2
 3. Formation of alkali
 4. All of these
127. For a reaction:-
- $$6H^+ + 5Br^- + BrO_3^- \rightarrow 3Br_2 + 6H_2O$$
- If rate of consumption of BrO_3^- is $x \text{ mol L}^{-1}\text{s}^{-1}$. Then calculate the rate of formation of Br_2 :-
1. $\frac{x}{3}$
 2. $\frac{2x}{3}$
 3. $\frac{x}{4}$
 4. $3x$
128. A 100.0 mL dilute solution of Ag^+ is electrolyzed for 15.0 minutes with a current of 1.25 mA and the silver is removed completely. What was the initial $[Ag^+]$:-
1. $2.32 \times 10^{-1} \text{ M}$
 2. $2.32 \times 10^{-4} \text{ M}$
 3. $2.32 \times 10^{-5} \text{ M}$
 4. $1.17 \times 10^{-4} \text{ M}$
129. Equal weights of ethane and hydrogen are mixed in an empty container at 25°C . The fraction to total pressure exerted by hydrogen is
1. 1: 2
 2. 1: 1
 3. 1: 16
 4. 15: 16
130. Which of the following pairs constitutes buffer solutions?
1. HNO_3 and NH_4NO_3
 2. HCl and KCl
 3. HNO_2 and $NaNO_2$
 4. $NaOH$ and $NaCl$
131. The R and S enantiomers of an optically active compound differ in
1. Their optical rotation of plane-polarized light
 2. Their reactivity with chiral reagents
 3. Their solubility in achiral reagents
 4. Their melting points
132. In organic reactions, sodium in liquid ammonia is used as
1. Oxidizing agent
 2. Reducing agent
 3. Hydrolyzing agent
 4. Precipitating agent

133.

A sample of HI(g) is placed in the flask at a pressure of 0.2 atm. At equilibrium, the partial pressure of HI(g) is 0.04 atm. What is K_P for the given equilibrium?



1. 2.0
2. 3.5
3. 4.0
4. 2.6

134.

Amongst the following elements whose electronic configuration are given below, the one having the highest ionisation enthalpy is

- (1) $[\text{Ne}] 3s^2 3p^1$
- (2) $[\text{Ne}] 3s^2 3p^3$
- (3) $[\text{Ne}] 3s^2 3p^2$
- (4) $[\text{Ar}] 3d^{10} 4s^2 4p^3$

135.

What type of oxide would Eka– aluminium form?

- (1) EO_4
- (2) E_2O_3
- (3) E_3O_2
- (4) EO

Chemistry - Section B

136.

Lithium borohydride (LiBH_4), crystallizes in an orthorhombic system with 4 molecules per unit cell. The unit cell dimensions are:- $a = 6.81 \text{ \AA}$, $b = 4.43 \text{ \AA}$, $c = 7.17 \text{ \AA}$. If the molar mass of LiBH_4 is 21.76 g mol^{-1} . The density of the crystal is:-

1. 0.668 g cm^{-3}
2. 0.585 g cm^2
3. 1.23 g cm^{-3}
4. None of these

137.

Aluminium is extracted from alumina (Al_2O_3) by electrolysis of a molten mixture of

1. $\text{Al}_2\text{O}_3 + \text{HF} + \text{NaAlF}_4$
2. $\text{Al}_2\text{O}_3 + \text{CaF}_2 + \text{NaAlF}_4$
3. $\text{Al}_2\text{O}_3 + \text{Na}_3\text{AlF}_6 + \text{CaF}_2$
4. $\text{Al}_2\text{O}_3 + \text{KF} + \text{Na}_3\text{AlF}_6$

138.

A catalyst lowers the activation energy of a reaction from 20 kJ mole^{-1} to 10 kJ mole^{-1} . The temperature at which the uncatalysed reaction will have the same rate as that of the catalysed at 27°C is

