

1.

When both male and female flowers are present on the same plant, then plant is said to be:

1. Bisexual
2. Monoecious
3. Unisexual
4. Dioecious

2.

In a monohybrid cross  $F_1$  progeny resemble neither of the parents. What would be true in this case?

1. The parental traits would not appear in any of the  $F_2$  - progenies
2. The  $F_2$  phenotypic ratio will be different from the  $F_2$  genotypic ratio
3. It could be a case of incomplete dominance
4. The  $F_2$  phenotypic ratio will be similar to any Mendelian monohybrid cross

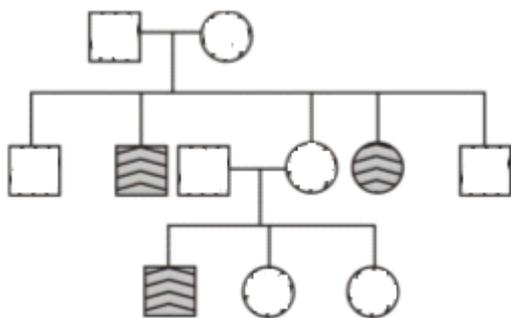
3.

The two alleles of a gene pair are located on:

1. Homologous sites on homologous chromosomes
2. Heterologous sites on homologous chromosomes
3. Homologous sites on heterologous chromosomes
4. Heterologous sites on heretologous chromosomes

4.

The trait shown in the given pedigree chart is most likely a/an:



1. Autosomal recessive trait
2. Autosomal dominant trait
3. Sex linked recessive trait
4. Sex linked dominant trait

5.

Aneuploidy results from :

1. Point mutations
2. Gross structural changes in chromosomes
3. Failure of cytokinesis after telophase stage of cell division
4. Failure of segregation of chromatids during cell division

6.

Regulation of *lac* operon by repressor is referred to as:

1. Inducible regulation
2. Repressible regulation
3. Negative regulation
4. Positive regulation

7.

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

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

8.

Which of the following would lead to deviation from Hardy-Weinberg equilibrium?

1. Random mating
2. Lack of mutations
3. No gene flow or gene migration
4. Natural selection

9.

The now extinct reptile group that evolved into mammals was:

1. Therapsids
2. Dinosaurs
3. Thecodonts
4. Sauropsids

10.

Identify the correct statement:

1. *Dryopithecus* was more man like than *Ramapithecus*
2. *Homo Habilis* probably did not eat meat
3. *Homo Erectus* had a cranial capacity of around 800 cc
4. Agriculture came around 18000 years ago

11.

An important biofertilizer in paddy fields is :

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

12.

Fredrick Griffith accidentally discovered transformation when attempting to develop a vaccine for pneumonia. He injected mice with samples from S-strain (virulent) and/or R-strain (nonvirulent) pneumococci bacteria (*Sterptococcus pneumoniae*). Which of the following results is NOT consistent with Griffith's experiments?

1. injected S-strain; mouse dies.
2. injected R-strain; mouse lives.
3. injected heat-killed S-strain; mouse lives.
4. injected mixture of heat-killed S-strain and live R-strain; mouse lives.

13.

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

1. Avery, MacLeod , and McCarty who repeated the transformation experiments of Griffith, and chemically characterized the transforming principle.
2. Garrod, who postulated that Alcaptonuria, or black urine disease, was due to a defective enzyme.
3. Beadle and Tatum, who used a mutational and biochemical analysis of the bread mold *Neurospora* to establish a direct link between genes and enzymes.
4. Meselson and Stahl who showed that DNA is replicated semiconservatively.

14.

Consider the cross  $AaBb \times AaBb$ . If the alleles for both genes exhibit complete dominance, what

genotypic ratio is expected in the resulting offspring?

1. 1:1:1:1
2. 9:3:3:1
3. 3:6:3:1:2:1
4. 1:2:1:2:4:2:1:2:1

15.

The function of the rho protein is

1. to help terminate translation
2. to help RNA polymerase bind to the DNA
3. to help RNA polymerase find a promoter
4. to help terminate transcription

16.

Baculoviruses are:

1. Species specific, narrow spectrum insecticides
2. Species specific, broad spectrum insecticides
3. Non specific, narrow spectrum insecticides
4. Non specific, broad spectrum insecticides

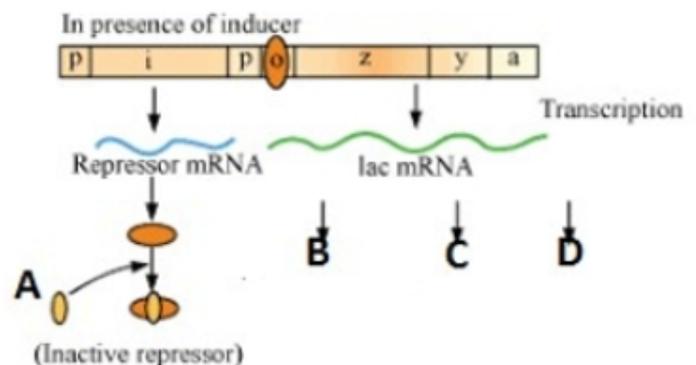
17.

Most fossils are found in:

1. Granite
2. Sedimentary rocks
3. Lava flows
4. Black soil

18.

Consider the following diagram showing the working of the lac operon in E.coli in the presence of inducer and choose the correct statement from the ones given below :



1. A is the inducer and can be either lactose or cAMP

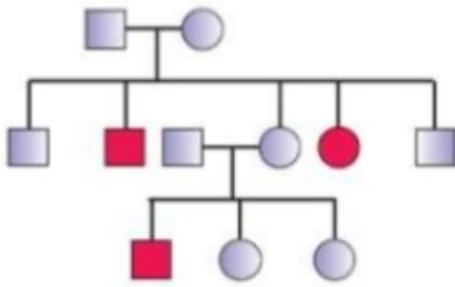
2. B is the enzyme that will metabolize glucose, the preferred energy source

3. Some amount of C will be present in the cell even if lactose is absent

4. The absence of D will stop lactose from entering the cell

19.

The disease inheritance pattern exemplified in the given pedigree analysis can be :



1. Hemophilia
2. Red green colour blindness
3. Phenyl ketonuria
4. Polydactyly

20.

In biological world each organism has evolved its own mechanism of reproduction, which depends upon?

1. Habitat
2. Internal physiology
3. Size of organism
4. Both 1 and 2

21.

