

Botany - Section A

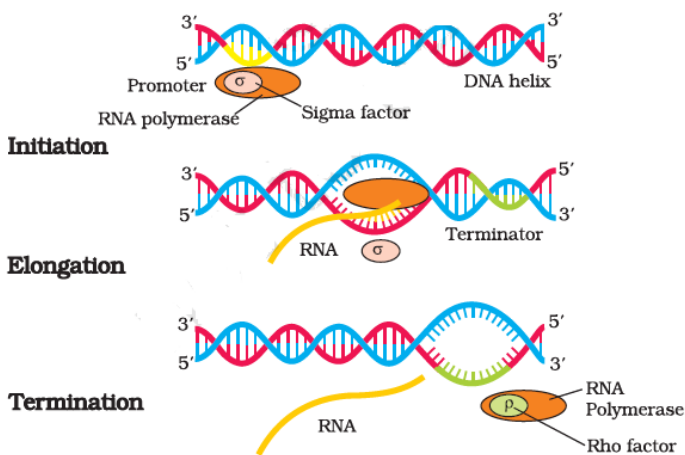
1.

Which non-radioactive isotope was used by Meselson and Stahl to label DNA in their experiment?

1. ^{35}S
2. ^{15}N
3. ^{32}P
4. None

2.

Study the diagram given below and choose the correct information that can be deduced :



1. The core RNA polymerase is capable of catalyzing elongation only
2. Sigma factor and Rho factor are needed for termination of transcription
3. DNA helicase opens the strand of the DNA
4. Both strands of DNA are transcribed by the same RNA polymerase

3.

Which one of the following is the start codon?

1. UGA
2. UAA
3. UAG
4. AUG

4.

Which one of the following pairs of codons are correctly matched with their function or the signal for the particular amino acid?

1. GUU, GCU – Alanine
2. UAG, UGA – Stop
3. AUG, ACG – Start/methionine
4. UUA, UCA – Leucine

5.

Untranslated regions (UTRs) are present

1. before and after the stop codon
2. after the start codon and before the stop codon
3. before and after the start codon
4. before the start codon and after the stop codon

6.

In DNA replication, the two strands of a daughter DNA molecules are derived as follows

1. one strand from parent DNA and the other freshly synthesized
2. both strands from parent DNA
3. both strands synthesized as templates on parent strands
4. both strands synthesized on RNA templates of parent strands

7.

In 1900 Mendel's work was rediscovered by:

1. Korana, Nirenberg and Mathei
2. De Vries, Correns and von Tschermak
3. Avery, McCleod and McCarty
4. Watson, Crick and Wilkins

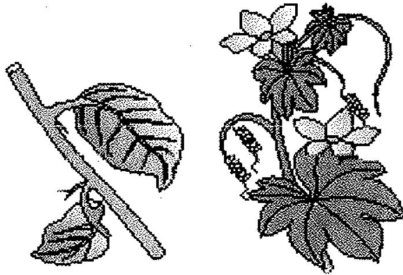
8. The genotypes of a husband and Wife are $I^A I^B$ and $I^A i$. Among the blood types of their children, how many different genotypes and phenotypes are possible?
1. 3 genotypes; 4 phenotypes
 2. 4 genotypes; 3 phenotypes
 3. 4 genotypes; 4 phenotypes
 4. 3 genotypes; 3 phenotypes
9. Select the correct statement:
1. Franklin Stahl coined the term "linkage".
 2. Punnett square was developed by a British scientist.
 3. Spliceosomes take part in translation.
 4. Transduction was discovered by S. Altman.
10. Which of the following rRNA acts as structural RNA as well as ribozyme in bacteria?
1. 5S rRNA
 2. 18S rRNA
 3. 23S rRNA
 4. 5.8S rRNA
11. The association of histone H1 with a nucleosome indicates:
1. DNA replication is occurring
 2. The DNA is condensed into a chromatin fibre
 3. The DNA double helix is exposed
 4. Transcription is occurring
12. Mendel's work remained unrecognized till 1900. Which of the following was not a reason for this?
1. His work was widely publicized and it brought bad name to Mendel
 2. His concept of factors as stable and discrete units that did not 'blend' was not accepted.
 3. His approach of using mathematics to explain biological phenomena was unacceptable.
 4. He could not provide any physical proof for the existence of factors or say what they were made of.
13. If a length of DNA has 45,000 base pairs, how many complete turns will the DNA molecule take?
1. 45000
 2. 450
 3. 4500
 4. 45
14. The major part of activated sludge is sent to
1. Anaerobic sludge digesters
 2. Aerobic sludge digesters
 3. Aeration tank
 4. Settling tank
15. Baculoviruses have no negative effect over
- (1) Plants, fish
 - (2) Mammals
 - (3) Birds, non-target insects
 - (4) All of these

16. Find the odd one (w.r.t. dominant traits in garden pea)
1. Yellow pod color
 2. Violet flower color
 3. Yellow seed color
 4. Full pod shape
17. With reference to protein synthesis, consider the following events
- a. Binding of aminoacyl - tRNA complex with mRNA
 - b. Activation of amino acid
 - c. Polypeptide formation
 - d. Formation of aminoacyl - tRNA complex
- What is the correct sequence of the above events in protein synthesis?
1. b, d, a & c
 2. a, b, d & c
 3. d, b, a & c
 4. a, d, b & c
18. Which of the following is not correct w.r.t. salient features of the double helix structure of DNA?
1. The plane of one base pair stacks over the other
 2. The backbone is constituted by sugar-phosphate and the bases project outside
 3. The two chains have anti-parallel polarity
 4. The pitch of the helix is 3.4 nm
19. The term 'Nuclein' for the genetic material was used by
1. Franklin
 2. Meischer
 3. Chargaff
 4. Mendel
20. The dough kept overnight in warm weather becomes soft and spongy because of:-
1. Fermentation
 2. Cohesion
 3. Osmosis
 4. Absorption of carbon dioxide from the atmosphere
21. Domestic wheat, which has 42 chromosomes, is probably hexaploid (6n), whereas the haploid number in the ancestral ones was 7. Find out the right reason as to how are such plants produced?
1. Due to failure of segregation of chromatids during cell division cycle
 2. Due to the gain of extra copy of chromosome
 3. Due to failure of cytokinesis after telophase stage of cell division
 4. Due to the loss of extra copy of chromosome
22. Phenomenon in which inheritance of a trait is controlled by two or more genes is known as
1. Polygenic inheritance
 2. Multiple allelism
 3. Pleiotropy
 4. Co-dominance
23. Which of the following enzyme is primarily responsible for the hydrolysis of the disaccharide, lactose into its monomeric units galactose and glucose in the Lac operon?
1. Beta-galactosidase
 2. Permease
 3. Transacetylase
 4. Tyrosinase

24. A location with luxuriant growth of lichens on the trees indicates that the:-
1. trees are very healthy
 2. trees are heavily infested
 3. location is highly polluted
 4. location is not polluted
25. According to Hugo de Vries, the mechanism of evolution is:-
1. Multiple step mutations
 2. Saltation
 3. Phenotypic variations
 4. Minor mutations
26. Why is it said that looking at stars on a clear night sky means looking back in time?
1. What we are seeing at that time is actually what started its journey trillions of years back
 2. What we are seeing at that time is actually what started its journey trillions of days back
 3. What we are seeing at that time is actually what started its journey thousands of days back
 4. What we are seeing at that time is actually what started its journey thousands of kilometres away
27. Which of the following is not true about Big Bang theory?
1. A singular huge explosion
 2. Universe expanded and temperature came down
 3. Hydrogen and Helium formed alongwith this expansion
 4. The gases condensed under gravitation and formed the galaxies of the present day universe.
28. Oparin of..... and Haldane of proposed that the first form of life could have come from pre existing
1. Russia, England, non-living inorganic molecules
 2. England, Russia, living organic matter
 3. Russia, England, non-living organic molecules
 4. England, Russia, life
29. Which of the following statements is true?
1. A British scientist created the conditions proposed by Oparin and Haldane in a closed flask with temperature of 800 degrees Celsius in electric discharge along with gases methane, hydrogen, ammonia and water vapour and observed the formation of amino acid.
 2. Some similar experimental setups were also prepared by other scientists and the formation of sugar, nitrogenous bases, pigments and fats were recorded.
 3. The processes of chemical evolution were occurring elsewhere in space was concluded by the analysis of content of gaseous cloud.
 4. The first self-replicating metabolic capsule of life arose 3 billion years back.
30. Similar biological structures or sequences in different taxa are homologous if they:
1. always perform the same function
 2. result from convergent evolution
 3. do not serve any known function
 4. are derived from a common ancestor

31.