1. -123°C
2. -327°C
3. 327°C
4. $+23^\circ \text{C}$

139. Iron carbonyl, $\text{Fe}(\text{CO})_5$ is
1. Tetranuclear
 2. Mononuclear
 3. Trinuclear
 4. Dinuclear
140. Aqueous solutions of 0.004 M Na_2SO_4 and 0.01 M Glucose are isotonic. The degree of dissociation of Na_2SO_4 is
1. 25%
 2. 60%
 3. 75%
 4. 85%
141. Monomer of natural rubber is
1. 1, 3-butadiene
 2. Isoprene
 3. Styrene
 4. Chloroprene
142. Alum helps in purifying water by:
1. Forming Si complex with clay particles
 2. Sulphate part which combines with the dirt and removes it
 3. Aluminium which coagulates the mud particles
 4. Making mud water soluble
143. Which one of the compounds does not decolorized an acidified solution of KMnO_4 ?
1. SO_2
 2. FeCl_3
 3. H_2O_2
 4. FeSO_4
144. Which statement is not correct!
- (1) Xe is the most reactive among the rare gases
 - (2) He is an inert gas
 - (3) Radon is obtained from the decay of radium
 - (4) The most abundant rare gas found in the atmosphere is He
145. An example of a reversible reaction is
1. $\text{KNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) = \text{KCl}(\text{aq}) + \text{NaNO}_3(\text{aq})$
 2. $2\text{Na}(\text{s}) + \text{H}_2\text{O}(\text{l}) = 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
 3. $\text{AgNO}_3(\text{aq}) + \text{HCl}(\text{aq}) = \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$
 4. $\text{Pb}(\text{NO}_3)_2(\text{aq}) + 2\text{NaI}(\text{aq}) = \text{PbI}_2(\text{s}) + \text{NaNO}_3(\text{aq})$
146. In which of the following molecules/ions all the bonds are unequal?
1. SF_4
 2. SiF_4
 3. XeF_4
 4. BF_4^-

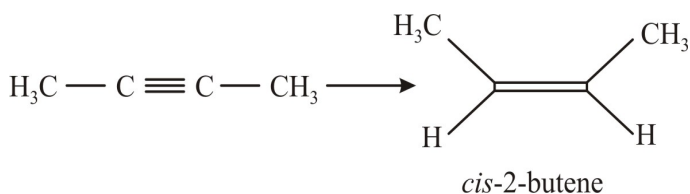
147.

Among the following, the narrow-spectrum antibiotic is:

1. Chloramphenicol
2. Penicillin G
3. Ampicillin
4. Amoxicillin

148.

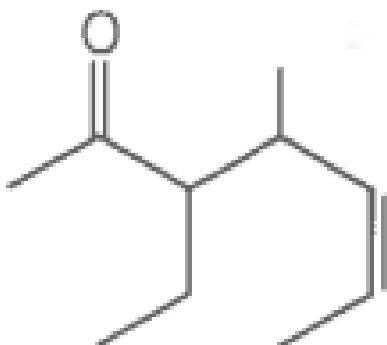
The most suitable reagent for the following conversion, is:



1. $\text{Hg}^{2+} / \text{H}^+, \text{H}_2\text{O}$
2. $\text{Na}/\text{liquid NH}_3$
3. $\text{H}_2, \text{Pd/C}, \text{quinoline}$
4. Zn/HCl

149.

What is the IUPAC name of this compound?



1. 3-Ethyl-4-methylhept-5-en-2-one
2. 4-Ethyl-4-methylhept-5-en-2-one
3. 4-Ethyl-3-methylhept-5-en-2-one
4. 3-Ethyl-3-methylhept-5-en-2-one

150.

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

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

Physics - Section A

151.

The electrical circuit used to get smooth output from a rectifier circuit is called

1. Oscillator
2. Filter
3. Amplifier
4. Logic gates

152.

Maximum velocity of photoelectrons emitted by a metal surface is 1.2×10^6 m/s. Assuming the specific charge of the electron to be 1.8×10^{11} C/kg, the value of the stopping potential in volt will be:-

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

153.

If 'M' be the mass of the charged particle having charge q_0 which enters with velocity 'v' normal to the magnetic field 'B', it will revolve with angular speed given by

1. $\frac{B}{q_0 M}$
2. $\frac{q_0 B}{M}$
3. $\frac{q_0 M}{B}$
4. $q_0 MB$

154.