Identify the incorrectly matched pair:

Organism	Length of DNA
1. Bacteriophage $\phi$ 174	5386 base pairs
2. Bacteriophage Lambda	48502 base pairs
3. Escherichia coli	$4.6 \times 10^6$ base pairs
4. Human beings	$3.3 \times 10^9$ base pairs

22.

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

23.

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

1. Yellow seed
2. Inflated pod
3. Green pod
4. Green seed

24.

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

1. Aerobic sludge digesters.
2. Anaerobic sludge digesters.
3. Primary sludge digesters.
4. Settling tanks.

25.

Recombination DNA technology has allowed the production of \_\_\_A\_\_\_ of pathogen in bacteria or yeast. Here A is :-

1. Pro-toxin.
2. Anti-bodies.
3. Antigenic polypeptide.
4. Antigenic polysaccharide.

26.

Who established that the behaviour of chromosomes was parallel to the behaviour of gene :-

1. Corners & tschermak.
2. Sutton & Boveri.
3. T.H. Morgan.
4. Klug & cumminis.

27.

Which of the following is not correct for "Snips"?

1. There are 1.4 million locations in human genome.
2. Where single base differences occur.
3. They shed light on chromosome structure, dynamics and evolution.
4. It promises to revolutionise the processes of finding chromosomal locations for disease associated sequences.

28.

The pure line round seeded pea plant was crossed with wrinkled seeded pea plant. The F1 generation is \_\_\_\_ and it can be explained by \_\_\_\_\_. (respectively)

1. Wrinkled : Law of segregation
2. Round : law of dominance
3. Round : Condominance
4. Wrinkled : Law of dominance

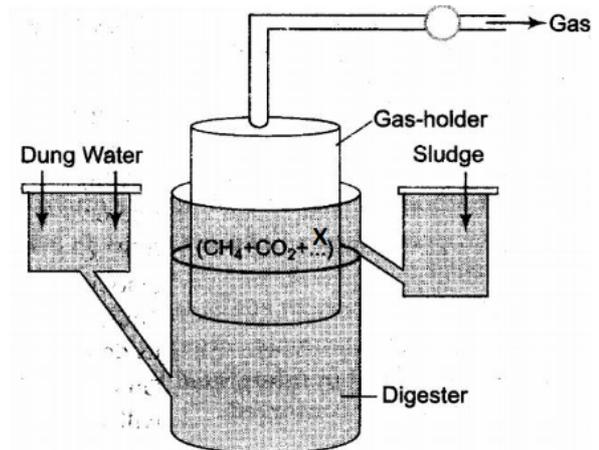
29.

Which of the following statement is not correct?

1. Satellite DNA normally do not code for any protein but they form a large portion of human genome.
2. Satellite DNA shows high degree of polymorphism and forms basis of DNA finger printing.
3. Satellite DNA is widely used as identification tool in forensic science.
4. Satellite DNA is not transmitted as mendelian trait from parent to progeny.

30.

In the given diagram the gas X can be:



1. Hydrogen sulfide
2. Carbon monoxide
3. Ammonia
4. Oxygen

31.

For the stability of the organic compounds, Oparin opined that probably:

1. UV radiation never reached the surface of the primeval Earth
2. the primitive Earth was in a molten state
3. the primitive Earth atmosphere was reducing rather than oxidizing
4. plenty of energy sources were available for chemical reactions to occur

32.

The first genetic code of life was based on :

1. DNA
2. RNA
3. Proteins
4. Lipids

33.

Which of the following was not a character studied by Mendel in garden pea?

1. Flower position
2. Pod shape
3. Flower colour
4. Pod position

34.

The last of 24 human chromosomes to be sequenced was:

1. Chromosome 1 and completed in 2003
2. Chromosome 1 and completed in 2006
3. Chromosome X and completed in 2003
4. Chromosome X and completed in 2006

- |         |                              |
|---------|------------------------------|
| b. rRNA | (ii) Template                |
| c. mRNA | (iii) Reads the genetic code |
| d. tRNA | (iv) For efficiency          |

35.

During an allergic reaction, the binding of antigens to IgE antibodies initiates a response, in which chemicals cause the dilation of blood vessels and a host of other physiological changes, Such chemicals are

- |                |                |
|----------------|----------------|
| 1. interferons | 2. hormones    |
| 3. histamines  | 4. acetylamine |

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)

40.

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)

41.

Gamete formation always occurs in

- (i) Sexual reproduction.
- (ii) Asexual reproduction.
- (iii) Partheno genesis.

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

42.

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

- i. Presence of Uracil.
- ii. Plane of one base pair stacking over the other in DNA helix.
- iii. Left handed fashion coiling of DNA helix.
- iv. Presence of hydrogen bonds.

39.

Match the columns with respect to the process of translation:

**Column-I**

**Column-II**

a. UTR

(i) Catalyst

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

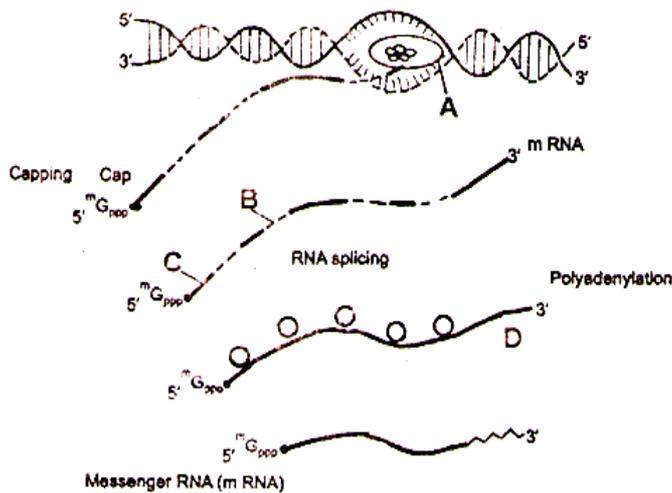
43.

In mycorrhiza association the fungal symbiont helpful in :

1. Phosphorus nutrition.
2. Resistance to root borne pathogen.
3. Tolerance to salinity and drought.
4. All the above.

44.

The following diagram refers to the process of transcription in Eukaryotes. Identify A, B, C and D –



1. A – RNA polymerase II, B – Exon, C – Intron, D – Poly A tail
2. A – DNA polymerase II, B – Intron, C – Exon, D – Poly A tail
3. A – RNA polymerase II, B – Intron, C – Exon, D – Poly A tail
4. A – RNA polymerase II, B – Intron, C – Exon, D – Poly G tail

45.