Identify the diagram and select the correct set of terms against it.



- 1 Thorn of Bougainvillea and tendril of Cucurbita – Homologous organs – Convergent evolution
- 2 Thorn of Bougainvillea and tendril of Cucurbita – Analogous organs – Divergent evolution
- 3 Thorn of Cucurbita and tendril of Bougainvillea – Homologous organs – Divergent evolution
- 4 Thorn of Bougainvillea and tendril of Cucurbita – Homologous organs – Divergent evolution

32.

There are five factors known to affect Hardy-Weinberg equilibrium, which of the following cannot be included in the five factors?

- 1 Gene flow and genetic drift
- 2 Genetic recombination and natural selection
- 3 Mutation
- 4 Isolation

33.

Read the following paragraph with blanks A, B, C, and D.

Hugo de Vries based his work on A brought forth the idea of mutations. Mutations are random and B while Darwinian variations are small and C. Evolution for Darwin was gradual while de Vries believed mutation caused speciation and hence called it D.

Choose the option which correctly fills in the blanks A, B, C, and D.

	A	B	C	D
(1)	Evening primrose	Directional	Directionless	Saltation
(2)	Evening primrose	Directional	Directionless	Natural selection
(3)	Garden pea	Directionless	Directional	Saltation
(4)	Evening primrose	Directionless	Directional	Saltation

34.

Stellar distances are measured in :

1. Meters
2. Nanometers
3. Light years
4. Kilometers

35.

Select the incorrect match

(1)	Universe	20 billion years old
(2)	Earth	4.5 million years back
(3)	UV rays	Broke up water into H ₂ and O ₂
(4)	Louis Pasteur	Demonstrated that life comes only from pre-existing life

Botany - Section B

36.

In 1953, James Watson and F. Crick proposed the Double Helix model of DNA and got Nobel Prize. Their model of DNA was based on:

- A. X-ray diffraction of DNA produced by M. Wilkins and R. Franklin
- B. Griffith's experiment.
- C. Hershey - Chase experiment
- D. Chargaff's rule of base equivalence ($A + G / T + C = 1$)

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

37.

DNA polymerase:

- A. Is the main enzyme for RNA synthesis
- B. Is DNA dependent DNA polymerizing enzyme
- C. Is a highly efficient enzyme
- D. Is catalyzes a reaction with a high degree of accuracy

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

38.

How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?

- 1. Five
- 2. Six
- 3. Eight
- 4. Seven

39.

Which one of the following pairs of nitrogenous bases of nucleic acids is wrongly matched with the category mentioned against it?

- 1. Thymine, Uracil - Pyrimidines
- 2. Uracil, Cytosine - Pyrimidines
- 3. Guanine, Adenine - Purines
- 4. Adenine, Thymine - Purines

40.

Column-I	Column-II
I. Operator site	(A) Binding site for RNA polymerase
II. Promoter site	(B) Binding site for repressor molecule
III. Structural gene	(C) Codes for enzyme protein
IV. Regulator gene	(D) Code for repressor molecules

The correct match is:

	I	II	III	IV
(1)	B	A	C	D
(2)	B	A	D	C
(3)	D	C	A	B
(4)	B	C	A	D

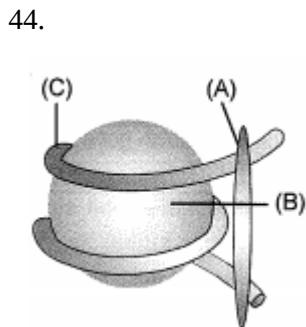
41.

The technology of biogas production was developed in India mainly due to the efforts of

- 1. IARI
- 2. KVIC
- 3. Both 1 and 2
- 4. IAIR

42. Mycorrhizal plants have the following benefits, except-
1. Phosphorus from the soil by means of fungi
 2. Resistance to root borne pathogens
 3. Tolerance to salinity, drought, and extremely low temperature
 4. Overall increase in plant growth and development

43. "The activated sludge pumped into large tanks. Here, other kinds of bacteria, which grow anaerobically, digest the bacteria and the fungi in the sludge". In which tank, this process of sewage treatment is performed?
1. Secondary settling tank
 2. Aeration tank
 3. Primark settling tank
 4. Anaerobic sludge digesters



- a. Part marked as (B) has five types of histone proteins.
 - b. Part marked as (A) is rich in basic amino acid residues.
 - c. Part marked as (C) is made up of 400 nucleotides.
- Which of the above statement(s) is/are incorrect?

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

45. A test cross is carried out to:
1. Predict whether two traits are linked
 2. Assess the number of alleles of a gene
 3. Determine whether two species or varieties will breed successfully
 4. Determine the genotype of a plant at F_2

46. Which of the following criteria should be fulfilled by a molecule to act as a genetic material?
- (i) It should not be able to generate its replica
 - (ii) It should chemically and structurally be stable
 - (iii) It should not allow slow mutation
 - (iv) It should be able to express itself in the form of Mendelian Characters
1. (i) and (ii)
 2. (ii) and (iii)
 3. (iii) and (iv)
 4. (ii) and (iv)

47. The naturalist who had the similar observations as that of Darwin was...
1. Alfred Wallace
 2. Oparin
 3. Haldane
 4. L. Miller

48. Match List - I with List - II

List - I	List - II
(a) <i>Aspergillus Niger</i>	(i) Acetic Acid
(b) <i>Acetobacter aceti</i>	(ii) Lactic Acid
(c) <i>Clostridium butylicum</i>	(iii) Citric Acid
(d) <i>Lactobacillus</i>	(iv) Butyric Acid

Choose the correct answer from the options given below.

- | | | | | |
|-----|-------|-------|-------|-------|
| | (a) | (b) | (c) | (d) |
| (1) | (ii) | (iii) | (i) | (iv) |
| (2) | (iv) | (ii) | (i) | (iii) |
| (3) | (iii) | (i) | (iv) | (ii) |
| (4) | (i) | (ii) | (iii) | (iv) |

49. The concept of chemical evolution is based on
1. crystallization of chemicals
 2. interaction of water, air, and clay under intense heat
 3. effect of solar radiation on chemicals
 4. the possible origin of life by the combination of chemicals under suitable environmental conditions

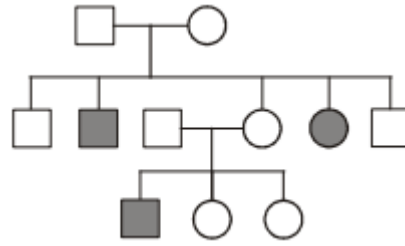
50. Evolutionary convergence is the development of
1. common set of characters in the group of different ancestry
 2. dissimilar characters in closely related groups
 3. common set of characters in closely related groups
 4. random mating

Zoology - Section A

51. 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

52. Which of the following bacteria has a role in removing clots from the blood vessels?
1. *Bacillus thuringiensis*
 2. *Clostridium butylicum*
 3. *Streptococcus*
 4. *Lactobacillus*

53. Study the pedigree chart given below



What does it show?

1. Inheritance of a sex-linked inborn error of metabolism
 2. Inheritance of a condition like phenylketonuria as an autosomal recessive trait
 3. The pedigree chart is wrong as this is not possible
 4. Inheritance of a recessive sex-linked disease like haemophilia
54. What is the genetic disorder in which an individual has an overall masculine development gynaecomastia, and is sterile?
1. Down's syndrome
 2. Turner's syndrome
 3. Klinefelter's syndrome
 4. Edward syndrome

55. The percentage of base sequences, that are dissimilar among humans, is
1. 99.9%
 2. 0.01%
 3. 0.10%
 4. 1.01%

56.