An electric dipole is placed at an angle of 30° with an electric field intensity 2×10^5 N/C. It experiences a torque equal to 4 Nm. The charge on the dipole, if the dipole length is 2 cm, is

1. 8 mC
2. 2 mC
3. 5 mC
4. $7 \mu C$

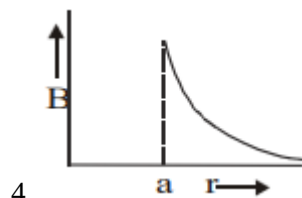
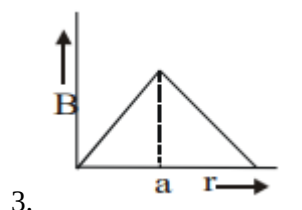
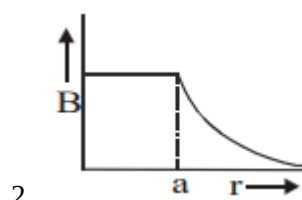
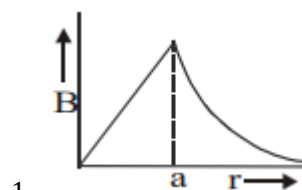
155.

The maximum wavelength of spectral line in Lyman series in terms of Rydberg constant R is:

1. R
2. $4/3R$
3. Rc
4. $1/R$

156.

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



157.

An aeroplane in which the distance between the tips of wings is 50 m is flying horizontally with a speed of 360 km/hr over a place where the vertical component of earth magnetic field is 2.0×10^{-4} weber /m². The potential difference between the tips of wings would be:

1. 0.1 V
2. 1.0 V
3. 0.2 V
4. 0.01 V

158.

In simple harmonic motion, the ratio of acceleration of the particle to its displacement at any time is a measure of

1. Spring constant
2. Angular frequency
3. (Angular frequency)²
4. Restoring force

159.

The banking angle for a curved road of radius 490 m for a vehicle moving at 35 m s^{-1} is

1. $\tan^{-1}(0.25)$
2. $\tan^{-1}(0.55)$
3. $\tan^{-1}(0.45)$
4. $\tan^{-1}(0.75)$

160.

The ratio of de-Broglie wavelengths of a proton and an alpha particle moving with the same velocity is:

1. 1
2. 2
3. 4
4. 0.25

161.

The coefficient of mutual inductance between two coils depends upon

1. medium between coils
2. separation between coils
3. orientation of coils
4. All of these

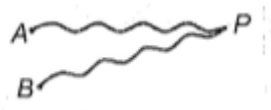
162.

Standing waves can be produced

1. On a string clamped at both ends
2. On a string clamped at one end and another end is free
3. When a wave is reflected from a wall
4. In all of the above conditions

163.

Two waves each of intensity i_0 and wavelength 0.2 m starts from sources A and B and meet at point P as shown in the figure. If AP = 0.5 m, BP = 0.8 m, then intensity at P is



1. $2i_0$
2. i_0
3. $i_0/2$
4. Zero

164.

A sound wave is passed through a chamber. If the r.m.s. speed of molecules of a gas is v_1 and speed of sound is v_2 in the gas, then:

1. $v_1 = v_2$
2. $v_1 > v_2$
3. $v_1 < v_2$
4. $v_1 \leq v_2$

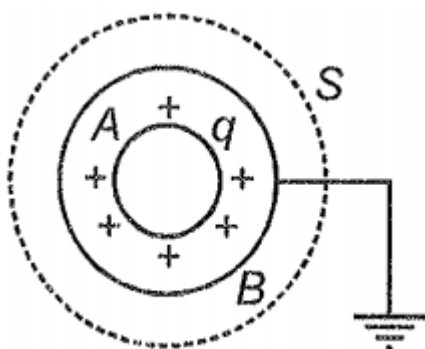
165.

Two rods P and Q of equal length having cross-sections A_p and A_q respectively have the same temperature difference across their ends. If k_p and k_q are their thermal conductivities, then the condition for their equal rate of conduction of heat will be

1. $k_p A_p = k_q A_q$
2. $\frac{\sqrt{k_p}}{A_p} = \frac{\sqrt{k_q}}{A_q}$
3. $k_p A_q = k_q A_p$
4. $k_p^2 A_p = k_q^2 A_q$

166.

If the following diagram the shell A is given a charge q and B is earthed. The electric flux linked with the Gaussian surface S is-



1. $\frac{q}{\epsilon_0}$
2. $\frac{q}{2\epsilon_0}$
3. $\frac{2q}{\epsilon_0}$
4. Zero

167.