Measuring Biochemical Oxygen Demand (BOD) is a method used for:

1. Estimating the amount of organic matter in sewage water.
2. Working out the efficiency of oil driven automobile engines.
3. Measuring the activity of *Saccharomyces cerevisiae* in producing curd on a commercial scale.
4. Working out the efficiency of R.B.Cs. about their capacity to carry oxygen.

46.

Which of the following are the functions of deoxyribonucleoside triphosphates?

- i. Act as substrates
- ii. Provide energy for polymerization reaction
- iii. Act as enzyme
- iv. To separate strands of DNA

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

47.

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.

48.

If frequency of 'A' allele is 0.4 than, find out the frequency of 'B' allele and heterozygous genotype in a random mating population at equilibria.

1. 0.6 and 0.24
2. 0.6 and 0.96
3. 0.6 and 0.48
4. 0.6 and 0.50

49.

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)
50. Genes which are tightly linked on chromosome show :
1. Very low recombination
  2. High recombination
  3. Very low parental combination
  4. Clear cut independent assortment
51. Total sum of possible genotypes and phenotypes of blood type amongst the children of a couple having genotypes  $I^A I^O$  and  $I^B I^O$  can be
1. 8
  2. 6
  3. 7
  4. 5
52. By performing a series of experiments that showed the effect of R and S strains of *Streptococcus pneumoniae* on mice, Griffith concluded that
1. Protein digesting enzyme does not affect transformation.
  2. DNA is more stable genetic material than RNA.
  3. DNA replication is semi conservative.
  4. Non-virulent bacteria were transformed by heat killed virulent bacteria.
53. Biologists discover about 1000 species in an Island which is descended from a single ancestor species. What is the reason behind the such large speciation?
1. Mutation
  2. Adaptive radiation
  3. Convergent evolution.
  4. Reproductive isolation
54. Proper burial of dead bodies for the first time started in which pre-historic man's period?
1. Peking man
  2. Java man
  3. Neanderthal man
  4. Cro-magnon man
55. In Australia, marsupials and placental mammals have evolved to share many similar characteristics. This type of evolution may be referred to as -
1. Adaptive Radiation
  2. Divergent Evolution
  3. Cyclical Evolution
  4. Convergent Evolution
56. Match the following RNA polymerases with their transcribed products:
- | <b>Column-I</b>        | <b>Column-II</b> |
|------------------------|------------------|
| (a) RNA polymerase I   | (i) tRNA         |
| (b) RNA polymerase II  | (ii) rRNA        |
| (c) RNA polymerase III | (iii) hnRNA      |
- Select the correct option from the following:
1. (a)-(i), (b)-(iii), (c)-(ii)
  2. (a)-(i), (b)-(ii), (c)-(iii)
  3. (a)-(ii), (b)-(iii), (c)-(i)
  4. (a)-(iii), (b)-(ii), (c)-(i)
57. Which of the following statements about methanogens is not correct?
1. They can be used to produce biogas,
  2. They are found in the rumen of cattle and their excreta.
  3. They grow aerobically and breakdown cellulose-rich food.
  4. They produce methane gas.
58. Gemmule formation is a common mode of asexual reproduction in
1. Paramecium
  2. Hydra
  3. Sponges
  4. Yeast
59. A person with Down syndrome will show all the given

symptoms except

1. Many loops on finger tips.
2. Flat back of head
3. Big and wrinkled tongue
4. Narrow round face

60.

In eukaryotes, at which of the levels regulation of gene expression could be exerted?

- i. processing level
- ii. translational level
- iii. transcriptional level
- iv. Transport of mRNA from nucleus to cytoplasm

1. iii only
2. ii and iii only
3. ii, iii and iv only
4. All

61.

Evolution by \_\_\_'a'\_\_\_ in a true sense would have started when cellular forms of life with differences in metabolic capability originated on earth. Here 'a' is

1. Mutation
2. Natural selection
3. Genetic drift
4. Special creation

62.

Production of a human protein in bacteria by genetic engineering is possible because

1. Bacterial cell can carry out the RNA splicing.
2. The mechanism of gene regulation is identical in humans and bacteria.
3. The human chromosome can replicate in bacterium cell.
4. The genetic code is universal

63.

Which of the following is not a hereditary disease?

1. Haemophilia.
2. Cretinism.
3. Cystic fibrosis.
4. Thalassemia.

64.

'Founder effect' is related to -

1. Gene recombination and Natural selection

2. Genetic drift and origin of new species

3. isolation and Natural selection

4. Hybridization and origin of new species

65.

Match the following column correctly

<b>Column-I</b>	<b>Column-II</b>
(A) <i>Aspergillus niger</i>	(i) Ethanol
(B) <i>Clostridium bretylium</i>	(ii) Statins
(C) <i>Saccharomyces cerevisiae</i>	(iii) Citric acid
(D) <i>Trichoderma polysporum</i>	(iv) Butyric acid
(E) <i>Monascus purpureus</i>	(v) Cyclosporin-A

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

66.

Cytidine is

1. an amino acid
2. a nucleotide
3. a nucleoside
4. a nitrogenous base

67.

The main enzyme of transcription

1. DNA dependent DNA polymerase
2. DNA dependent RNA polymerase
3. RNA dependent RNA polymerase
4. RNA dependent DNA polymerase

68.

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

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

69.

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

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

70.

During sewage anaerobic sludge digestion is performed and as a result biogas is produced.

The components of biogas are :-

1.  $CO$ ,  $NH_3$ ,  $H_2S$
2.  $CO_2$ ,  $CH_4$ ,  $NH_3$
3.  $CO$ ,  $CO_2$ ,  $H_2S$
4.  $CO_2$ ,  $CH_4$ ,  $H_2S$

71.

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

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

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

72.

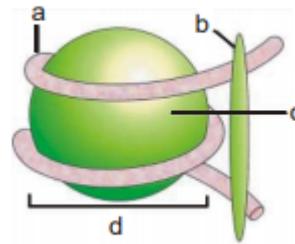
When a violet flower of unknown genotype is crossed with white flower, the progenies are violet and white in equal proportion. Then read the following statements :

- (i) This is called test cross.
- (ii) Unknown flower is homozygous
- (iii) Unknown flower is heterozygous
- (iv) This test used to determine the phenotype of the plant at F<sub>2</sub>
- (v) In test cross, violet or white flower is crossed with the recessive parent instead of self-crossing.