The DNA fingerprinting has applications in

1. forensic sciences
2. population genetics
3. genetic diversities determination
4. All of the above

60.

Which of the following combination of chromosome numbers represents the correct sex determination pattern in honey bees?

1. Male 32, Female 16
2. Male 16, Female 32
3. Male 31, Female 32
4. Female 32, Male 31

57.

Down's syndrome and Klinefelter's syndrome both can be included in

1. Autosomal trisomy
2. Monosomy
3. Trisomy
4. Allosomal trisomy

61.

Which of the following cross will produce four different blood groups in children?

1. $I^A I^B \times I^A I^B$
2. $I^A I^O \times I^B I^O$
3. $I^A I^A \times I^A I^B$
4. $I^A I^B \times I^O I^O$

58.

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

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

62.

Consider the following statements:

- I. HIV is a reterovirus.
- II. It infects and destroys the CD4 T-ymphocytes
- III. The newer antiretroviral drugs are a cure for HIV infection

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

59.

Which of the following step is incorrect w.r.t DNA fingerprinting?

1. Separation of DNA fragments by electrophoresis
2. Isolation of DNA
3. Hybridisation using labeled VNTR probe
4. Detection of hybridized DNA fragments by ultracentrifugation

63.

Consider the following statements:

- I. Innate immunity is non-specific type of defence, that is present at the time of birth.
- II. Acquired immunity is pathogen specific and is characterized by memory
- III. Memory-based acquired immunity developed in higher vertebrates based on ability to distinguish self from non-self

Which of the following statements are true?

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

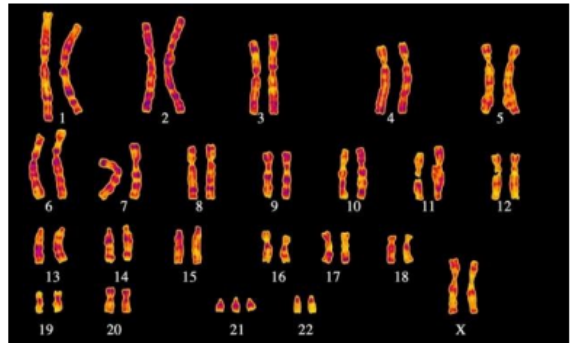
64.

The theory of special creation was strongly challenged during the nineteenth century on the basis of observation made

- 1. During a sea voyage in a sail ship called H.M.S. Beagle round the Europe
- 2. During a sea voyage in a sail ship called M.H.S. Beagle round the Africa
- 3. During a sea voyage in a sail ship called H.M.S. Beagle round the world
- 4. During a sea voyage in a sail ship called M.H.S. Beagle round the world

65.

Placed below is a karyotype of a human being..



On the basis of this karyotype, which of the following conclusions can be drawn:

- 1. Normal human female
- 2. Person is suffering from Colour Blindness
- 3. Affected individual is a female with Down's syndrome
- 4. Affected individual is a female with Turner's syndrome

66.

Which of the following is not the example of evolution by anthropogenic actions?

- 1. Herbicide resistant varieties
- 2. Antibiotic resistant microbes
- 3. Darwin Finches
- 4. Different breeds of dogs

67.

The following are some symptoms, find the disease associated with it.

Sustained high fever, weakness, stomach pain, constipation, headache, loss of appetite

- 1. Pneumonia
- 2. Malaria
- 3. Typhoid
- 4. Filariasis

68. Which of the following can be a result of drug or alcohol abuse?
1. Coma and death due to failure of Heart
 2. Reckless behavior, vandalism, and violence
 3. A combination of drugs and alcohol lead to overdosing and then to death
 4. All of these
69. Industrial melanism is an example of
1. Neo Darwinism
 2. Natural Selection
 3. Mutation
 4. Neo Lamarckism
70. In the case of peppered moth (*Biston betularia*) the black-coloured form became dominant over the light-coloured form in England during the industrial revolution. This is an example of
1. natural selection whereby the darker forms were selected
 2. appearance of the darker colours individuals due to very poor sunlight
 3. protective mimicry
 4. inheritance of darker colour character acquired due to the darker environment
71. A person likely to develop tetanus is immunised by administering
1. dead germs
 2. preformed antibodies
 3. wide spectrum antibiotics
 4. weakened germs
72. Adaptive radiation does not follow which of the following statements?
1. Blackbird on Galapagos islands observed by Darwin is an amazing example of Adaptive Radiation.
 2. All the varieties of Finches evolved on the same planet from original seed feeding finches to insectivorous and vegetarian finches.
 3. Australian marsupials, which are similar to each other evolved from an ancestral stock but all within the Australian island continent.
 4. More than one adaptive radiation appeared to have occurred in an isolated geographical area representing different habitats, known as convergent evolution
73. Infection of alveoli of lungs, alveoli become fluid filled and lead to severe problems in respiration are characteristic feature of
1. A bacterial disease
 2. A viral disease
 3. A fungal disease
 4. A helminth disease
74. The infection of nose and respiratory passage but not lungs is a distinguishing feature of
1. Pneumonia
 2. Common cold
 3. AIDS
 4. Dengue
75. The common roundworm spreads an infectious disease by means of
1. Contaminated water and cooked food
 2. Contaminated water, and vegetables
 3. Contaminated cooked food
 4. Contaminated vegetables and cooked food

76.

The genital organs are affected resulting in gross deformities. This symptom is associated with

1. AIDS
2. Cancer
3. Filariasis
4. Ringworms

77.

Allergies could be because of

1. Protected environment provided in early life
2. Modern day life style
3. More sensitivity to the environment
4. All of these

78.

Which of the following acts as a filter of blood?

1. Bone marrow
2. Lymph node
3. Spleen
4. Thymus

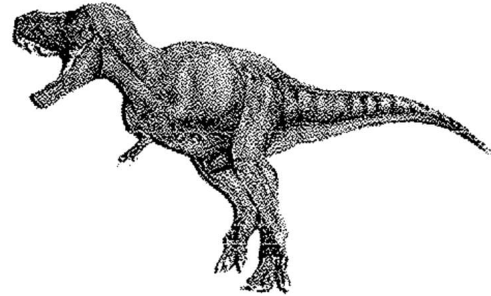
79.

Which of the following is not a correct pair of animals representing convergent evolution?

- 1 Anteater and Numbat
- 2 Lemur and Flying phalanger
- 3 Bobcat and Tasmanian cat
- 4 Wolf and Tasmanian wolf

80.

Mark the correct character of the following figure



- 1 Tetrapedal and having bony plates on back
- 2 Tetrapedal and having collar on neck
- 3 Bipedal and have huge fearsome dagger-like teeth
- 4 Bipedal and have three horns on head

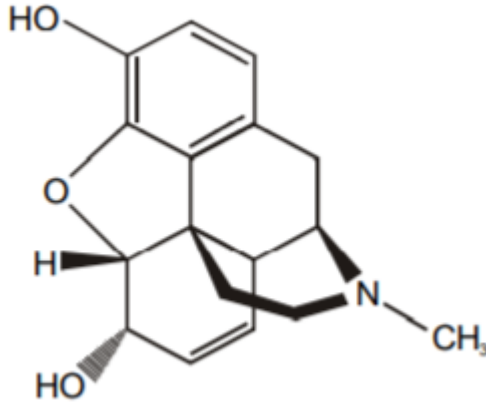
81.

The IgG antibodies received by the developing fetus from the mother through the placenta will provide it with

- 1 Naturally acquired passive immunity
- 2 Artificially acquired passive immunity
- 3 Naturally acquired active immunity
- 4 Artificially acquired active immunity

82.

Which of the following statement is true for the structure given below?



1. It interferes with the transport of the neurotransmitter dopamine
2. Useful in patients who have undergone surgery
3. Obtained from Cannabis sativa
4. It has a potent stimulating action on the nervous system

83.