A heat engine operates between the temperatures of 300 K and 500 K. If it extracts 1200 J of heat energy from the source, then the maximum amount of work that can be done by the engine is

1. 720 J
2. 520 J
3. 480 J
4. 200 J

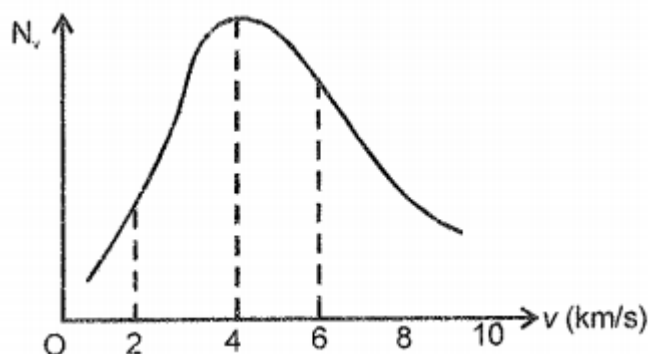
168.

An ideal monatomic gas at pressure P_0 , volume V_0 and temperature T_0 is compressed suddenly so that its final volume becomes $\frac{V_0}{8}$. The final pressure of the gas is

1. $P = 8P_0$
2. $P = 16P_0$
3. $P = 24P_0$
4. $P = 32P_0$

169.

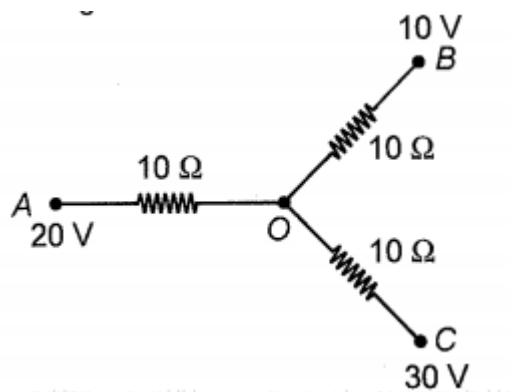
Maxwell's speed distribution graph is drawn as shown below. The most probable speed of the gas molecules is:



1. 4 km/s
2. Between 3 km/s and 1 km/s
3. Any value between 2 km/s and 6 km/s
4. More than 4 km/s

170.

Current through the branch AO is-



1. 2 A
2. 4 A
3. 1 A
4. Zero

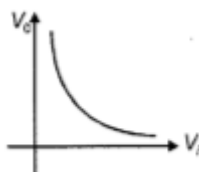
171.

When an object is placed at 10 cm and 30 cm from a convex lens, images obtained are of the same magnitude of magnification. The focal length of the lens may be:

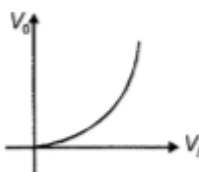
1. 10 cm
2. 15 cm
3. 20 cm
4. 25 cm

172.

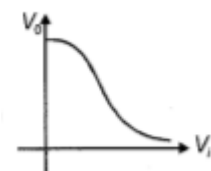
The variation of output potential V_0 with input potential (V_i) in a transistor in CE-mode can be best represented as:



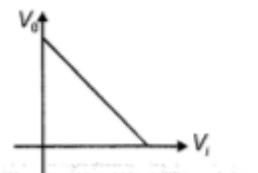
1.



2.



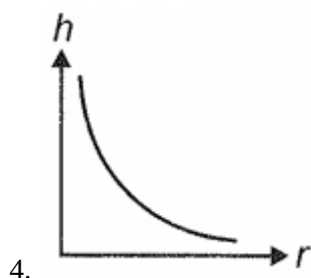
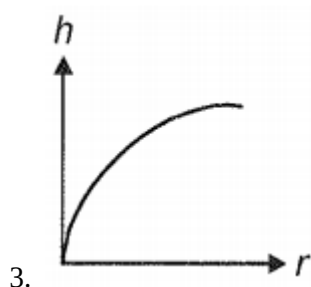
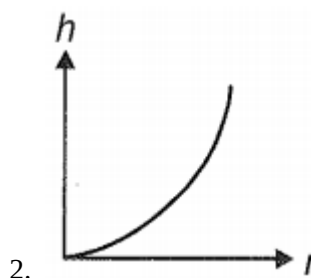
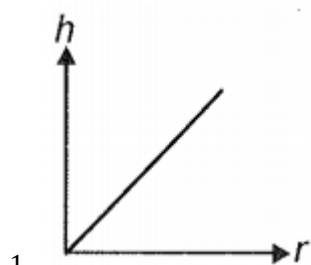
3.



