1. For which of the following organisms there is no natural death?

   1. Bacteria reproducing by sporulation fission

   2. Yeast reproducing by budding

   3. Unicellular organisms reproducing by spores

   4. Unicellular organisms reproducing by binary

2. Vegetative reproduction is also a type of asexual reproduction." Which of the following statements justify this?

   1. Involvement of one parent

   2. Gametes are not involved

   3. Does not involve meiosis

   4. More than one option is correct

3. In algae and fungi homothallic term is used to represent

   1. Dioecious condition

   2. Unisexual condition

   3. Bisexual condition

   4. More than one option is correct

4. Read the following statement carefully: "Further development of zygote depends on the type of life cycle the organism has and the environment it is exposed to." Identify the correctly matched pair w.r.t the above statement

1. Thick walled zygote	Haplontic life cycle
2. Zygote forms new generation, by mitosis, represented by one cell	Haplodiplontic life cycle
3. Zygote undergoes meiosis to form haploid generation	Diplontic life cycle
4. Zygote forms multicellular diploid generation	Haplontic life cycle

5. Choose the correct option from following statements

   I. During ebryogenesis, zygote undergoes mitotic cell division

   II. In organism with diplontic life cycle, zygote divides by meiotic cell division

   III. The pericarp (fruit wall) develop from integument of ovule, after fertilization

   IV. In brinjal, sepals remained attached to fruit even after fertilization

   1. I,II are incorrect but III,IV are correct

   2. III, IV are incorrect but II,III are correct

   3. I,IV are incorrect but II,III are correct

   4. II,III are incorrect but I,IV are correct

6. Entry of pollen tube into embryo sac is under ___guidance

   1. Chemotropic

   2. Chemotactic

   3. Phototropic

   4. Thigmotropic

7. Double fertilization was discovered by Nawaschin and Guignard in

1. Lilium and Allium

2. Lilium and Fritillaria

3. Zea mays and Mangifera

4. Nigella and Fritillaria

8. Why is vivipary an undesirable character for annual crop plants?

1. It reduces the vigour of the plant

2. It adverselt affects the fertility of the plant

3. The seeds exhibit long dormacy

4. The seeds cannot be stored under normal conditions for the next season

9. The pollen grain represents

1. Male gamete

2. Male gametophyte

3. Microsporophyll

4. Microsporangium

10. Choose the correct option w.r.t the function of the germ pore.

1. It allows growth of pollen tube

2. It allows water absorption in seed

3. It helps dehiscence of pollen grain

4. More than one option is correct

11. The number of mitotic generations required to form a mature embryo sac from megaspore in most of the flowering plants is

1. One

2. Two

3. Three

4. Four

12. Hydrophily is limited to 30 genera which are mostly

1. Gymnosperms

2. Monocots

3. Dicots

4. More than one option is correct

13. Pollen pistil interaction is

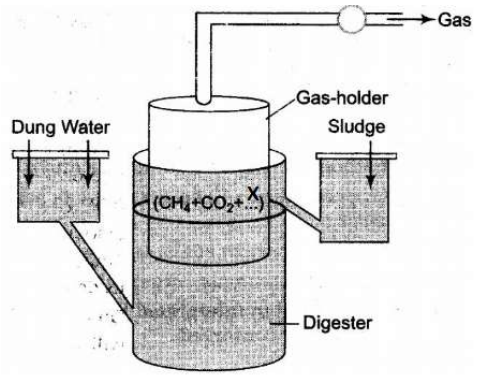
1. Chemically mediated process

2. Dynamic process

3. Genetically controlled process

4. More than one option is correct

14. In the given diagram the gas X can be:



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

15. Choose the correct option from the following

I. Dehydration and dormancy of mature seeds are crucial for seed storage

II. Seed of *Lupinusarticus* is the oldest one which germinated after 2000 year

III. Orchid seed is one of largest seed in plant kingdom

IV. Seeds are parasitic plants Orobanche and Striga are tiny seeds

1. I,II are correct but III,IV are incorrect

2. I,IV are correct but II,III are incorrect

3. III,IV are correct but I,II are incorrect

4. II,III are correct but I,IV are incorrect

16. A dioecious flowering plant prevents both

    1. Autogamy and xenogamy

    2. Autogamy and geitonogamy

    3. Geitonogamy and xenogamy

    4. Cleistogamy and xenogamy

17. The ovule of an angiosperm is technically equivalent to

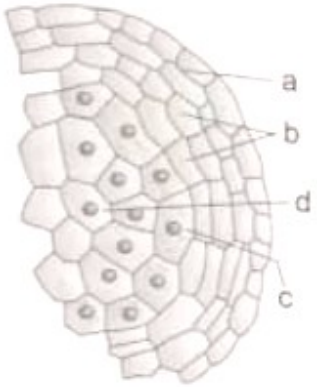
    1. Megasporangium

    2. Megasporophyll

    3. Megaspore mother cell

    4. Megaspore

18. Examine the figure given below and select the right option giving all the four parts a,b,c and d. Correctly identify



	a	b	c	d
1.	Endothecium	Tapetum	Microspore mother cell	Middle layer
2.	Tapetum	Endothecium	Microspore mother cell	Middle layer
3.	Endothecium	Middle layer	Tapetum	Microspore mother cell
4.	Endothecium	Microspore mother cell	Middle layer	Tapetum

19. Nucellar polyembryony is reported in species of

    1. Brassica

    2. Citrus

    3. Gossypium

    4. Triticum

20. What is common between vegetative reproduction and Apomixis?

    1. Both occur round the year

    2. Both produces progeny identical to the parent

    3. Both are applicable to only dicot plants

    4. Both bypass the flowering phase

21. What would be the number of chromosomes of the aleurone cells of a plant with 42 chromosomes in its root tip cells?

    1. 21

    2. 42

    3. 63

    4. 84

22. In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation?

1. Intrauterine transfer

2. Gamete intracytoplasmic fallopian transfer

3. Artificial Insemintion

4. Intracytoplasmic sperm injection

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

1. Inhibits the release of gonadotropins

2. Inhibits the release of estrogen and progesterone

3. Stimulate the release of FSH and LH

4. Stimulates the release of estrogen and progesterone

24. What is the function of copper ions in copper releasing IUDs?

1. They increase phagocytosis of sperm within the uterus

2. They suppress sperm motility and the fertilising capacity of sperms

3. They make the uterus unsuitable for implantation

4. They inhibit ovulation

25. Which of the following STD and its causative agent is not correctly matched?

1.	Genital warts	:	Haemophilus ducrei
2.	Syphilis	:	Treponema pallidum
3.	Genital herpes	:	Type II herpes simplex virus (HSV-2)
4.	trichomoniasis	:	Trichomonas vaginalis