Choose the incorrect statement w.r.t. natural selection theory

1. The unit of natural selection is an individual
2. Darwin implied natural selection as a method of evolution
3. Reproductively fit organisms will survive more and hence are selected by nature
4. Increase in the number of melanised moths during post-industrialisation is not an example of natural selection

84. Select the correct sequence w.r.t. evolution

1. Chlorophyte ancestors → Rhynia-type plants → Seed ferns → Progymnosperms
2. Progymnosperms → Seed ferns → Cycads → Angiosperms
3. Sauropsids → Thecodonts → Therapsids → Mammals
4. Psilophyton → Progymnosperms → Seed ferns → Angiosperms

85. Cave paintings by pre-historic humans can be seen at Bhimbetka rock shelter in

1. Andhra Pradesh
2. Madhya Pradesh
3. Uttar Pradesh
4. Himachal Pradesh

Zoology - Section B

86.

How sickle cell anaemia is different from Thalassemia?

1. Being autosomal recessive
2. Being a blood disease
3. Being a qualitative disorder
4. Involvement of mutation

87.

Which of the following symbols represent consanguineous mating?

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

88.

Which of the following is not a salient observation drawn from human genome project?

1. Chromosome 1 has most genes
2. More than 50% of the genome codes for proteins
3. Dystrophin is the largest human gene
4. The function for over 50% of the discovered genes are unknown

89. Consider the following statements:
- I. Cancer is essentially a genetic disease caused by multiple mutational events.
 - II. Cancerous cells are rapidly dividing cells that exhibit contact inhibition.
 - III. Metastasis is the most feared complication of any cancer
- 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
90. The early-stage human embryo distinctly possesses
1. gills
 2. gill slits
 3. external ear (pinna)
 4. eyebrows
91. In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self –cells, then it leads to
1. graft rejection
 2. auto – immunity disease
 3. active immunity
 4. allergic response
92. Mammals evolved from
1. Therapsids
 2. Sauropsids
 3. Thecodonts
 4. Tuataras
93. In malaria; female Anopheles mosquito is
1. Host
 2. Vector
 3. Both
 4. Neither host nor vector completely
94. Amoebiasis or amoebic dysentery is caused by
1. Entamoeba histolytica, a protozoan parasite in small intestine
 2. Escherichia coli, a protozoan parasite in small intestine
 3. Entamoeba histolytica, a protozoan parasite in large intestine
 4. Escherichia coli, a protozoan parasite in large intestine
95. Which of the following techniques is used to detect the cancer of internal organs?
- 1 Radiography
 - 2 Computerized tomography
 - 3 Magnetic resonance imaging
 - 4 All of these
96. To which type of barriers under innate immunity do the saliva in the mouth and the tears from the eyes belong?
- 1 Cellular barriers
 - 2 Physiological barriers
 - 3 Physical barriers
 - 4 Cytokine barriers

97.

Read the following four statements A, B, C and D which are the descriptions of some events in the life cycle of Plasmodium and select the correct option having a set of correct statements

A. Parasite reproduces asexually in red blood cells. The rupture of RBCs is associated with the release of a toxic substance, haemozoin, which is responsible for chills and high fever

B. Sexual stages (gametocytes) develop in the intestine of man

C. Fertilisation and development take place in the mosquito's intestine

D. Female mosquito takes up the gametocyte with blood meal

1 A & B

2 B & C

3 A & D

4 C & D

98.

In human evolution, the development of the brain and language is an example of:-

1. Convergent evolution

2. Divergent evolution

3. Parallel evolution

4. Adaptive radiation

99.

Embryological support for evolution was proposed by

1. Ernst Heckel

2. Karl Ernst von Baer

3. Charles Darwin

4. Alfred Wallace

100.

A Hominid fossil discovered in Java in 1891, now extinct, having a cranial capacity of about 900 cc was:

1. Homo erectus

2. Neanderthal man

3. Homo sapiens

4. Australopithecus

Chemistry - Section A

101.

IUPAC name of $\text{H}_2[\text{PtCl}_6]$ is:

1. Hydrogen hexachloroplatinate (IV)

2. Dihydrogen hexachloroplatinate (IV)

3. Hydrogen hexachloroplatinic (IV) acid

4. Hexachloroplatinic (IV) acid

102.

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

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

103.

Iron carbonyl, $\text{Fe}(\text{CO})_5$ is

1. Tetranuclear

2. Mononuclear

3. Trinuclear

4. Dinuclear

104. The sum of coordination number and oxidation number of the metal M in the complex $[M(en)_2(C_2O_4)]Cl$ is -
1. 9
 2. 6
 3. 7
 4. 8
105. An anticancer agent among the following is -
1. mer - $[Co(NH_3)_3 Cl]$
 2. Cis - $[PtCl_2(NH_3)_2]$
 3. Cis - $K_2[Pt Cl_2 Br_2]$
 4. $NH_2 CoCl_4$
106. The gas that will be adsorbed more readily on the surface of charcoal is :
1. CO_2
 2. NH_3
 3. Br_2
 4. N_2
107. $d\pi - p\pi$ bond is present in :-
1. XeO_3
 2. $POCl_3$
 3. SO_3
 4. All
108. The correct statements among the following about solid catalysts is -
- a. Same reactants may give different products by using different catalysts
 - b. Catalyst does not change ΔH of reaction
 - c. Catalyst is required in large quantities to catalyse reactions
 - d. Catalytic activity of a solid catalyst does not depend upon the strength of chemisorption
1. (a, b)
 2. (b, c)
 3. (c, d)
 4. (a, d)
109. A brown ring is formed in the ring test for NO_3^- ion. It is due to the formation of-
1. $[Fe (H_2O)_5 (NO)]^{2+}$
 2. $FeSO_4 \cdot NO_2$
 3. $[Fe (H_2O)_4 (NO)_2]^{2+}$
 4. $FeSO_4 \cdot HNO_3$
110. The coloured compound among the following in the solid state is-
1. Ag_2SO_4
 2. CuF_2
 3. ZnF_2
 4. Cu_2Cl_2

111. Gadolinium belongs to 4f series. Its atomic number is 64. The correct electronic configuration of gadolinium among the following is-
1. $(Xe)4f^75d^16s^2$
 2. $(Xe)4f^65d^26s^2$
 3. $(Xe)4f^86d^2$
 4. $(Xe)4f^95s^1$
112. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not the characteristic property of interstitial compounds?
1. They have high melting points in comparison to pure metals
 2. They are very hard
 3. They are conductor.
 4. They are chemically very reactive
113. The colour of the coordination compounds depends on the crystal field splitting. What will be the correct order of absorption of the wavelength of light in the visible region, for the complexes,
1. $[Co(CN)_6]^{3-} > [Co(NH_3)_6]^{3+} > [Co(H_2O)_6]^{3+}$
 2. $[Co(CN)_6]^{3-} > [Co(H_2O)_6]^{3+} > [Co(NH_3)_6]^{3+}$
 3. $[Co(H_2O)_6]^{3+} > [Co(NH_3)_6]^{3+} > [Co(CN)_6]^{3-}$
 4. $[Co(NH_3)_6]^{3+} > [Co(CN)_6]^{3-} > [Co(H_2O)_6]^{3+}$
114. In the extraction of copper from its sulphide ore, the metal is formed by the reduction of Cu_2S with :
1. FeS
 2. CO
 3. Cu_2O
 4. SO_2
115. In qualitative analysis when H_2S is passed through an aqueous solution of salt acidified with dil. HCl, a black precipitate is obtained. On boiling the precipitate with dil. HNO_3 , it forms a solution of blue colour. Addition of excess of aqueous solution of ammonia to this solution gives-
1. Deep blue precipitate of $Cu(OH)_2$
 2. Deep blue solution of $[Cu(NH_3)_4]^{2+}$
 3. Deep blue solution of $Cu(NO_3)_2$
 4. Deep blue solution of $Cu(OH)_2 \cdot Cu(NO_3)_2$
116. Aqua regia is used for dissolving noble metals (Au, pt, etc.). The gas evolved in this process is -
1. N_2O_5
 2. N_2O_3
 3. N_2
 4. NO
117. In a molecule of pyrophosphoric acid, the number of P – OH, P = O and P – O – P bonds/moiety (ies) respectively are :
1. 4, 2 and 0
 2. 2, 4 and 1
 3. 4, 2 and 1
 4. 3, 3 and 3

118.