4.

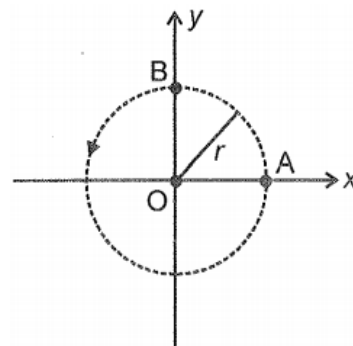
173.

Which of the following graph represents the variation of capillary rise of liquid with radius of the capillary tube?



174.

A particle is moving with speed v on a circle (of radius r and centred at the origin) as shown in the given figure in anticlockwise fashion. The average acceleration of the particle during its motion from point A to point B is:



1. $\frac{-2v^2}{\pi r} (\hat{i} - \hat{j})$

2. $\frac{-2v^2}{\pi r} (\hat{i} + \hat{j})$

3. $\frac{2v^2}{\pi r} (\hat{i} - \hat{j})$

4. $\frac{2v^2}{\pi r} (\hat{i} + \hat{j})$

175.

To the captain of a ship A travelling with velocity $\vec{v}_A = (3\hat{i} - 4\hat{j})$ km/h, a second ship B appears to have a velocity $\vec{v}_B = (5\hat{i} + 12\hat{j})$ km/h. What is the true velocity of the ship B?

1. $2\hat{i} + 16\hat{j}$ km/h

2. $13\hat{i} + 8\hat{j}$ km/h

3. $-2\hat{i} - 16\hat{j}$ km/h

4. none of these

176.

A particle of mass m is projected at an angle α with the horizontal with an initial velocity u . The work done by gravity during the time it reaches its highest point is:

1. $u^2 \sin^2 \alpha$
2. $\frac{mu^2 \cos^2 \alpha}{2}$
3. $\frac{mu^2 \sin^2 \alpha}{2}$
4. $-\frac{mu^2 \sin^2 \alpha}{2}$

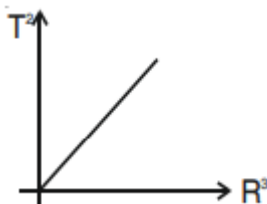
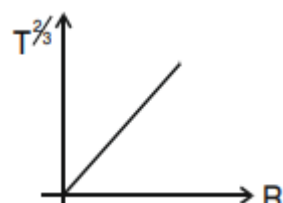
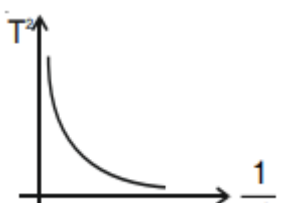
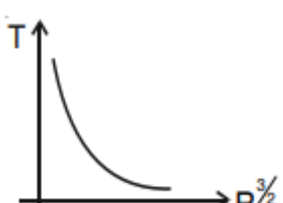
177.

A particle is moving with a constant velocity along a line parallel to positive X-axis. The magnitude of its angular momentum with respect to the origin is,

1. zero
2. increasing with x
3. decreasing with x
4. remaining constant

178.

T is the time period of revolution of a planet revolving around the sun in an orbit of mean radius R , then identify the 'INCORRECT' graph.

1. 
2. 
3. 
4. 

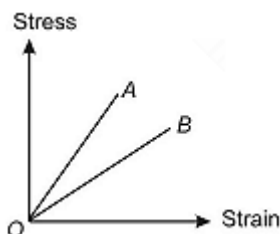
179.

A body is under pure rolling. Fraction of its total kinetic energy which is purely rotational is $\frac{1}{2}$. The body is:

1. Circular ring
2. Circular disc
3. Hollow sphere
4. Solid sphere

180.

The stress versus strain graph is shown for two wires. If Y_1 and Y_2 are Young modulus of wire A and B respectively, then the correct option is



1. $Y_1 > Y_2$
2. $Y_2 > Y_1$
3. $Y_1 = Y_2$
4. Cannot say

181.

In an experiment four quantities a, b, c and d are measured with percentage errors of 2%, 3%, 1%, and 0.5% respectively. A quantity Q is defined as:

$Q = \frac{a\sqrt{b}}{c^{3/2}d^4}$. The maximum percentage error in the calculation of Q will be:

1. 5%
2. 6%
3. 7%
4. 9%

182.