Select the incorrect statement.

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

73.



Choose correct one :-

1. a-DNA, b-H<sub>1</sub>-histone, c-histone octamer, d-core of histone
2. a-core of histone, b-DNA, c-H<sub>1</sub> histone, d-histone octamer
3. a-Histone octamer, b-core of histone, c-DNA, d-H<sub>1</sub> histone
4. a-H<sub>1</sub> histone, b-histone octamer, c-core of histone, d-DNA

74.

The unequivocal proof that DNA is the genetic material was given by

1. Griffith
2. Avery
3. Hershey and Chase
4. MacLeod

75.

Queen Victoria of England was :

1. Haemophilic carrier
2. Colour blind
3. AIDS patients
4. Deaf

76.

Which of the following drugs is not obtained from plants :-

1. Cocaine  
2. Ganja  
3. Charas  
4. Barbiturates
77. Select the correct match
1. Alc Jeffreys – Automated DNA sequencers
  2. Frederick Sanger – Amino acid sequencing
  3. Holley – Inverted L-shaped Structure of tRNA
  4. Meselson & Stahl – DNA structure
78. The disease in which the pathogenic infection produces hemozoin granules resulting in high fever in the body is
1. Filariasis
  2. Ascariasis
  3. Amoebiasis
  4. Malaria
79. Each of the following statements concerning pneumonia are correct, except
1. It is caused by Streptococcus pneumoniae and Hemophilus influenzae
  2. Pneumonia bacteria grow better at 33°C than at 37°C, hence they tend to cause the disease in upper respiratory tract rather than the lower respiratory tract
  3. Bacteria infects alveoli of lungs
  4. In pneumonia finger nails turn bluish in colour
80. During post-transcriptional modification of hnRNA, capping involves.
1. Addition of poly-A tail at 3' end
  2. Addition of 7 mG cap at 5' end
  3. Removal of introns
  4. Addition of 7 mG cap at 3' end
81. Absence of disjunction of chromosomes during cell division can lead to
1. Myotonic dystrophy
  2. Cystic fibrosis
  3. Down's syndrome
  4. Phenylketonuria
82. Select the incorrect match
1. Penicillium - conidia
  2. Chlamydomonas - Zoospore
  3. Spirogyra – Binary fission
  4. Yeast - Budding
83. Which among the following functions is/are **incorrect** w.r.t DNA function?
- (a) Control of metabolism
  - (b) Produces its replica
  - (c) Undergoes mutation
  - (d) Acts as enzyme
1. a, c
  2. a, d
  3. a, c
  4. d
84. Select the odd one w.r.t sexual reproduction.
1. Can be uniparental or biparental
  2. Is slow
  3. Is elaborate
  4. Does not involve syngamy
85. Males produce two types of gametes in
1. Butterflies
  2. Birds
  3. Drosophila
  4. Moth
- 86.

- In lac operon,  $\beta$  galactosidase is coded by
1. Lac z gene
  2. Lac y gene
  3. Lac a gene
  4. i gene
87. Blood cholesterol-lowering agents called statins are produced from
1. A bacterium
  2. A virus
  3. A yeast
  4. An animal
88. Crack or coke interferes predominantly with the transport of
1. Glycine
  2. Dopamine
  3. GABA
  4. Acetylcholine
89. Which of the following statements is incorrect?
1. MALT constitutes about 50% of the lymphoid tissue in human body
  2. The envelope of AIDS virus encloses RNA genome
  3. Cancer cells show the property of contact inhibition
  4. Chronic use of drugs and alcohol can damage nervous system and liver
90. A 25 year old female develops a runny nose after exposure to dust due to development of allergy. Which of the following antibodies is most likely to rise first in this condition?
1. IgG
  2. IgM
  3. IgE
  4. IgD
91. Which of the following oxyacid contains both
- P-H and P-P bond simultaneously?
1.  $H_4P_2O_5$
  2.  $H_4P_2O_7$
  3.  $H_4P_2O_6$
  4. None
92. What is the denticity of EDTA ?
1. monodentate
  2. hexadentate
  3. bidentate
  4. tridentate
93. The ionization isomer of  $[Cr(H_2O)_4Cl(NO_2)]Cl$  is :
1.  $[Cr(H_2O)_4(O_2N)]Cl_2$
  2.  $[Cr(H_2O)_4Cl_2](NO_2)$
  3.  $[Cr(H_2O)_4Cl(ONO)]Cl$
  4.  $[Cr(H_2O)_4Cl_2(NO_2)].H_2O$
94. 10 mg starch protected 5 ml gold sol in 1 ml 2% NaCl solution. The gold number of starch is:
- |       |        |
|-------|--------|
| 1. 20 | 2. 40  |
| 3. 80 | 4. 100 |
95.  $Cr_2O_7^{2-} + X \xrightarrow{H^+} Cr^{3+} + H_2O + \text{oxidized product of X}$ , X in the above reaction cannot be
1.  $C_2O_4^{2-}$
  2.  $Fe^{2+}$
  3.  $SO_4^{2-}$
  4.  $S^{2-}$
96. Which of the following is not an ambidentate ligand?
1.  $CN^-$

2.  $\text{NO}_2^-$

3.  $\text{SCN}^-$

4.  $\text{NH}_3$

97.

An example of a sigma bonded organometallic compound is

1. ruthenocene

2. Grignard's reagent

3. ferrocene

4. cobaltocene

98.

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

1.  $d^7$

2.  $d^8$

3.  $d^4$

4.  $d^9$

99.

In which of the following coordination entities the magnitude of  $\Delta_{\text{oct}}$  (CFSE in octahedral field) will be maximum?

(Atomic number Co = 27)

1.  $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$

2.  $[\text{Co}(\text{NH}_3)_6]^{3+}$

3.  $[\text{Co}(\text{CN})_6]^{3-}$

4.  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$

100.

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

101.

Which of the following process is used in the extractive metallurgy of magnesium?

1. Fused salt electrolysis

2. Self reduction

3. Aqueous solution electrolysis

4. Thermite process.

102.

Which of the following does not form stable pentoxide

1. As

2. Sb

3. Bi

4. P

103.