26. All the following statements about ZIFT are correct, but one is wrong. Which one is wrong?

1. It is zygote intra fallopian transfer

2. Zygote is transferred into the fallopian tube about after IVF

3. Early embryos upto 8 blastomeres can also be transferred into the fallopian tubes

4. Embryos with more than 8 blastomeres are also transferred into the fallopian tubes

27. In the human female, menstruation can be deferred by the administration of

1. FSH only

2. LH only

3. Combination of FSH and LH

4. Combination of estrogen and progesterone

28. In human, cleavage divisions are

1. Slow and synchronous

2. Fast and synchronous

3. Slow and asynchronous

4. Fast and asynchronous

29. A : In morula stage the cells divide without any increase in size without any increase in size

R : Zone pellucida remains intact till cleavage is completed

30. The extra embryonic membranes of the mammalian embryo are derived from

1. Trophoblast

2. Inner cell mass

3. Formative cells

4. Follicle cells

31. In the 28 day human ovarian cycle, the duration of luteal phase is approximate?

1. 14 days

2. 28 days

3. 30 days

4. 5 days

32. A change in the amount of yolk and its distribution in the egg will affect :

1. Pattern of cleavage

2. Number of blastomeres produced

3. Fertilization

4. Formation of zygote

33. Capacitation refers to changes in the

1. Sperm after fertilization

2. Sperm before fertilization

3. Ovum before fertilization

4. Ovum after fertilization

34. In which type of placenta minimum number of barrier is/are present between foetal and maternal blood?

1. Syndesmochorial

2. Haemochorial

3. Haemoendothelial

4. Endotheliochorial

35. Drugs such as Thalidomide taken by woman in first trimester of pregnancy cause all the following malformations in the developing embryo except

1. Phocomelia

2. Amelia

3. Heart disorder

4. Placentitis

36. In the fertile human female, approximately on which day of the menstrual cycle (32 days) does ovulation take place?

1. Day 18

2. Day 14

3. Day 1

4. Day 8

37. Which of the following groups of hormones produced in women only during pregnancy ?

1. hCG, hPL, relaxin

2. Estrogen, progesterone, hCG

3. Cortisol, prolactin, thyroxine

4. Prolactin. progesterone, hCG

38. The stem cells which have potency to give rise to all tissues and organs are formed from

1. Trophoblast

2. Umbilical cord

3. Inner cell mass

4. Placenta

39. Identify the hormones that are secreted in large amount prior to ovulation :

A. LH B. FSH

C. Estrogen D. Progesterone

1. A only

2. A & B only

3. A,B & C only

4. A,B,C & D

40. Which centriole is spermatozoa is required for first cleavage ?

1. Proximal centriole

2. Distal centriole

3. Ring centriole

4. Posterior centriole

41. Primary sex organs differ from the secondary sex organs in all the following, except

1. They produce gametes

2. They secrete sex hormones

3. They are concerned with the conduction of gametes

4. Testes in male and ovaries in female are the examples of primary sex organs

42. Which one of the following statements is incorrect about menstrual cycle ?

1. The first menstruation begins at puberty and is called menarche

2. Lack of menstruation may also occur due to some environmental factors like stress, poor health

3. Corpus luterum secretes large amounts of progesterone which is essential for maintainence of endometrium

4. In absence of fertilisatio, corpus luteum degenerates in luteal phase and new follicles start developing immediately

43. Phase of menstrual cycle in human that lasts for 7-8 days is

1. Follicular phase

2. Ovualtory phase

3. Luteal phase

4. Menstruation

44. A change in ovum after penetration of sperm is

1. Formation of first polar body

2. Second meiosis starts

3. First meiosis

4. Formation of second polar body

45. Cryptochidism is

1. Non-development of testes

2. Nondescent of testes into scrotum

3. Removal of scrotum

4. Breaking connection of vas deferens

46. Scrotal sacs of man are connected with the abdominal cavity by

1. Inguinal canal

2. Haversian cana;

3. Spermatic canal

4. Rete testis

47. Which one of the following is important as one of the first line of defense against inhaled and ingested pathogen ?

1. IgA

2. IgG

3. IgM

4. IgD

48. A metastatic cancerous tumour is termed 'sarcoma' if the disorder is in

1. Fibroblasts

2. Circulatory system

3. Immune system

4. Epithelial cells

49. A person suffering from a disease caused by *Plasmodium,* experiences chill and fever at the time when?

1. The sporozites released from RBCs are being rapidly killed and broken down inside spleen

2. The trophozites reach maximum growth and give out certain toxins

3. The parasite after its rapid multiplication inside RBCs ruptures them, releasing the stage to enter fresh RBCs

4. The microgametocytes and megagametocytes are being destroyed by the WBCs

50. Alzheimer disease in humans is associated with the deficiency of

1. Glutamic acid

2. Acetylcholine

3. Gamma aminobutyric acid (GABA)

4. Dopamine

51. Match the disease in Column I with the appropriate items (pathogen/prevention/treatment) in Column II

	Column-I		Column-II
a.	Amoebiasis	(i)	Treponema palladium
b.	Diphtheria	(ii)	Use only sterilized food and water
c.	Cholera	(iii)	DPT vaccine
d.	Syphilis	(iv)	Use oral rehydration therapy

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

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

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

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

52. A person who met with road accident is likely to develop tetanus, he is immunised by administering

1. Weakened germs

2. Dead germs

3. Preformed antibodies

4. Wide spectrum antibiotics

53. Antivenom injection contains performed antibiotics while polio drops that are administered into the body contain

1. Attenuated pathogens

2. Activated pathogens

3. Harvested pathogens

4. Gamma pathogens

54. MALT constitutes about _____ percent of the lymphoid tissue in human body

1. 50%

2. 20%

3. 70 %

4. 10%

55. Acid in stomach, saliva in the mouth, tears from eyes, all prevent microbial growth belong to which of the following barriers?