A particle has initial velocity $\vec{u} = (4\hat{i} - 5\hat{j})$ m/s and it is moving with acceleration $\vec{a} = (\frac{1}{4}\hat{i} + \frac{1}{5}\hat{j})$ m/s². Velocity of the particle at t = 2s is-

1. $(6\hat{i} - 4\hat{j})$ m/s
2. $(4.5\hat{i} - 4.5\hat{j})$ m/s
3. $(4.5\hat{i} - 4.6\hat{j})$ m/s
4. $(6\hat{i} - 4.6\hat{j})$ m/s

183.

What is the Q-value of a series LCR circuit with $L = 2.0$ H, $C = 32 \mu\text{F}$ and $R = 10 \Omega$?

1. 35
2. 20
3. 15
4. 25

184.

A capacitor is made of two circular plates each of radius 12 cm and separated by 5.0 cm. The capacitor is being charged by an external source. The charging current is constant and equal to 0.15 A. The displacement current across the plates is:

1. 0
2. 0.14 A
3. 0.16 A
4. 0.15 A

185.

The amplitude of the magnetic field part of a harmonic electromagnetic wave in vacuum is $B_0 = 510$ nT. What is the amplitude of the electric field part of the wave?

1. 200 N/C
2. 153 N/C
3. 150 N/C
4. 510 N/C

Physics - Section B

186.

A 5 kg stationary bomb is exploded in three parts having mass in the ratio 1 : 1 : 3 respectively. If parts having same mass move in perpendicular directions with velocity 30 m/s, then the speed of the bigger part will be -

1. $10\sqrt{2}$ m/s
2. $\frac{10}{\sqrt{2}}$ m/s
3. $13\sqrt{2}$ m/s
4. $\frac{15}{\sqrt{2}}$ m/s

187.

A particle starting from the point (1, 2) moves in a straight line in XY plane. Its coordinates at a later time are (2,3). The path of the particle makes with x-axis an angle of

1. 30°
2. 45°
3. 60°
4. data insufficient

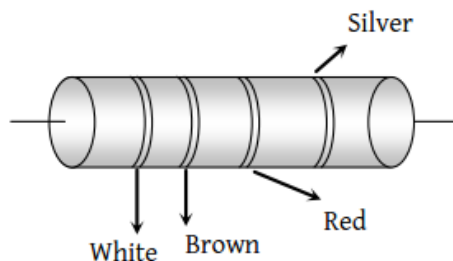
188.

Five equal capacitors connected in series have a resultant capacitance of $4\mu F$. The total energy stored in these when these are connected in parallel and charged to 400 V is -

1. 1 J
2. 8 J
3. 16 J
4. 4 J

189.

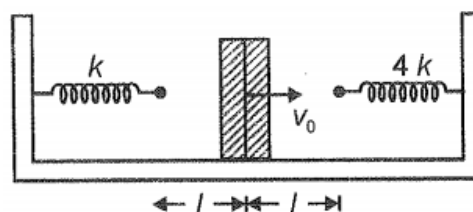
In the figure a carbon resistor has bands of different colours on its body as mentioned in the figure. The value of the resistance is



1. 2.2 k Ω
2. 3.3 k Ω
3. 5.6 k Ω
4. 9.1 k Ω

190.

All the surfaces are smooth and springs are ideal. If a block of mass m is given the velocity v_0 in the right direction, then the time period of the block shown in the figure is



1. $\frac{12l}{v_0}$
2. $\frac{2l}{v_0} + \frac{3\pi}{2} \sqrt{\frac{m}{k}}$
3. $\frac{4l}{v_0} + \frac{3\pi}{2} \sqrt{\frac{m}{k}}$
4. $\frac{1}{2} \pi \sqrt{\frac{m}{k}}$

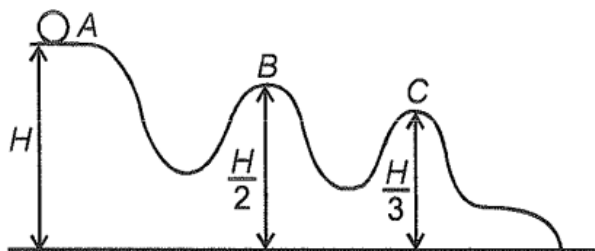
191.