Correct increasing order for the wavelengths of absorption in the visible region the complexes of  $\text{Co}^{3+}$  are:

1.

$[\text{Co}(\text{H}_2\text{O})_6]^{3+} < [\text{Co}(\text{en})_3]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+}$

2.

$[\text{Co}(\text{H}_2\text{O})_6]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{en})_3]^{3+}$

3.  $[\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{en})_3]^{3+} < [\text{Co}(\text{H}_2\text{O})_6]^{3+}$

4.  $[\text{Co}(\text{en})_3]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{H}_2\text{O})_6]^{3+}$

104.

On which of the following properties does coagulating power of an ion depend?

1. The magnitude of the charge on the alone

2. Size of the ion alone

3. Both magnitude and sign of the charge the ion

4. The sign of charge on the ion alone

105.

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

1. tetranuclear

2. mononuclear

3. trinuclear

4. dinuclear

106.

Fog is a colloidal solution of

1. Gas in liquid
2. Solid in gas
3. Gas in gas
4. Liquid in gas

107.

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

108.

Strong reducing behavior of  $H_3PO_2$  is due to

1. Presence of one-OH group and two P-H bonds
2. High electron gain enthalpy of phosphorus
3. High oxidation state of phosphorus
4. Presence of two -OH groups and one P-H bonds

109.

"Metals are usually not found as nitrates in their ores". Out of the following two (a and b) reasons which is/are true for the above observation?

- I. Metal nitrates are highly unstable.
- II. Metal nitrates are highly soluble in water.

1. I and II are true
2. I and II are false
3. I is false but II is true
4. I is true but II is false

110.

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

1. *mer* -  $[Co(NH_3)_3Cl]$
2. *Cis* -  $[PtCl_2(NH_3)_2]$
3. *Cis* -  $K_2[PtCl_2Br_2]$
4.  $NH_2CoCl_4$

111.

Which is the strongest acid in the following :

1.  $HClO_3$
2.  $HClO_4$
3.  $H_2SO_3$

4.  $H_2SO_4$

112.

More number of oxidation states are exhibited by the actinoids than by the lanthanoids. The main reason for this is :

1. more energy difference between 5f and 6d orbitals than that between 4f and 5d orbitals
2. lesser energy difference between 5f and 6d orbitals than that between 4f and 5d orbitals
3. greater metallic character of the lanthanoids than that of the corresponding actinoids
4. more active nature of the actinoids

113.

HBr and HI reduce sulphuric acid; HCl can reduce  $KMnO_4$  and HF reduces:

1.  $H_2SO_4$
2.  $KMnO_4$
3.  $K_2Cr_2O_7$
4. none

114.

The bleaching action of bleaching powder is due to the formation of :

1.  $OCl^-$
2.  $O_2$
3.  $Cl_2$
4.  $Cl^-$

115.

The geometry of  $H_2S$  and its dipole moment are:

1. angular and non-zero
2. angular and zero
3. linear and zero
4. linear and non-zero

116.

Which of the following hydride is most acidic?

1.  $H_2Te$

2.  $H_2Se$
3.  $H_2S$
4.  $H_2O$
- 117.
- $SO_2 + H_2S \rightarrow$  product. The final product is:
1.  $H_2O + S$
  2.  $H_2SO_4$
  3.  $H_2SO_3$
  4.  $H_2S_2O_3$
- 118.
- Which hydride has the lowest boiling point?
1.  $H_2O$
  2.  $H_2S$
  3.  $H_2Se$
  4.  $H_2Te$
- 119.
- The crystal field stabilization energy (CFSE) for  $[CoCl_6]^{4-}$  is  $18000\text{ cm}^{-1}$ , the CFSE for  $[CoCl_4]^{2-}$  will be
1.  $6000\text{ cm}^{-1}$
  2.  $16000\text{ cm}^{-1}$
  3.  $18000\text{ cm}^{-1}$
  4.  $8000\text{ cm}^{-1}$
- 120.
- A solution containing 0.319 g of complex  $CrCl_3 \cdot 6H_2O$  was passed through a cation exchanger and the solution given out was neutralized by 28.5 ml of 0.125 M NaOH. The correct formula of the complex will be [molecular weight of complex = 266.5]
1.  $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$
  2.  $[Cr(H_2O)_6]Cl_3$
  3.  $[CrCl_2(H_2O)_4]Cl \cdot H_2O$
  4. All are correct
- 121.
- Zero magnetic moment of octahedral complex  $K_2[NiF_6]$  is due to
1. Low spin  $d^6$  Ni(IV) complex
  2. Low spin  $d^8$  Ni(II) complex
  3. High spin  $d^8$  Ni(II) complex
  4. High spin  $d^6$  Ni(IV) complex
- 122.
- Which among the following species is colored as per CFT?
1.  $[Ti(H_2O)_5]^{4+}$
  2.  $[Cr(NH_3)_6]^{3+}$
  3.  $K_3[VF_6]$
  4.  $(NH_4)_2[TiCl_6]$
- 123.
- The geometry and the number of the unpaired electron(s) of  $[MnBr_4]^{2-}$ , respectively, are
1. Tetrahedral and 1
  2. Square planar and 1
  3. Tetrahedral and 5
  4. Square planar and 5
- 124.
- 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

125.

The hardest lanthanide is

1. La
2. Gd
3. Sm
4. Yb

126.

Which of the following can not exist together in aqueous solution?

1.  $\text{HgCl}_2$  and  $\text{SnCl}_2$
2.  $\text{HgCl}_2$  and  $\text{SnCl}_4$
3.  $\text{SnCl}_4$  and  $\text{FeCl}_3$
4.  $\text{SnCl}_4$  and  $\text{PbCl}_4$

127.

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

1.  $\text{SCN}^- < \text{F}^- < \text{CN}^- < \text{C}_2\text{O}_4^{2-}$
2.  $\text{F}^- < \text{SCN}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$
3.  $\text{CN}^- < \text{C}_2\text{O}_4^{2-} < \text{SCN}^- < \text{F}^-$
4.  $\text{SCN}^- < \text{F}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$

128.

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

129.

Among the following surfactant molecules, the surfactant that forms micelles in aqueous solution at the lower CMC at ambient condition is:

1.  $\text{CH}_3(\text{CH}_2)_{15}\text{N}^+(\text{CH}_3)_3\text{Br}^-$
2.  $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$

3.  $\text{CH}_3(\text{CH}_2)_6\text{COO}^- \text{Na}^+$

4.  $\text{CH}_3(\text{CH}_2)_{11}\text{N}^+(\text{CH}_3)_3\text{Br}^-$

130.