1. Physical barrier

2. Physiological barrier

3. Cellular barrier

4. Cytokine barrier

56. Asbestos causes cancer of

1. Liver

2. Lungs

3. Lungs and urinary bladder

4. Urinary bladder

57. Different species of *Mycobacterium* cause

1. Syphilis and Diphtheria

2. Whooping cough and leprosy

3. Tuberculosis and leprosy

4. Syphilis and gonnorhoea

58. Which of the following cancer is opportunistic disease associated with HIV ?

1. Cancer of cervix

2. Liver cancer

3. Pancreatic cancer

4. Kaposi's sarcoma

59. Which of the following is not an autoimmune disorder ?

1. Myasthenia gravis

2. Rheumatoid arthritis

3. Hashimoto's disease

4. Adam's-Stoke syndrome

60. Which of the following enhances or induces fusion of protoplasms ?

1. IAA and gibberellins
2. Sodium chloride and potassium chloride
3. Polyethylene glycol and sodium nitrate
4. IAA and kinetin

61. Which one of the following is a case of wrong matching ?

1. Micropropagation-In vitro production of plants in large numbers
2. Callus-Unorganised mass of cells produced in tissue culture
3. Somatic hybridization-Fusion of two diverse cells
4. Vector DNA-site for t-RNA synthesis

62. Consider the following four statements (a-d) and select the option which includes all the correct ones only

(a) Single *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins etc.

(b) Body weight-wise the micro-organism *Methylophilus methylotrophus* may be able to produce several times more proteins than the cows per day

(c) Common button mushrooms are a very rich source of vitamin C

(d) A rice variety has been developed which is very rich in calcium

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

63. Consider the following four measures (a-d) that could be taken to successfully grow chick-pea in an area where bacterial blight disease is common

(a) Spray with Bordeaux mixture

(b) Control of insect vector of the disease pathogen

(c) Use of only disease-free seeds

(d) use of varieties resistant to the disease

Which two above measures can control the disease ?

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

64. *Triticale,* the first man-made cereal cropm has been obtained by crossing wheat with

1. Rye
2. Pearl millet
3. Sugarcane
4. Barley

65. Three crops that contribute maximum to global food grain production are

1. Wheat , rice and maize
2. Wheat , maize and sorghum
3. Rice, maize and sorghum
4. Wheat, rice and barley

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

	Microbe	Product	Application
1.	*Clostridium butylicum*	Lipase	Removal of oil stains
2.	*Trichodermapolysporum*	Cyclosporin A	Immunosuppressive drug
3.	*Monascuspurpureus*	Statins	Lowering of blood cholesterol
4.	*streptococcus*	Streptokinase	Removal of clot from blood vessel

67. During sewage treatment, biogases are produced which include :

1. Methane,oxygen, hydrogen sulphide
2. Hydrogen sulphide, methane, sulphur dioxide
3. Hydrogen sulphide, nitrogen, methane
4. Methane, hydrogen sulphide, carbon monoxide

68. All are correct w.r.t BOD (Biochemical oxygen Demand), except

1. It refers to the amount of oxygen that would be consumed if all the organic matter in one liter of water were oxidized by bacteria
2. The BOD test is a measure of the organic matter present in the water
3. The greater the BOD of waste water, less is its polluting potential
4. Waste water is treated till BOD is reduced significantly

69. The most abundant prokaryotes helpful to humans in making curd from milk and in production of antibiotics are the ones categorized as

1. Chemosynthetic autotrophs
2. Heterotrophic bacteria
3. Cyanobacteria
4. Archaebacteria

70. What are flocs?

1. Masses of anaerobic bacteria
2. Masses of aerobic fungi only
3. Masses of anaerobic bacteria and fungi
4. Masses of aerobic bacteria associated with fungal filaments

71. The most common substrate used in distilleries for the production of ethanol is

1. Molasses
2. Corn meal
3. Soya meal
4. Ground gram

72. Select the correct statement from the following

1. Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria
2. Biogas is produced by the activity of aerobic bacteria on animal waste
3. *Methanobacterium* is an aerobic bacterium found in rumen of cattle
4. Biogas, commonly called gobar gas is pure methane

73. Probiotics are

1. Live microbial food supplement
2. Safe antibiotics
3. Cancer inducing microbes
4. New kind of food allergens

74. One of the major difficulties in the biological control of insect/pest is that

1. The method is less effective as compared with the use of insecticides
2. The practical difficulty of introducing the predator to specific areas
3. The predator develops a preference to other deits and may itself become a pest
4. The predator does not always survive when transferred to a new environment

75. Which one of the following helps in absorption of phosphorus from soil by plants ?

1. *Anabaena*
2. *Glomus*
3. *Rhizobium*
4. *Frankia*

76. An organism used as a biofertilizer for raising soyabean crop is

1. *Nostoc*

2. *Azobacter*

3. *Azospirillium*

4. *Rhizobium*

77. An pollen tube liberated the male gametes into

1. Degenerating synergid

2. Intact synergid

3. Antipodals

4. Egg

78. At what stage of endosperm development will you observe the type of development

1. When divisions start in embryo

2. When embryo is heart shaped

3. Early division of primary endosperm

4. Mature stage of endosperm

79. Which one of the following is an example of carrying out biological control of pests/diseases using microbes ?

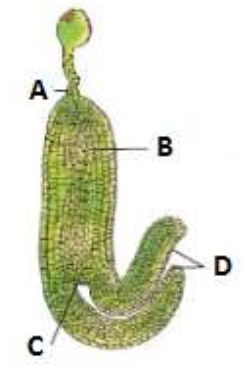
1. Bt- cotton to increase cotton yield

2. Lady bird beetle against aphids in mustard

3. *Trichoderma* sp. against certain plant pathogens

4. Nucleopolyhedrovirus agains white rust in *Brassica*

80. What functions as the embryonic root of the plant?

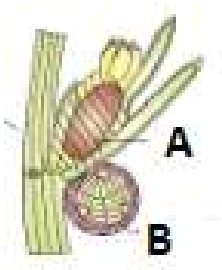


1. A
2. B
3. C
4. D

81. The following diagram shows:

1. Multicarpellary, syncarpus pistil of *Papaver*
2. Multicarpellary, apocarpus pistil of *Papaver*
3. Multicarpellary, apocarpus gynoecium of *Michelia*
4. Multicarpellary, syncarpus gynoecium of *Michelia*