The magnetic moment of a short dipole is 100 A-m^2 . The magnetic induction in vacuum at 1 m from the dipole on the axis of the dipole is :

1. $2 \times 10^{-5} \text{ T}$
2. 10^{-5} T
3. $2 \mu T$
4. $1 \mu T$

192.

A ball of mass m at rest starts moving from point A. The irregular surface is frictionless. The speed of the ball at the point C on the track is



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

193.

Which of the following relations is dimensionally wrong? [The symbols have their usual meanings.]

1. $s = ut + \frac{1}{6}at^2$
2. $v^2 = u^2 + \frac{2as^2}{\pi}$
3. $v = u - 2at$
4. All of these

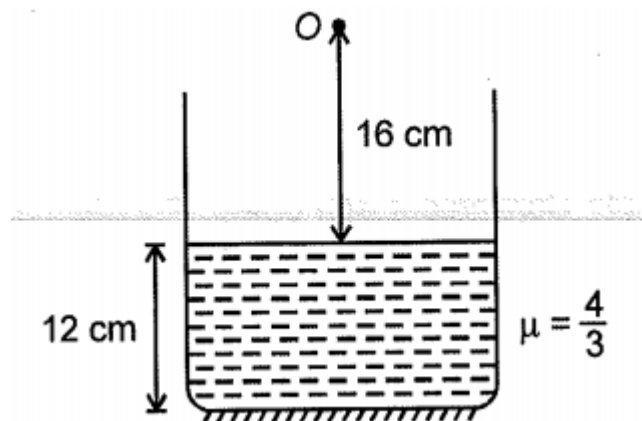
194.

When a radioactive nucleus undergoes negative beta decay, the ejected electron is

1. Electron already present in the nucleus
2. Valance electron
3. Emitted by a neutron in the nucleus
4. Emitted by a proton in the nucleus

195.

What is the distance of the image of the point object O from the bottom of the container in the diagram shown below, where the bottom of the container is silver polished?



1. 30 cm
2. 33 cm
3. 20 cm
4. 15 cm

196.

A body is projected with velocity $\vec{v} = (\alpha\hat{i} + \beta\hat{j}) \text{ m/s}$. The time of flight of body is [considering x as horizontal and y as vertical axis and g is acceleration due to gravity]

1. $\frac{2\beta}{g}$
2. $\frac{2\alpha}{g}$
3. $\frac{2\alpha\beta}{g}$
4. $\frac{2\alpha}{g\beta}$

197.

The relative velocity of two adjacent layers of a liquid is 6 cm/s and the perpendicular distance between layers is 0.1 mm. The velocity gradient for liquid (in per second) is

1. 6
2. 0.6
3. 0.06
4. 600

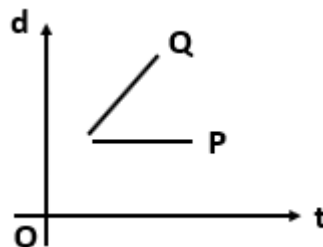
198.

Angle between position vector and acceleration vector of a particle in non-uniform circular motion (centre of circle is taken as origin) may be

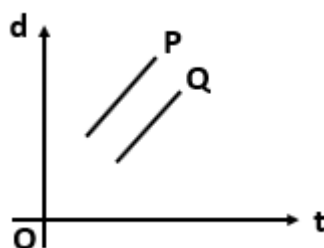
1. 0°
2. 45°
3. 75°
4. 135°

199.

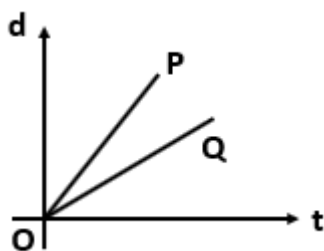
Which one of the following displacement-time graph represents two moving objects P and Q with zero relative velocity?



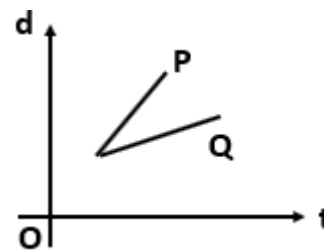
1.



2.



3.



4.

200.

The resolving power of a compound microscope will be maximum when

- (1) Red light is used to illuminate the object
- (2) Violet light is used to illuminate the object instead of red light
- (3) Infrared light is used to illuminate the object instead of visible light
- (4) The microscope is in normal adjustment

[Fill OMR Sheet*](#)

*If above link doesn't work, please go to test link from where you got the pdf and fill OMR from there