The d-electron configuration of $[\text{Ru}(\text{en})_3]\text{Cl}_2$ and $[\text{Fe}(\text{H}_2\text{O})_6]\text{Cl}_2$, respectively are :

1. $t_{2g}^6 e_g^0$ and $t_{2g}^4 e_g^2$
2. $t_{2g}^4 e_g^2$ and $t_{2g}^4 e_g^2$
3. $t_{2g}^3 e_g^3$ and $t_{2g}^4 e_g^2$
4. $t_{2g}^4 e_g^2$ and $t_{2g}^3 e_g^3$

119.

The method used for the purification of Indium is-

1. Van Arkel method
2. Liquation
3. Zone refining
4. Vapour phase refining

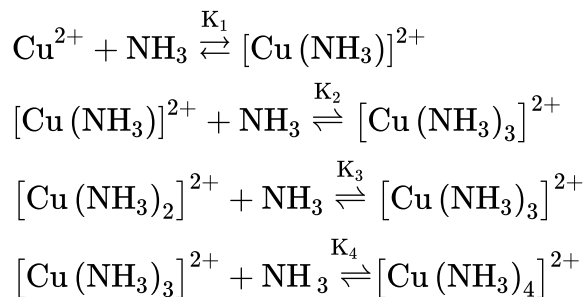
120.

Al_2O_3 was leached with alkali to get X. The solution of X on the passing of gas Y forms Z. X, Y and Z respectively are :

1. $\text{X} = \text{Na}[\text{Al}(\text{OH})_4]$, $\text{Y} = \text{SO}_2$, $\text{Z} = \text{Al}_2\text{O}_3$
2. $\text{X} = \text{Na}[\text{Al}(\text{OH})_4]$, $\text{Y} = \text{CO}_2$, $\text{Z} = \text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
3. $\text{X} = \text{Al}(\text{OH})_3$, $\text{Y} = \text{CO}_2$, $\text{Z} = \text{Al}_2\text{O}_3$
4. $\text{X} = \text{Al}(\text{OH})_3$, $\text{Y} = \text{SO}_2$, $\text{Z} = \text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

121.

The stepwise formation of $[\text{Cu}(\text{NH}_3)_4]^{2+}$ is given below



The value of stability constants K_1 , K_2 , K_3 and K_4

are 10^4 , 1.58×10^3 , 5×10^2 and 10^2

respectively. The overall equilibrium constants for the dissociation of $[\text{Cu}(\text{NH}_3)_4]^{2+}$ is $x \times 10^{-12}$. The value of x is _____.

(Rounded off to the nearest integer)

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

122.

The calculated magnetic moments (spin only value) for species $[\text{FeCl}_4]^{2-}$, $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$ and MnO_4^{2-} respectively are :

1. 5.82, 0 and 0 BM
2. 4.90, 0 and 1.73 BM
3. 5.92, 4.90 and 0 BM
4. 4.90, 0 and 2.83 BM

123.

The number of $\text{Cl} = \text{O}$ bonds in perchloric acid is-

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

124. The nature of a charge on resulting colloidal particles when FeCl_3 is added to an excess of hot water is :
1. Positive
 2. Sometimes positive and sometimes negative
 3. Neutral
 4. Negative
125. In a mildly alkaline medium, thiosulphate ion is oxidized by MnO_4^- to "A". The oxidation state of sulphur in "A" is-
1. +4
 2. +2
 3. -2
 4. +6
126. The structure of IF_7 is :
1. Square pyramidal
 2. Trigonal bipyramidal
 3. Octahedral
 4. Pentagonal bipyramidal
127. The most reactive among the following is-
1. Cl_2
 2. Br_2
 3. I_2
 4. ICI
128. The element has the highest boiling point among the following is-
1. He
 2. Ne
 3. Kr
 4. Xe
129. The pair in which phosphorous atoms have a oxidation state of +3 is :
1. Orthophosphorous and pyrophosphorous acids
 2. Pyrophosphorous and hypophosphoric acids
 3. Orthophosphorous and hypophosphoric acids
 4. Pyrophosphorous and pyrophosphoric acids
130. The point of dissimilarity between lanthanides and actinides is
1. Three outermost shells are partially filled
 2. They show oxidation state of +3 (common)
 3. They are called inner transition elements
 4. They are radioactive in nature
131. Among the ligands NH_3 , en, CN^- and CO, The correct order of their increasing field strength, is
1. $\text{CO} < \text{NH}_3 < \text{en} < \text{CN}^-$
 2. $\text{NH}_3 < \text{en} < \text{CN}^- < \text{CO}$
 3. $\text{CN}^- < \text{NH}_3 < \text{CO} < \text{en}$
 4. $\text{en} < \text{CN}^- < \text{NH}_3 < \text{CO}$

132.

The factors that may be regarded as the main cause of lanthanoid contraction among the following is-

1. Greater shielding of 5d electron by 4f electrons
2. Poorer shielding of 5d electron by 4f electrons
3. Effective shielding of one of the 4f electrons by another in the sub-shell
4. Poor shielding of one of the 4f electrons by another in the sub-shell

133.

The complex does not involve inner orbital hybridisation among the following is-

1. $[\text{CoF}_6]^{3-}$
2. $[\text{Co}(\text{NH}_3)_6]^{3+}$
3. $[\text{Fe}(\text{CN})_6]^{3-}$
4. $[\text{Cr}(\text{NH}_3)_6]^{3+}$

134.

The IUPAC name of $[\text{Co}(\text{NH}_3)_5\text{ONO}]^{2+}$ ion is-

1. Pentaamminenitritocobalt(IV) ion
2. Pentaamminenitritocobalt(III) ion
3. Pentaamminenitrocobalt(III) ion
4. Pentaamminenitrocobalt (IV) ion

135.

Ce^{3+} , La^{3+} , Pm^{3+} and Yb^{3+} have ionic radii in the increasing order as :

1. $\text{La}^{3+} < \text{Ce}^{3+} < \text{Pm}^{3+} < \text{Yb}^{3+}$
2. $\text{Yb}^{3+} < \text{Pm}^{3+} < \text{Ce}^{3+} < \text{La}^{3+}$
3. $\text{La}^{3+} = \text{Ce}^{3+} < \text{Pm}^{3+} < \text{Yb}^{3+}$
4. $\text{Yb}^{3+} < \text{Pm}^{3+} < \text{La}^{3+} < \text{Ce}^{3+}$

Chemistry - Section B

136.

A substance that gives a brick red flame and breaks down on heating gives oxygen and a brown gas, is-

1. Calcium carbonate
2. Magnesium carbonate
3. Calcium nitrate
4. None of the above

137.

The correct statements among the following is -

- a. Micelle formation by soap in aqueous solution is possible at all temperatures
- b. Micelle formation by soap in aqueous solution occurs above a particular concentration
- c. On dilution of soap solution micelles may revert to individual ions
- d. Soap solution behaves like a normal strong electrolyte all concentrations

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

138.

Extent of adsorption of adsorbate from solution phase increases with...

1. Increase in amount of adsorbate in solution.
2. Decrease in surface area of adsorbent.
3. Increase in temperature of solution.
4. Decrease in amount of adsorbate in solution.