82. What is true about the given figure?



1. The plant concerned is Chara and A is Oogonium and B is Antheridium
2. The plant concerned is Chara and B is Oogonium and A is Antheridium
3. The plant concerned is Marchantia and A is Oogonium and B is Antheridium
4. The plant concerned is Marchantia and B is Oogonium and A is Antheridium

83. The functions of male sex accessory ducts and glands are maintained by:

1. Hypothalamic releasing hormone
2. Pituitary gonadotropins
3. Adrenal cortex steroids
4. Testicular androgens

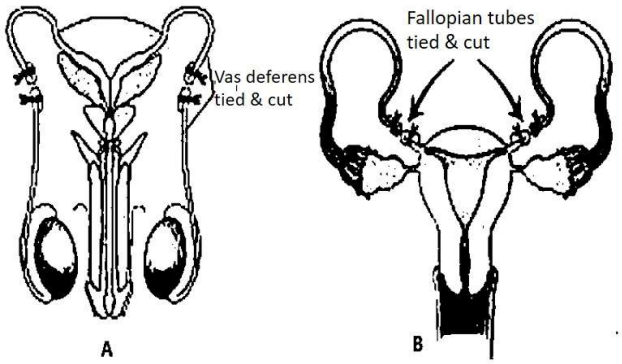
84. At the birth of the female child, the follicles in her ovaries contain:

1. Primary oocytes that have been arrested at the S phase of the cell cycle
2. Primary oocytes that have been arrested at the Prophase I of Meiosis I
3. Secondary oocytes that have been arrested at the Prophase I of Meiosis I
4. Secondary oocytes that have been arrested at the Metaphase II of Meiosis II

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

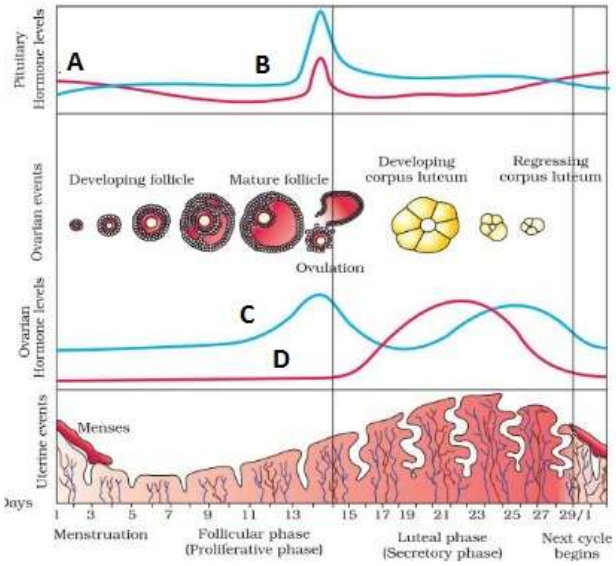
1. They get invested by multiple layers of granulosa cells
2. They enlarge in size and then get dormant
3. They undergo atresia or degeneration
4. They cluster together at one end of the ovary

86. Consider the two surgical procedures given below and choose the correct statement:



1. A is a more difficult procedure than B
2. The reversibility of A is good but that of B is very poor
3. A will make the male impotent and B will make the female infertile
4. Both A and B can be called as sterilization procedures

87. In the given diagram, identify A, B, C and D respectively:



1. LH, FSH, Progesterone and Estrogen
2. FSH, LH, Estrogen and Progesterone
3. Estrogen, Progesterone, LH and FSH
4. Progesterone, Estrogen, FSH and LH

88. Which of the following is not used as a biopesticide ?

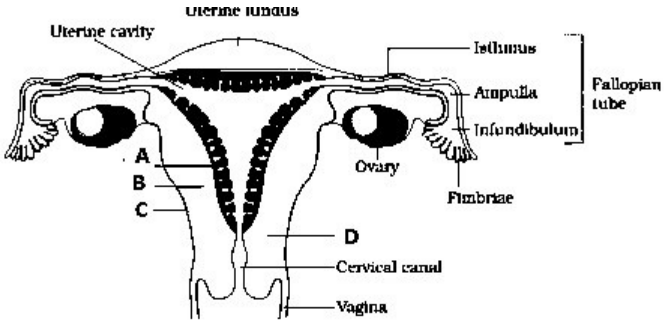
1. *Trichoderma harzianum*

2. Nuclear Polyhedrosis Virus (NPV)

3. *Xanthomonas campestris*

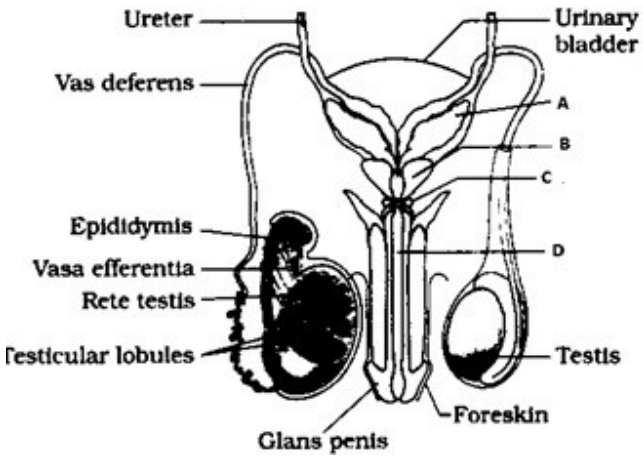
4. *Bacillus thuringiensis*

89. In the given diagram the part of the female reproductive system that undergoes cyclical changes with changes in the secretion of gonadotropins and gonadal steroids during the menstrual cycle is represented by:



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

90. Which of the structures shown in the following diagram contributes the source of nutrition for the sperms ejaculated in the semen?