Which one of the compound does not decolourised an acidified solution of  $\text{KMnO}_4$ ?

1.  $\text{SO}_2$
2.  $\text{FeCl}_3$
3.  $\text{H}_2\text{O}_2$
4.  $\text{FeSO}_4$

131.

Which ore contains both iron and copper ?

1. Cuprite
2. Chalcocite
3. Chalcopyrite
4. Malachite

132.

Which one of the following compounds on hydrolysis yield hydrogen peroxide ?

1.  $\text{HNO}_3$
2.  $\text{H}_2\text{P}_2\text{O}$
3.  $\text{H}_2\text{S}_2\text{O}_8$
4.  $\text{H}_2\text{S}_2\text{O}_6$

133.

The formula of exhausted permutit is

1.  $\text{K}_2\text{Al}_2\text{Si}_2\text{O}_8 \cdot x\text{H}_2\text{O}$
2.  $\text{CaAl}_2\text{Si}_2\text{O}_8 \cdot x\text{H}_2\text{O}$
3.  $\text{Na}_2\text{Al}_2\text{Si}_2\text{O}_8 \cdot x\text{H}_2\text{O}$
4.  $\text{CaB}_2\text{Si}_2\text{O}_8 \cdot x\text{H}_2\text{O}$

134.

For a tetrahedral complex  $[\text{MCl}_4]^{2-}$ , the spin-only magnetic moment is 3.83 B.M. The element M is

1. Co
2. Cu

3. Mn

4. Fe

135.

The crystal field stabilization energies (CFSE) of high spin and low spin  $d^6$  metal complexes in terms of  $\Delta_0$ , respectively are

1. -0.4 and -2.4
2. -2.4 and -0.4
3. -0.4 and 0.0
4. -2.4 and 0.0

136.

There are two points A and B on the extended axis of a 2 cm long bar magnet. Their distances from the centre of the magnet are  $x$  and  $2x$  respectively. The ratio of magnetic fields at points A and B will be-

1. 8 : 1 approximately
2. 4 : 1 (approximately)
3. 4 : 1
4. 8 : 1

137.

In an ideal parallel LC circuit, the capacitor is charged by connecting it to a dc source which is then disconnected. The current in the circuit :-

1. becomes zero instantaneously.
2. grows monotonically.
3. decays monotonically.
4. oscillates instantaneously.

138.

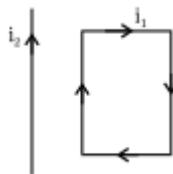
An electromagnetic radiation has an energy 14.4 keV. To which region of electromagnetic spectrum does it belong?

1. Infra red region
2. Visible region
3. X-ray region
4.  $\gamma$  - ray region

139.

A rectangular loop carrying a current  $i_1$ , is situated near a long straight wire carrying a steady current  $i_2$ . The wire is parallel to one of the sides of the loop and is in the plane of the loop as shown in the figure. Then the

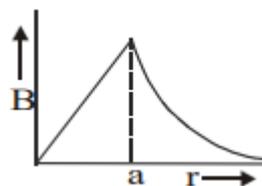
current loop will :-



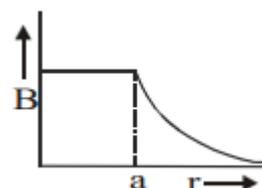
1. move away from the wire.
2. move towards the wire.
3. remain stationary.
4. rotate about an axis parallel to the wire.

140.

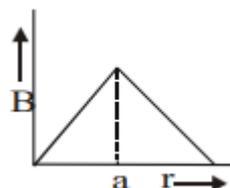
The magnetic field due to a straight conductor of uniform cross-section of radius 'a' and carrying a steady current is represented by-



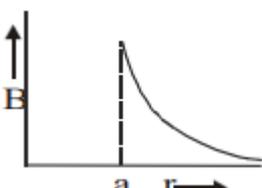
1.



2.



3.



4.

141.

Statement-1 :- Magnetic flux linked with a closed surface is always zero.

Statement-2 :- Magnetic monopole does not exist.

1. Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
2. Statement-1 is true, statement-2 is true and

statement-2 is NOT the correct explanation for statement-1.

3. Statement-1 is true, statement-2 is false.

4. Statement-1 is false, statement-2 is true.

142.

The magnetic flux through a circuit of resistance R changes by an amount  $\Delta\phi$  in time  $\Delta t$ . Then the total quantity of electric charge which passing during this time through any point of the circuit is given by-

1.  $Q = \frac{\Delta\phi}{\Delta t}$

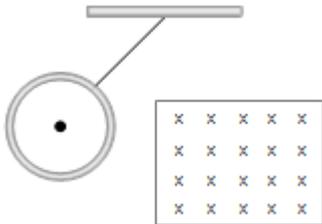
2.  $Q = \frac{\Delta\phi}{\Delta t} \times R$

3.  $Q = -\frac{\Delta\phi}{\Delta t} + R$

4.  $Q = \frac{\Delta\phi}{R}$

143.

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



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

144.

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

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

2.  $\frac{R_2}{R_1}$

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

4.  $\frac{R_1}{R_2}$

145.

A series AC circuit has a resistance of  $4\Omega$  and an inductor of reactance  $3\Omega$ . The impedance of the circuit is  $z_1$ . Now a capacitor of reactance  $6\Omega$  is connected in the series of above combination, the impedance becomes  $z_2$ , Then  $\frac{z_1}{z_2}$  will be

1. 1 : 1

2. 5 : 4

3. 4 : 5

4. 2 : 1

146.

The magnetic moment of a circular orbit of radius 'r' carrying a charge 'q' and rotating with velocity v is given by

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

2.  $\frac{qvr}{2}$

3.  $qv\pi r$

4.  $qv\pi r^2$

147.

Two bar magnets are held together tightly in a vibration magnetometer. When their like poles are together, they make 20 oscillations per minute and when their unlike poles are together, they make 8 oscillations per minute. The ratio of the magnetic dipole moments of two bar magnets is :

1 29:21

2 6:15

3 1:6

4 25:4

148.