139. The electronic configuration of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$, the correct statement about the aqueous solution of Cu(II) and Cu(I) among the following is-
1. Cu(II) is more stable
 2. Cu(II) is less stable
 3. Cu(I) and Cu(II) are equally stable
 4. Stability of Cu(I) and Cu(II) depends on the nature of copper salts
140. When 1 mole of $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ is treated with excess of AgNO_3 , 3 moles of AgCl , are obtained. The formula of the complex is
1. $[\text{CrCl}_3(\text{3H}_2\text{O})] \cdot 3\text{H}_2\text{O}$
 2. $[\text{CrCl}_2(\text{H}_2\text{O})_4] \text{Cl} \cdot 2\text{H}_2\text{O}$
 3. $[\text{CrCl}_3(\text{H}_2\text{O})_5] \text{Cl}_2 \cdot \text{H}_2\text{O}$
 4. $[\text{Cr}(\text{H}_2\text{O})_6] \text{Cl}_3$
141. The lanthanide ion that would show colour is -
1. La^{3+}
 2. Gd^{3+}
 3. Sm^{3+}
 4. Lu^{3+}
142. The correct statement among the following is :
1. Zincite is a carbonate ore.
 2. Sodium cyanide cannot be used in the metallurgy of silver.
 3. Aniline is a froth stabilizer.
 4. Zone refining process is used for the refining of titanium
143. On heating compound (A) gives a gas (B) which is a constituent of air. This gas when treated with H_2 in the presence of a catalyst gives another gas (C) which is basic in nature. (A) should not be-
1. $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
 2. $\text{Pb}(\text{NO}_3)_2$
 3. NaN_3
 4. NH_4NO_2
144. The one that is not expected to show isomerism is :
1. $[\text{Ni}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}$
 2. $[\text{Ni}(\text{NH}_3)_2\text{Cl}_2]$
 3. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 4. $[\text{Ni}(\text{en})_3]^{2+}$
145. Among statements (a) – (d), the correct ones are-
- (I) Limestone is decomposed to CaO during the extraction of iron from its oxides
 (II) In the extraction of silver, silver is extracted as an anionic complex
 (III) Nickel is purified by Mond's process
 (IV) Zr and Ti are purified by the Van Arkel method
1. (III) and (IV) only
 2. (I), (III), and (IV) only
 3. (II), (III), and (IV) only
 4. (I), (II), (III), and (IV)
146. Considering that $\Delta_0 > P$, the magnetic moment (in BM) of $[\text{Ru}(\text{H}_2\text{O})_6]^{2+}$ would be-
1. 0
 2. 4.9
 3. 6.9
 4. 3.5

147.

The correct order of the following elements with respect to their density is-

1. Cr < Zn < Co < Cu < Fe
2. Zn < Cu < Co < Fe < Cr
3. Zn < Cr < Fe < Co < Cu
4. Cr < Fe < Co < Cu < Zn

148.

Number of bridging CO ligands in $[Mn_2(CO)_{10}]$ is-

1. 2
2. 0
3. 4
4. 1

149.

In which of the following metallic bond is strongest?

1. V
2. Fe
3. Cr
4. Sc

150.

The substance used in Holmes signals of the ship is a mixture of :

1. $CaC_2 + Ca_3P_2$
2. $Ca_3(PO_4)_2 + Pb_3O_4$
3. $H_3PO_4 + CaCl_2$
4. $NH_3 + HOCl$

Physics - Section A

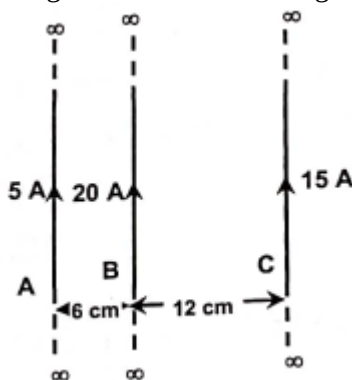
151. Correct relation between magnetic field B, Magnetic intensity H, and Intensity of Magnetization I is

1. $B = \mu_0 (H + I)$
2. $I = \mu_0 (H + B)$
3. $H = \mu_0 (I + B)$
4. $B = 2H (I + \mu_0)$

152. The property possessed by only ferromagnetic materials is:

1. Attracting magnetic substances
2. Hysteresis
3. Susceptibility independent of temperature
4. Directional property

153. The force acting on 10 cm length of wire A in the arrangement shown in the figure is

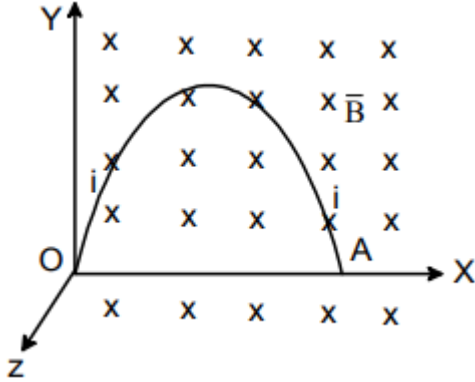


1. $2.08 \times 10^{-5} N$ towards right
2. $2.08 \times 10^{-5} N$ towards left
3. $4.58 \times 10^{-5} N$ towards right
4. $4.58 \times 10^{-5} N$ towards left

154. The magnetic field due to a current carrying loop of radius 3 cm at a point on its axis at a distance 4 cm from the center is $54 \mu T$. What will be its value at the centre of the loop?

1. $250 \mu T$
2. $150 \mu T$
3. $125 \mu T$
4. $75 \mu T$

155. A wire carrying a current i from O to A is placed inside a uniform magnetic field $\vec{B} = -B_0\hat{k}$. The shape of the wire is parabolic and has equation $Y = 2x - x^2$. The force on the wire will be

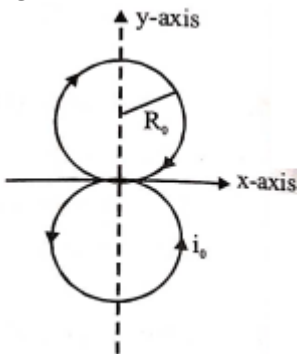


1. $F = 2B_0i$, upwards
2. $F = 2B_0i$, downwards
3. $F = 4B_0i$, upwards
4. $F = 4B_0i$, downwards

156. A charged particle with charge q enters a region of constant, uniform and mutually orthogonal fields \vec{E} and \vec{B} , with a velocity \vec{v} perpendicular to both \vec{E} and \vec{B} and comes out without any change in magnitude or direction of \vec{v} . Then

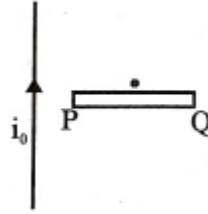
1. $\vec{v} = \vec{B} \times \vec{E} / E^2$
2. $\vec{v} = \vec{E} \times \vec{B} / B^2$
3. $\vec{v} = \vec{B} \times \vec{E} / B^2$
4. $\vec{v} = \vec{E} \times \vec{B} / E^2$

157. A current carrying wire frame is in the shape of digit eight (8). It is carrying current i_0 . If the radius of each loop is R_0 , then the net magnetic dipole moment of the figure is



1. $(i_0\pi R_0^2) \sqrt{2}$
2. zero
3. $i_0 \times 2\pi R_0^2$
4. $i_0 (4\pi R_0)$

158. A metal rod PQ (carrying current from P to Q) is placed perpendicular to the infinite long wire carrying current i_0 . If this arrangement lies in a horizontal plane; then the rod PQ will rotate:



1. Clockwise
2. Anticlockwise
3. Along PQ
4. Does not rotate

159. A certain series L,C,R circuit with $L = 10 \text{ mH}$ and capacitance $C = 5 \mu\text{F}$ when connected to an alternating source of peak voltage 100 V draws a maximum current of 7 Amp (rms value) when the frequency of source is adjusted for the maximum power condition. What is the value of resistance (approx) for the circuit?

1. 7Ω
2. 10Ω
3. 21Ω
4. 5Ω

160. Two coils A and B are connected in series across a 240 V , 50 Hz supply. The resistance of A is 5Ω and the inductance of B is 0.02 H . The power consumed is 3 kW and the power factor is 0.75 . The impedance of the circuit is

1. 0.144Ω
2. 1.44Ω
3. 14.4Ω
4. 144Ω

161. In a LCR circuit 100Ω resistance is connected to an a.c. source of 200 V and angular frequency 300 rad/s . If only the capacitance is removed, the voltage leads the current by phase angle ϕ . If only the inductance is removed the current leads the voltage by phase angle ϕ

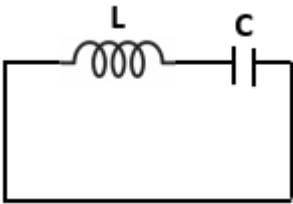
The rms value of current in LCR circuit is

1. 2 A
2. 4 A
3. 1.2 A
4. 5 A

162. An LCR series a.c. circuit is connected to an a.c. source of variable angular frequency ω and a fixed voltage amplitude. The current amplitude in the circuit is found to be the same for two angular frequencies ω_1 and ω_2 . The resonance angular frequency of this circuit must be