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

91. The vapour pressure of water at 200 C is 17.5. mm Hg. If 18g of glucose ($C_6H_{12}O_6$) is added to 178.2 g of water at 200 C, the vapour pressure of the resulting solution will be
1. 15.750 mm Hg

2. 16.500 mm Hg

3. 17.325 mm Hg

4. 17.675 mm Hg

92. Two liquids X and Y form an ideal solution. At 300K, vapour pressure of the solutions containing 1 mol of X and 3 mol of Y is 550 mmHg. At the same temperature, if 1mol of Y is further added to this solution, vapour pressure of the solution increased by 10mmHg. Vapour pressure (in mmHg) of X and Y in their pure states will be, respectively:

1. 300 and 400

2. 400 and 600

3. 500 and 600

4. 200 and 300

93. On mixing, heptane and octane to form an ideal solution. At 373K, the vapour pressures of the two liquid components (heptane and octane) are 105 kPa and 45 kPa respectively. Vapour pressure of the solution obtained by mixing 25.0g of heptane and 35g of octane will be (molar mass of heptane and 35g of octane will be (molar mass of heptane = 100g mol $^{-1}$ and of octane = 114g mol $^{-1}$)
1. 72.0 kPa

2. 36.1 kPa

3. 96.2 kPa

4. 144.5 kPa

94. 12 g of non volatile solute dissolved in 108 g of water produces the relative lowering of vapour pressure of 0.1 . The molecular mass
of the solute is
1. 80

2. 60

3. 20

4. 40

95. K_f for water is 1.86K kg mol $^{-1}$. If your automobile radiator holds 1.0kg of water, how many grams of ethylene glycol ($C_2H_6O_2$) must you add to get the freezing point of the solution lowered to −2.8°C ?
1. 39g

2. 93g

3. 72g

4. 27g

96. How many grams of methyl alcohol should be added to 10 litre tank of water to prevent it from freezing at 268K?
(K_f for water is 1.86 K Kg mol^{-1})
1. 880.07 g

2. 899.04 g

3. 886.02 g

4. 860.2 g

97. The degree of dissociation (α) of a weak electrolyte, A_xB_y is related to van't Hofffactor (i) by the expression:

1. $\alpha = \frac{x+y-1}{i-1}$

2. $\alpha = \frac{x+y+1}{i-1}$

3. $\alpha = \frac{i-1}{(x+y-1)}$

4. $\alpha = \frac{i-1}{(x+y+1)}$

98. The molar mass of solute X in g mol^{-1} , if its 1% solution is osmotic with a 5% solution of cane sugar (molar mass =342 g mol^{-1}),is
1. 68.4

2. 34.2

3. 136.2

4. 171.2

99. The Van'tHaff factor of a 0.005 M aqueous solution of KCl is 1.95. The degree of ionisation of KCl is:

1. 0.95

2. 0.97

3. 0.94

4. 0.96

100. In a face centred cubic lattice, atom A occupies the corner positions and atom B occupies the face centre positions. If one atom of B is missing from one of the face centred points, the formula of the compound is

1.AB_2

2.A_2B_3

3.A_2B_5

4.A_2B

101. An aqueous solution of 2% non volatile solute exerts a pressure of 1.004bar at the normal boiling point of the solvent. What is the molecular mass of the solute?
1. 4.135g / mol

2. 22.1g / mol

3. 90.1g / mol

4. 41.35g / mol

102. Two elements A and B form compounds of formula AB_2 and AB_4. When dissolved in 20.0 g of benzene 1.0 g of AB_2 lowers F.pt. by 2.30C whereas 1.0g of AB_4 lowers F.pt. by 1.30C. The K_f for benzene is 5.4. The atomic masses of A and B are respectively
1. 27, 45

2. 42, 25

3. 52, 48

4. 48, 52

103. What is the osmotic pressure of the solution obtained by mixing 300cm^3 of 2% (mass/volume) solution of urea with 300cm^3 of 3.42% (mass/volume) solution of sucrose at 20^0C ? (R = 0.082L $atmK^{-1}mol^{-1}$)

1. 5 atm

2. 5.2 atm

3. 2.6 atm

4. 4.5 atm

104. Among the electrolytes Na_2SO_4,$CaCl_2$,$Al_2(SO_4)_3$ and , the most effective coagulating agent for Sb_2S_3 sol is
1. Na_2SO_4

2. $CaCl_2$

3. $Al_2(SO_4)_3$

4. NH_4Cl

105. Silver iodide is used for producing artificial rains because AgI
1. is easy to spray at high altitude
2. is insoluble in water
3. is easy to synthesize
4. has crystals similar to ice

106. During micelle formation
1. ΔH = + ve, ΔS = + ve
2. ΔH = −ve, ΔS = −ve
3. ΔH = −ve, ΔS = + ve
4. ΔH = + ve, ΔS = −ve

107. The volume of a colloidal particle, V_c as compared to the volume of a solute particlein a true solution V_s could be

1. $\frac{V_C}{V_S} = 1$
2. $\frac{V_C}{V_S} = 10^{23}$
3. $\frac{V_C}{V_S} = 10^{-3}$
4. $\frac{V_C}{V_S} = 10^{3}$

108. The coagulation of 200mL of a positive colloid took place when 0.73g HCl was added to it without changing the volume much. The flocculation value of HCl for the colloid is
1. 0.365

2. 36.5

3. 100

4. 150

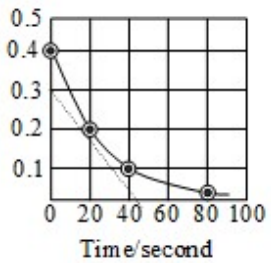
109. Sedimentation potential is the reverse of
1. Electroomosis