Soft iron is used to manufacture electromagnets because-

1. It has a high permeability.

2. Its retentivity and coercivity are small.
3. Its retentivity and coercivity are high.
4. Both (1) & (2)

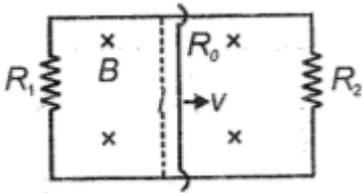
149.

Calculate the self-inductance of a solenoid having 1000 turns and length 1m. The area of cross-section is  $7 \text{ cm}^2$  and  $\mu_r = 1000$ .

1. 888 H
2. 0.88 H
3. 0.088 H
4. 88.8 H

150.

A rod having length  $l$  and resistance  $R_0$  is moving with speed  $v$  as shown in the figure. Find the current through the rod.



1.  $\frac{Blv}{\frac{R_1 R_2}{R_1 + R_2} + R_0}$
2.  $\frac{Blv}{\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_0}\right)^2}$
3.  $\frac{Blv}{R_1 + R_2 + R_0}$
4.  $\frac{Blv}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_0}}$

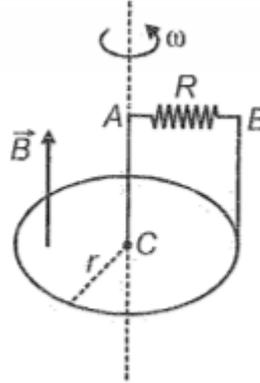
151.

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

152.

A conducting disc of radius  $r$  rotates about its axis with an angular speed  $\omega$  in a uniform magnetic field  $B$  perpendicular to the plane of the disc as shown. A resistance  $R$  is connected between centre and rim of the disc, then-



1. No e.m.f. will induce across the resistance
2. E.m.f. will induce and A is at high potential
3. Current in resistance will flow from A to B
4. Resistance becomes hot due to Joule's heating

153.

A wire of length  $l$  is folded to form double circular loop. If current in the wire is  $i$ , the magnetic field at the center is :

1.  $\frac{\mu_0 i \pi}{2l}$
2.  $\frac{\mu_0 i \pi}{l}$
3.  $\frac{2\mu_0 i \pi}{l}$
4.  $\frac{4\mu_0 i \pi}{l}$

154.

When a  $1\Omega$  resistor is connected in parallel with a moving coil galvanometer in parallel, then its deflection reduces from 50 division to 5 divisions. The resistance of galvanometer is :

1.  $9\Omega$
2.  $10\Omega$
3.  $11\Omega$
4.  $1\Omega$

155.

A voltmeter of resistance  $2000\Omega$  can measure a maximum potential difference of 2 V. If it is to be converted into a voltmeter of range 20 V, the required resistance in series will be :

1.  $2000\Omega$
2.  $1800\Omega$
3.  $18000\Omega$
4.  $8000\Omega$

156.

If magnetic induction at center due to electron in first orbit of hydrogen atom is B, then the magnetic induction due to electron in 5<sup>th</sup> orbit of the atom is :

1. 2B
2.  $\frac{B}{(5)^3}$
3.  $\frac{B}{(5)^4}$
4.  $\frac{B}{(5)^5}$

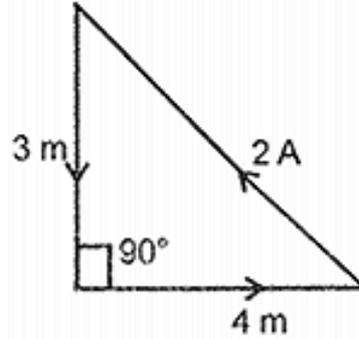
157.

If number of turns in a moving coil galvanometer is doubled, then :

1. Voltage sensitivity becomes double
2. Current sensitivity becomes double
3. Voltage sensitivity becomes half
4. Current sensitivity remains same

158.

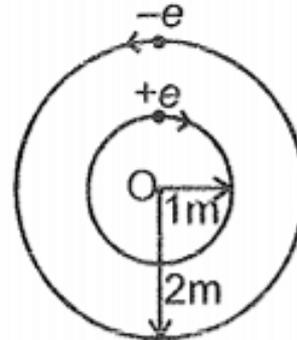
What is the magnetic moment of the current loop shown below?



1.  $24 Am^2$
2.  $12 Am^2$
3.  $6 Am^2$
4. Zero

159.

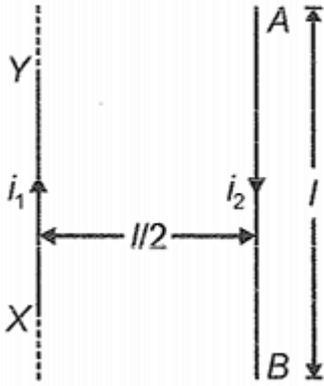
An electron and a proton are revolving around common center O in two coplanar circular paths as shown in figure with time period of rotation 1 s and 2 s respectively. The net magnetic field at O will be-



1.  $\frac{\mu_0 e}{\pi}$  tesla
2.  $\frac{\mu_0 e}{2}$  tesla
3.  $2\mu_0 e$  tesla
4. Zero

160.

A conductor AB of length l, carrying a current  $i_2$ , is placed antiparallel to a long straight conductor XY carrying a current  $i_1$  as shown. The force on AB has magnitude-



1.  $\mu_0 i_1 i_2$

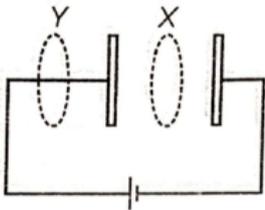
2.  $\frac{\mu_0 i_1 i_2}{\pi}$

3.  $\frac{\mu_0 i_1 i_2}{2\pi}$

4.  $2\mu_0 i_1 i_2$

161.

Figure shows a parallel plate capacitor being charged by a battery. If X and Y are two closed curves then during charging,  $\oint \vec{B} \cdot d\vec{l}$  is zero along the curve-



1. X only

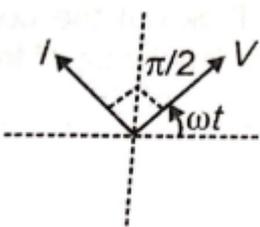
2. Y only

3. Both X & Y

4. Neither X nor Y

162.