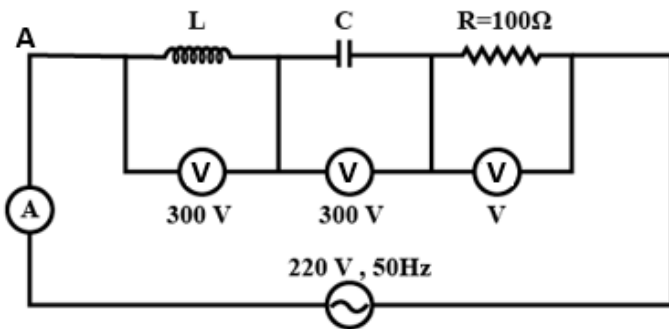
1. $[\omega_1\omega_2]^{1/2}$
2. $\frac{\omega_1+\omega_2}{2}$
3. $\frac{\omega_1\omega_2}{\omega_1+\omega_2}$
4. None of these

163. In an LC oscillation circuit the capacitor has maximum charge q_0 . The value of $\left(\frac{dI}{dt}\right)_{\max}$



1. $\frac{q_0}{LC}$
2. $\frac{q_0}{\sqrt{LC}}$
3. $\frac{q_0}{LC} - 1$
4. $\frac{q_0}{LC} + 1$

164. In the circuit shown below, what will be the reading of the 3rd voltmeter and the ammeter?

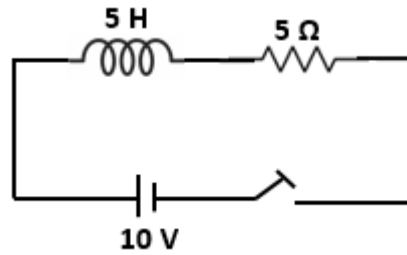


1. 800 V, 2A
2. 300 V, 2A
3. 220 V, 2.2 A
4. 100 V, 2A

165. A metal wire of mass m slides without friction on two horizontal rails l distance apart. The track is in a vertical uniform magnetic field of induction B . A battery of constant emf ϵ is connected to the rails. The terminal speed of the slider is

1. $\frac{\epsilon B}{l}$
2. $\frac{\epsilon}{Bl}$
3. $\frac{3\epsilon}{2Bl}$
4. $\frac{2\epsilon}{3Bl}$

166. The switch is closed at time $t = 0$. The potential difference across inductor and resistor respectively at $t = 0$ is-



1. 5 V, 5V
2. 8V, 6V
3. 10 V, 0 V
4. 0 V, 10 V

167. Two proton beams are moving in parallel direction. Which of the following statements are correct?

1. Force between the proton beams will be attractive
2. Magnetic force between proton beams will be attractive
3. Repulsive forces will be smaller than attractive forces
4. Magnetic and electrostatic forces will cancel each other

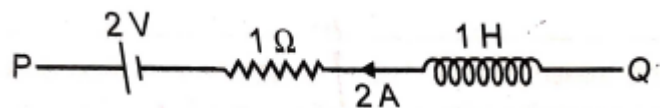
168. Two protons enter a region of transverse magnetic field. What will be ratio of time period of revolution if the ratio of energy is $2\sqrt{2} : \sqrt{3}$?

1. $2\sqrt{2} : \sqrt{3}$
2. $\sqrt{3} : 2\sqrt{2}$
3. 3 : 8
4. 1 : 1

169. A time varying magnetic flux passing through a coil is given by $\phi = xt^2$. If at $t = 3$ s, the emf induced is 9V, then the value of x is

1. 0.66 Wb/s²
2. -0.66 Wb/s²
3. 1.5 Wb/s²
4. -1.5 Wb/s²

170. Network shown in the diagram is part of an electrical circuit. The current is 2 A and is decreasing at the rate of 2 A/s, then $V_P - V_Q$ equals-



1. 2 V
2. -2 V
3. 4 V
4. -4 V

171. Two coils of self-inductance 2 mH and 8 mH are placed so close together that the effective flux in one coil is completely linked with the other. The mutual inductance between these coils is

1. 16 mH
2. 10 mH
3. 6 mH
4. 4 mH

172. As a result of change in the magnetic flux linked to the closed-loop as shown in the figure an emf V volt is induced in the loop. The work done (in joule) in taking a charge Q coulomb once taken along the loop is

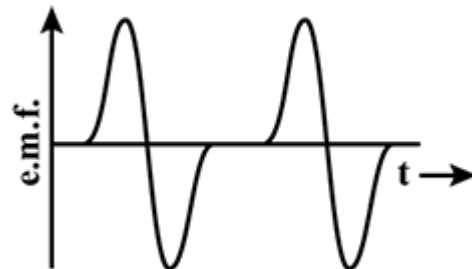
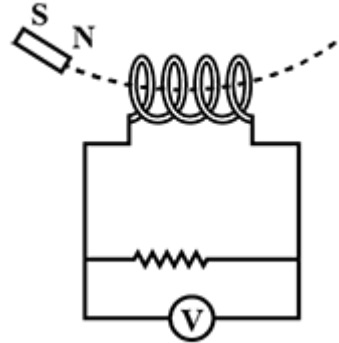


1. QV
2. $2 QV$
3. $Q \frac{V}{2}$
4. zero

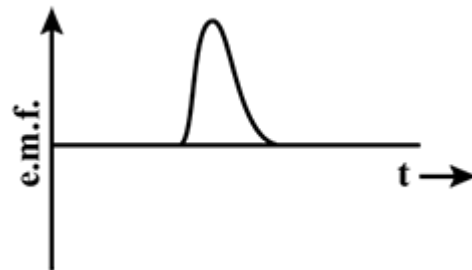
173. Two identical circular loops of metal wire are lying on a table. Loop A carries a current which increases with time. In response, the loop B

1. Is attracted by loop A
2. Is repelled by loop A
3. Remains stationary
4. None of these

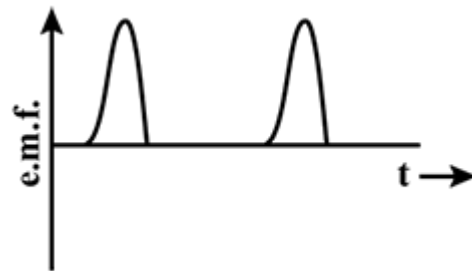
174. A magnet is made to oscillate with a particular frequency through a coil as shown in figure. The time variation of magnitude of emf generated across the coil during one cycle is



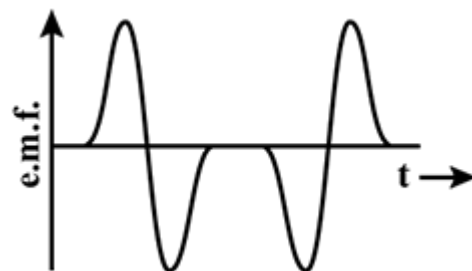
1.



2.



3.



4.

175. When a capacitor is being charged, then
(I_C = conduction current, I_d = displacement current)

1. $I_C=0, I_d \neq 0$
2. $I_C \neq 0, I_d=0$
3. $I_C = I_d$ but in same direction
4. $I_C = I_d$ but in opposite direction

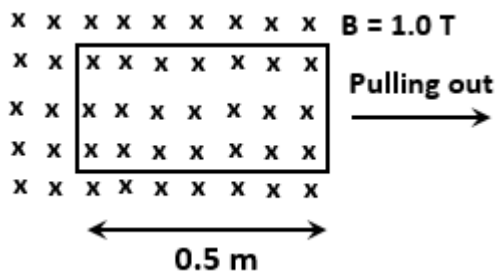
176. The dimensional formula of $\mu_0 \epsilon_0$ is

1. $[M^0 L^{-1} T^{-1}]$
2. $[M^0 L^{-2} T^{-2}]$
3. $[M^0 L^{-2} T^2]$
4. $[M^0 L^{-1} T]$

177. An electromagnetic wave consists of an oscillating electric and magnetic field vector. The phase difference between the two oscillating fields is

1. π
2. $\frac{\pi}{2}$
3. $\frac{\pi}{4}$
4. zero

178. Figure shows a square loop of side 0.5 m and resistance 10Ω . The magnetic field has a magnitude $B = 1.0 \text{ T}$. The work done in pulling the loop out of the field uniformly in 2.0 s is