2. Electrophoresis

3. Electrokinetic potential

4. Dorn potential

110. A reaction follows the given concentration (C) vs time graph. The rate for this reaction at 20 seconds will be –



1. 4×10^{-3} Ms^{-1} 2. 8.4×10^{-2} Ms^{-1}

3. 2×10^{-2} Ms^{-1} 4. 7.5×10^{-3} Ms^{-1}

111. The rate of the simple reaction $2NO+O_2 \rightarrow 2NO_2$, when the volume of the reaction vessel is doubled –
1. Will grow eight times of its initial rate
2. Reduce to one-eighth of its initial rate
3. Will grow four times of its initial rate
4. Reduce to one-fourth of its initial rate

112. For a first order reaction, the plot of 't' against log C gives a straight line with slope equal to–

1. (k/2.303)

2. $-\frac{2.303}{k}$

3. (ln k/2.303)

4. -k

113. Two substances A ($t_{1/2}$ = 5min) and ($t_{1/2}$ = 15 min) are taken in such a way that initially [A] = 4[B]. The time after which both the concentration will be equal is (assuming reactions are of 1st order) :
1. 5 min
2. 15 min
3. 20 min
4. concentration can never be equal

114. The decomposition of a gaseous substance (A) to yield gaseous products (B) and (C) follows first order kinetics. If initially only (A) is present and 10 minutes after the start of the reaction the pressure of (A) is 200 mm Hg and that of over all mixture is 300 mm Hg, then the rate constant for 2A → B + 3 C is –

1. (1/600) ln 1.25 sec^{-1}

2. (2.303/10) log 1.5 min^{-1}

3. (1/10) ln 1.25 sec^{-1}

4. none of these

115. Under the same reaction conditions, initial concentration of 1.386 mol/dm^3 of a substance becomes half in 40 seconds and 20 seconds through first order and zero order kinetics, respectively. Ratio $\left(\frac{k_1}{k_2}\right)$ of the rate constant for first order (k_1) and zero order (k_0) of the reaction is –

1. 0.5 mol^{-1} dm^3 2. 1.0 $moldm^{-3}$

3. 1.5 $moldm^{-3}$ 4. 2 mol^{-1} dm^3

116. For a first order reaction A → P, the temperature (T) dependent rate constant(k) was found to follow the equation logk = – (2000) + 6.0. The pre-exponential factor A and the activation energy E_a,respectively, are-

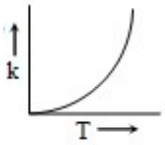
1. 1.0 × 10^6 s^{-1} and 9.2 kJ mol^{-1}

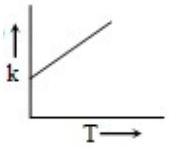
2. 6.0 s^{-1} and 16.6 kJ mol^{-1}

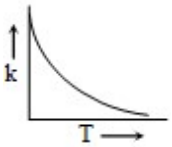
3. 1.0 × 10^6 s^{-1} and 16.6 kJ mol^{-1}

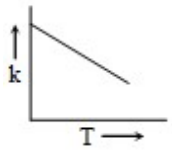
4. 1.0 × 10^6 s^{-1} and 38.3 kJ mol^{-1}

117. Plots showing the variation of the rate constant (k) with temperature (T) are given below. The plot that follows Arrhenius equation is –

1. 

2. 

3. 

4. 

118. The rate of a first order reaction is 0.04 $mollitre^{-1}s^{-1}$ at 10 minutes and 0.03 $mollitre^{-1}$ sec^{-1} at 20 minutes after initiation. Find the half life of the reaction.

1. 24 min

2. 30 min

3. 20 min

4. None of these

119. Ionic radii of Mg^{2+} and O^{2-} ions are 66 pm and 140 pm respectively. The type of interstitial void and coordination number of Mg^{2+} ion respectively are
1. tetrahedral, 12

2. octahedral, 6

3. tetrahedral, 6

4. octahedral, 8

120. An element crystallizes in a structure having FCC unit cell of an edge length 200 pm. If 200 g this element contains 24 x 10^{23} atoms, the density of the element is

1. 50.3 g/cc

2. 63.4 g/cc

3. 41.6 g/cc

4. 34.8 g/cc

121. Iron has body centred cubic lattice. If the edge length of the unit cell is 286 pm, the radius of iron atom is
1. 80 pm 2. 62 pm

3. 160 pm 4. 124 pm

122.

	Column-I		Column-II
A)	Simple cubic and face-centered cubic	p)	Have these cell parameters a=b=c, α=β=γa=b=c,
B)	Cubic and rhombohedral	q)	Are two crystal systems
C)	Cubic and tetragonal	r)	Have only two crystallographic angles of 90°
D)	Hexagonal and monoclinic	s)	Belong to the same crystal same

1. A-p,s ; B-p,q; C-q; D-q,r
2. A-p,q ; B-p,s ;C-q,r ;D-p
3. A-q,s; B-r; C-q,r; D-q
4. A-q; B-r; C-p,s; D-q,r

123. If the radius of octaherdal void is 'r' and radius of the atoms in close packing is 'R', then the relation between 'r' and 'R' is
1. r = 0.732 R

2. r = 0.414 R

3. r = 0.98 R

4. r = 0.225 R

124. In a compound, atoms of element Y form cubical - closest packing and those of element X occupy 2/3 of tetrahedral voids. The formula of the compound will be
1. X_3Y

2. X_4Y_3

3. X_2Y_3

4. X_2Y

125. In a conductivity cell the two platinum electrodes, each of area 10 sq. cm are fixed 1.5 cm apart. The cell contained 0.05 N solution of a salt. If the two electrodes are just half dipped into the solution which has a resistance of 50W, find equivalent conductance of the salt solution –

1. 120 S cm^2 eq^{-1} 2. 160 S cm^2 eq^{-1}

3. 120 S m^2 eq^{-1} 4. 125 S cm^2 eq^{-1}

126. The resistance of a N/10 KCl solution is 245 W. Calculate the equivalent conductance of the

solution if the electrodes in the cell are 4 cm apart and each having an area of 7.0 sq. cm -

1. 23.32 S cm^2 eq^{-1} 2. 23.23 S m^2 eq^{-1}

3. 2.332 S cm^2 eq^{-1} 4. None of these

127. Calculate molar conductivity at infinite dilution of CH_3COOH if molar conductivity at infinite dilution of CH_3COONa, HCl and NaCl are 91.6, 425.0 and 128.1 S cm^2 mol^{-1} -

1. 390.5 S cm^2 mol^{-1} 2. 388.5 S cm^2 mol^{-1}

3. 490.5 S cm^2 mol^{-1} 4. None of these

128. The equivalent conductance of an infinitely dilute solution of NH_4Cl is 150 and the ionic conductance of OH^- and Cl^- ions are 198 and 76 respectively . If the equivalent conductance of a 0.01 N solution of NH_4OH is 9.6, What will be its degree of dissociation ?