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

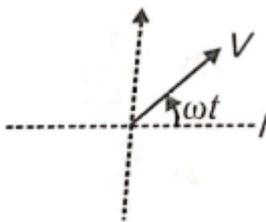
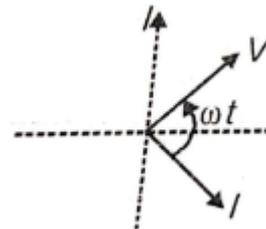
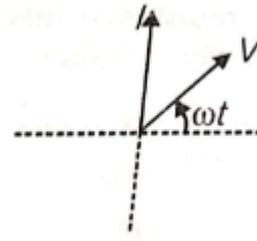


1.

2.

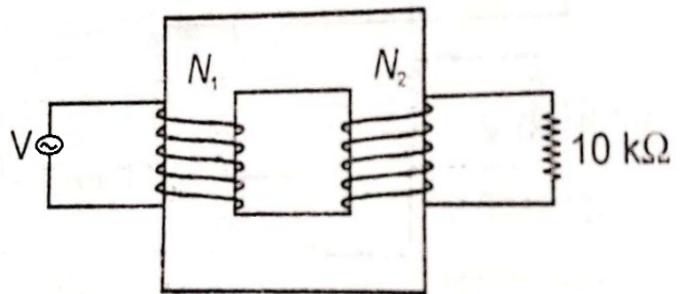
3.

4.



163.

In the transformer shown in figure, ratio of number of turns of primary to the secondary is  $\frac{N_1}{N_2} = \frac{1}{50}$ . If a battery of emf 10 V is connected across primary, then induced current through the load of 10 kΩ in secondary is



1.  $\frac{1}{20} A$

2. zero

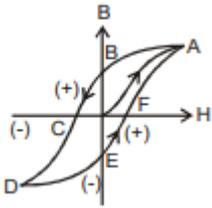
3.  $\frac{1}{10} A$

4.  $\frac{1}{5} A$

164.

A ferromagnetic substance is placed in the varying magnetising field H. The magnetic induction B is measured for various values of direct and reverse

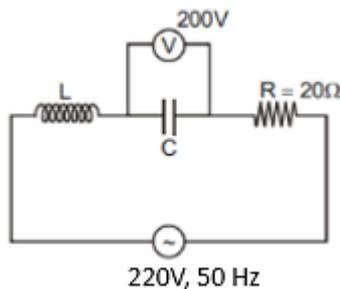
magnetising fields. Following graph has been plotted for B versus H. Choose the wrong statement :-



1. There is a limit of direct and reverse external magnetising field at which the magnetisation and hence the magnetic induction saturates
2. Even after removing the external magnetising field some residual magnetisation called 'retentivity' is left over in the substance
3. On increasing the reverse magnetising field, the magnetic field decreases to zero for a value of magnetising field which is known as 'susceptibility'
4. On increasing the reverse magnetising field, the magnetic field decreases to zero for a value of magnetising field known as 'coercivity'

165.

In the circuit shown rms current is 11A. The potential difference across the inductor is:-



1. 220 V
2. 0 V
3. 300 V
4. 200 V

166.

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

1. 200 V
2. 100 V
3. 50 V
4. 150 V

167.

A horizontal straight wire 10 m long extending from east to west is falling with a speed of  $5.0 \text{ ms}^{-1}$ , at right angle to the horizontal component of the earth's magnetic field,  $0.30 \times 10^{-4} \text{ Wb m}^{-2}$ . The instantaneous value of the emf induced in the wire is:

1.  $2.5 \times 10^{-3} \text{ V}$
2.  $1.5 \times 10^{-4} \text{ V}$
3.  $2.5 \times 10^{-4} \text{ V}$
4.  $1.5 \times 10^{-3} \text{ V}$

168.

Current in a circuit falls from 5.0 A to 0.0 A in 0.1 s. If an average emf of 200 V is induced, the self-inductance of the circuit is:

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

169.

A  $100 \Omega$  resistor is connected to a 220 V, 50 Hz ac supply. The net power consumed over a full cycle is:

1. 484 W
2. 848 W
3. 400 W
4. 786 W

170.

A 44 mH inductor is connected to 220 V, 50 Hz ac supply. The rms value of the current in the circuit is:

1. 1.0 A
2. 15 A
3. 15.92 A

4. 14.29 A  
171. 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. 200 N/C
2. 153 N/C
3. 150 N/C
4. 510 N/C

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

172. 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 0.15A. The displacement current across the plates is:

176. The electric field part of an electromagnetic wave in vaccum is-

$$\vec{E}$$

$$= (3.1 \text{ N/C}) \cos \left[ (1.8 \text{ rad/m})y + (5.4 \times 10^8 \text{ rad/s})t \right] \hat{i}$$

What is the frequency of the wave?

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

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

173. A plane electromagnetic wave travels in vaccum along the z-direction. Then the directions of its electric and magnetic field vectors will be in:

177. A pair of adjacent coils has a mutual inductance of 1.5 H. If the current in one coil changes from 0 to 20 A in 0.5 s, what is the change of flux linkage with the other coil?

1. 35 Wb
2. 25 Wb
3. 30 Wb
4. 20 Wb

1. The x-y plane and they are parallel to each other.
2. The x-y plane and they are mutually perpendicular to each other.
3. The y-z plane and they are mutually perpendicular to each other.
4. The z-x plane and they are parallel to each other.

174. Which physical quantity does not change in vaccum for X-rays?

178. If a loop changes from an irregular shape to a circular shape, then magnetic flux linked with it:

1. Decreases
2. Remains constant
3. First decreases and then increases
4. Increases

1. speed of light
2. wavelength
3. frequency
4. none of these

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

179. At a certain location in Africa, a compass points  $12^\circ$  west of the geographic north. The north tip of the magnetic needle of a dip circle placed in the plane of magnetic meridian points  $60^\circ$  above the horizontal. The horizontal component of the earth's field is measured to be 0.16 G. The magnitude of the earth's field at the location is:

1. 0.16 G
2. 0.48 G
3. 0.32 G
4. 0.30 G

180.

A magnetic dipole is under the influence of two magnetic fields. The angle between the field directions is  $60^\circ$ , and one of the fields has a magnitude of  $1.2 \times 10^{-2} T$ . If the dipole comes to stable equilibrium at an angle of  $15^\circ$  with this field, what is the magnitude of the other field?

[Given:  $\sin 15^\circ = 0.26$ ]

1.  $7.29 \times 10^{-3} T$
2.  $4.39 \times 10^{-3} T$
3.  $6.18 \times 10^{-3} T$
4.  $5.37 \times 10^{-3} T$

**[Fill OMR Sheet](#)**