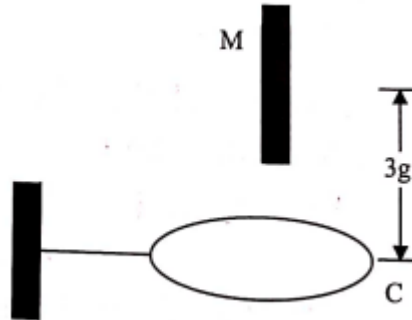


1. $3.125 \times 10^{-3} \text{ J}$
2. $6.25 \times 10^{-4} \text{ J}$
3. $1.25 \times 10^{-2} \text{ J}$
4. $5.0 \times 10^{-4} \text{ J}$

179. A steady current I flows in a small square loop of wire of side L in a horizontal plane. The loop is now folded about its middle such that half of it lies in a vertical plane. Let μ_1 and μ_2 (vectors) denote the magnetic moment due to the current loop before and after folding, respectively. Then

1. $\frac{|\mu_1|}{|\mu_2|} = 1$
2. μ_1 and μ_2 are in the same direction
3. $\frac{|\mu_1|}{|\mu_2|} = \sqrt{2}$
4. $\frac{|\mu_1|}{|\mu_2|} = \frac{1}{\sqrt{2}}$

180. A bar magnet M is allowed to fall from rest towards a fixed conducting ring C . If g is the acceleration due to gravity, v is the velocity of the magnet at $t = 2\text{ s}$ and S is the distance traveled by it in the same time, then-



1. $v > 2g$
2. $v < g$
3. $S > 2g$
4. $S < 2g$

181. A bar magnet used in a vibration magnetometer is heated, so as to reduce the magnetic moment by 36%. The time period of magnet: (neglecting changes in dimensions of magnet)

1. increases by 36%
2. decreases by 36%
3. increases by 25%
4. decreases by 25%

182. The magnetic moment of a diamagnetic atom is:

1. much greater than one
2. one
3. between zero and one
4. equal to zero

183. A short bar magnet of magnetic moment 0.4 J T^{-1} is placed in a uniform magnetic field of 0.16 T . The magnet is in stable equilibrium when the potential energy is:

1. 0.064 J
2. -0.064 J
3. zero
4. -0.082 J

184. Which of the following electromagnetic radiations is used for viewing through haze and fog?

1. Radio wave
2. Infrared wave
3. Microwave
4. Matter wave

185. According to electromagnetic theory, choose the statement which is not correct.

1. \vec{E} and \vec{B} vectors vary sinusoidally in the same phase
2. \vec{E} and \vec{B} vectors vary sinusoidally in the opposite phase
3. \vec{E} and \vec{B} vectors contribute to energy equally
4. \vec{E} and \vec{B} vectors vibrate orthogonally with the same frequencies

Physics - Section B

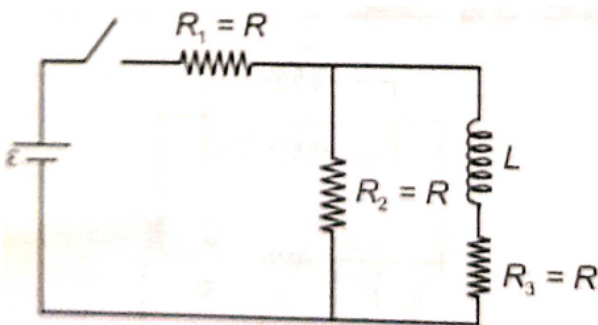
186. A copper disc of radius 0.1 m is rotated about its centre with 20 revolutions per second in a uniform magnetic field of 0.1 T with its plane perpendicular to the field. The emf induced across the radius of disc is:

1. $\frac{\pi}{20}$ volt
2. 20π millivolt
3. 2π mV
4. 20π μ V

187. According to Faraday's law of electromagnetic induction, the total charge flown through a cross-section of a conducting loop depends upon

1. Initial magnetic flux only
2. Final magnetic flux only
3. Rate of change of magnetic flux
4. Net change in magnetic flux

188. In the given circuit, the switch is closed at $t = 0$. The ratio of electric current through resistance R_2 at $t = 0$ and at $t = \infty$ is



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

189. In a LCR circuit 100 Ω resistance is connected to an a.c. source of 200 V and angular frequency 300 rad/s. If only the capacitance is removed, the voltage leads the current by phase angle ϕ . If only the inductance is removed the current leads the voltage by phase angle ϕ . The power dissipated in the LCR circuit is:

1. 500 W
2. 400 W
3. 300 W
4. 200 W

190. An electron moving with a velocity $\vec{v}_1 = 1\hat{i}$ m/s at a point in a magnetic field experiences a force $\vec{F}_1 = -2\hat{j}$ N. If the electron is moving with a velocity $\vec{v}_2 = 1\hat{j}$ m/s at the same point, it experiences a force $\vec{F}_2 = 2\hat{i}$ N. The force that an electron would experience if it were moving with a velocity $\vec{v}_3 = 2\hat{k}$ m/s at the same point is:

1. zero
2. $2\hat{k}$ N
3. $-2\hat{k}$ N
4. information is insufficient

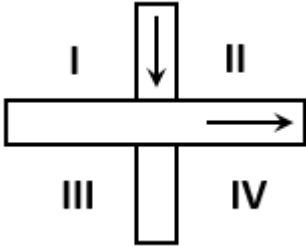
191. The ratio of the magnetic field due to a small bar magnet in the end-on position to that in its broad side-on position at equal distance from the magnet is:

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

192. At a point on the earth's surface horizontal component of the earth's magnetic field is $40 \mu T$ and dip angle is 30° . Find the total magnetic field of the earth at this point.

1. $46 \mu T$
2. $82 \mu T$
3. $66 \mu T$
4. $86 \mu T$

193. Two fixed long conducting wires cross each other perpendicularly so that they do not actually touch but are close to each other as shown in the figure. Equal current i exist in each wire in the directions indicated. In what region(s) will there be some points with zero net magnetic fields?



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

194. A cylindrical region contains a uniform electric field that is parallel to the axis and is changing with time. If r is the distance from the cylinder axis the magnitude of the magnetic field outside the region is:

1. 0
2. Proportional to $1/r$
3. Proportional to r^2
4. Proportional to $1/r^2$

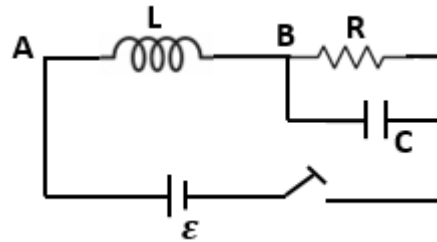
195. A charged particle moves in a gravity-free space without a change in its velocity. Which of the following is not possible?

1. $E = 0, B = 0$
2. $E \neq 0, B = 0$
3. $E = 0, B \neq 0$
4. $E \neq 0, B \neq 0$

196. The deflection of a moving coil galvanometer falls from 60 divisions to 12 divisions for the same value of current in the circuit, when a shunt of 12Ω is connected. The resistance of the galvanometer is:

1. 2 ohm
2. 20 ohm
3. 48 ohm
4. 96 ohm

197. In the given LCR circuit, the key is closed at $t = 0$. The emf induced in the coil at $t = 0$ will be:



1. zero
2. $\frac{CR^2}{L} \varepsilon$
3. ε with $V_A > V_B$
4. ε with $V_A < V_B$

198. A bar magnet is placed on a smooth horizontal surface in the earth's magnetic field. Then the bar magnet can:

1. Translate only
2. Rotate only
3. Translate as well as rotate
4. Neither translate nor rotate

199. Which of the following rays is emitted by a human body?

1. X-rays
2. Visible rays
3. UV -rays
4. IR -rays

200. At the magnetic poles of the earth, a dip needle will be:

1. bent slightly vertical
2. vertical
3. horizontal
4. inclined at 45° to the horizontal

[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

[CLICK HERE](#) to get
FREE ACCESS for 3
days of ANY NEETprep
course