1. 0.0353 2. 0.0103

3. 0.96 4. 0.414

129. Molar conductance of 0.1 M acetic acid is 7 ohm^{-1} cm^2 mol^{-1} . If the molar conductance of acetic acid at infinite dilution is 380.8 ohm^{-1} cm^2 mol^{-1}, the value of dissociation constant will be -

1. 226×10^{-5} $moldm^{-3}$

2. 1.66×10^{-3} $moldm^{-1}$

3. 1.66×10^{-2} $moldm^{-3}$

4. 3.442×10^{-5} $moldm^{-3}$

130. If $E^0_{Fe3+/Fe}$ is x_1, is x_2 then $E^0_{Fe3+/Fe}$ will be :

1. $3x_2 - 2x_1$ 2. $x_2 - x_1$

3. $x_2 + x_1$ 4. $2x_1 + 3x_2$

131. The EMF of the cell Ni | Ni^{2+} || Cu^{2+} | Cu(s) is 0.59 volt. The standard reduction electrode potential of copper electrode is 0.34 volt. The standard reduction electrode potential of nickel electrode will be

1. 0.25 volt 2. – 0.25 volt

3. – 0.50 volt 4. – 0.025 volt

132. Given that E^o values of Ag^+/Ag, K^+/K, Mg^{+2}/Mg and Cr^{+3}/Cr are 0.80V, – 2.93V, – 2.37V, and – 0.74 V, respectively. Which of the following orders regarding the reducing power of metal is correct ?

1. Ag > Cr > Mg > K

2. Ag < Cr < Mg < K

3. Ag > Cr > K > Mg

4. Cr > Ag > Mg > K

133. 1/2 $H_2(g)$ + AgCl(s) = $H^+(aq)$ + $Cl^-(aq)$ + Ag(s) occurs in the galvanic cell :

1. Ag/AgCl(s) | KCl(sol) | | $AgNO_3$ (s) | Ag

2. Pt/H_2(g) | HCl (sol) | | $AgNO_3$ (s) | Ag

3. Pt/H_2(g) | HCl (sol) | | |AgCl(s) | Ag

4. Pt/H_2(g) | KCl (sol) | | AgCl(s) | Ag

134. The half cell reduction potential of a hydrogen electrode at pH = 10 will be

1. 0.59 V 2. – 0.59 V

3. 0.059 V 4. – 0.059

135. Pt | Cl_2 (P_1) | HCl (0.1 M) | Pt | Cl_2 (P_2) ; cell reaction will be spontaneous if :

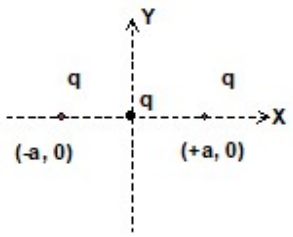
1. $P_1 = P_2$ 2. $P_1 > P_2$

3. $P_2 > P_1$ 4. $P_1 = P_2 = 1$ atm

136. Potential in the x-y plane is given as $V = 5(x^2 + xy)$ volts. The electric field at the point (1, -2) will be

1. $3\hat{j}$ V/m
2. $-5\hat{j}$ V/m
3. $5\hat{j}$ V/m
4. $-3\hat{j}$ V/m

137. Two point charges each of charge +q are fixed at (+a, 0) and (-a, 0). Another positive point charge q placed at the origin is free to move along x- axis. The charge q at origin in equilibrium will have



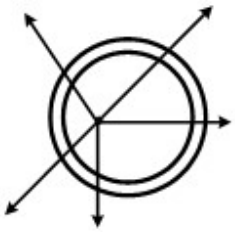
1. maximum force and minimum potential energy.

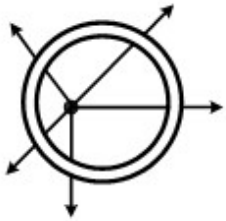
2. minimum force & maximum potential energy.

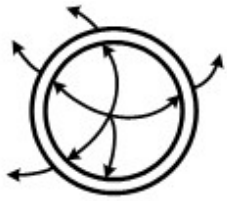
3. maximum force & maximum potential energy.

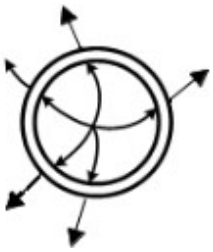
4. minimum force & minimum potential energy.

138. A point charge q is placed inside the cavity of a metallic shell. Which one of the diagram correctly represents the electric lines of force ?

1. 

2. 

3. 

4. 

139. The electric field intensity at a point is $(20\hat{i} + 15\hat{j})$N/C . Considering potential at origin to be zero, the potential at P (2, 4) is

1. $-(40\hat{i} + 60\hat{j})$V

2. $-(10\hat{i} + 15\hat{j})$V

3. -100V

4. 20V

140. A simple pendulum consists of a small sphere of mass m suspended by a thread of length l. The sphere carries a positive charge q. The pendulum is placed in a uniform electric field of strength E directed vertically upwards. With what period will the pendulum oscillate if the electrostatic force acting on the sphere is less than the gravitational force? Assume the oscillations to be small

1. $T = 2\pi\left(\frac{l}{g}\right)^{1/2}$
2. $T = 2\pi\left(\frac{ml}{qE}\right)^{1/2}$
3. $T = 2\pi\left[\frac{l}{\left(g - \frac{qE}{m}\right)}\right]^{1/2}$
4. $T = 2\pi\left[\frac{l}{\left(g + \frac{qE}{m}\right)}\right]^{1/2}$

141. A ring has charge Q and radius R. If a charge q is placed at its centre then the increase in tension in the ring is

1. $\frac{Qq}{4\pi\varepsilon_0 R^2}$
2. zero
3. $\frac{Qq}{4\pi^2\varepsilon_0 R^2}$
4. $\frac{Qq}{8\pi^2\varepsilon_0 R^2}$

142. In a parallel plate capacitor of capacitance C, a metal sheet is inserted between the plates, parallel to them. The thickness of the sheet is half of the separation between the plates. The capacitance now becomes

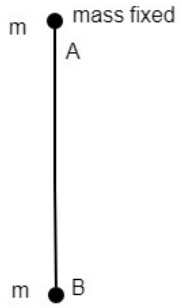
1. 4C

2. 2C

3. C/2

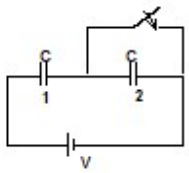
4. C/4

143. Two particles A & B are connected by a string such that A is fixed and B is free to oscillate. If A & B both are supplied q charge each, then the ratio of time period of B before and after charging is



1. ≥1
2. >1
3. ≤1
4. =1

144. The charge flowing across the cell on closing the key k is equal to



1. CV

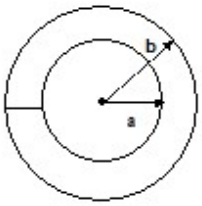
2. CV/2

3. 2CV

4. zero

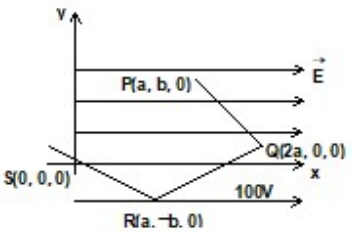
1. qaE
2. –qaE
3. $q\sqrt{(a^2+b^2)}$
4. $3qE\sqrt{(a^2+b^2)}$

145. The conducting spherical shells shown in the figure are connected by a conductor. The capacitance of the system is

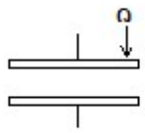


1. $4\pi\varepsilon_0 \frac{ab}{b-a}$
2. $4\pi\varepsilon_0 a$
3. $4\pi\varepsilon_0 b$
4. $4\pi\varepsilon_0 \frac{a^2}{b-a}$

146. A point charge q moves from point P to S along the path PQRS in a uniform electric field pointing parallel to the positive direction of the x-axis. The coordinate of the point P, Q, R and S are (a, b, 0), (2a, 0, 0), (a, -b, 0) and (0, 0, 0) respectively. The work done by the field in the above process is given by the expression



147. Charge Q is given to the upper plate of an isolated parallel plate capacitor of capacitance C. The potential difference between the plates



1. $\frac{Q}{C}$
2. $\frac{Q}{C/2}$
3. $\frac{Q/2}{C}$
4. zero

148. Supposing that the earth has a surface charge density of 1 electron/m^2; calculate earth's potential
[Given : Radius of Earth = 6400 km]

1. - 0.115Volt

2. - 0.9 Volt

3.- 0.12Volt

4. - 0.10 Volt

149. A charge Q is distributed over two concentric hollow spheres of radii r and R (R >r) such that the surface densities are equal. Find the potential at the common centre.

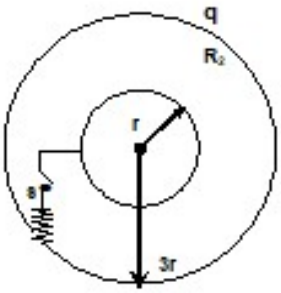
1. $\frac{1}{4\pi\varepsilon_0}\frac{Q(R+r)}{R^2+r^2}$

2. $\frac{1}{4\pi\varepsilon_0}\frac{Q(R-r)}{R^2+r^2}$

3. $\frac{1}{4\pi\varepsilon_0}\frac{Q(R+r)}{R^2-r^2}$

4. $\frac{1}{4\pi\varepsilon_0}\frac{Q(R+r)^2}{R^2+r^2}$

150. Figure shows two conducting thin concentric shells of radii r and 3r. The outer shell carries charge q. Inner shell is neutral. Find the charge that will flow from inner shell to earth after the switch S is closed.



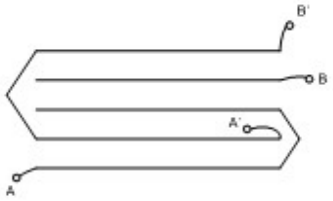
1. $-\frac{q}{3}$

2. $\frac{q}{2}$

3. $+\frac{q}{3}$

4. None of the above

151. The equivalent capacitance between A and B is (each of the capacitors obtained is of capacitance equal to C)



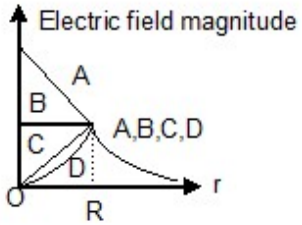
1. $\frac{1}{2}C$

2. $\frac{3}{5}C$

3. $\frac{5}{3}C$

4. $\frac{2}{5}C$

152. An isolated sphere of radius R contains a uniform volume distribution of positive charge. Which of the curve on the graph below correctly illustrates the dependence of the magnitude of the electric field of the sphere as a function of the distance r from its centre



1. A

2. B

3. C

4. D

153.

153. When two resistances X and Y are put in the left hand and right hand gaps in a wheatstone meter bridge, the null point is at 60cm. If X is shunted by a resistance equal to half of itself then find the shift in the null point.

1. 26.7 cm

2. 33.4 cm

3. 46.7 cm

4. 96.7 cm

154.The current in a wire varies with time according to the equation I = 4 + 2t, where I is in ampere and t is in sec. The quantity of charge which has passed through a cross-section of the wire during the time t = 2 sec to t = 6 sec will be
1. 60 coulomb

2. 24 coulomb

3. 48 coulomb

4. 30 coulomb

155. A copper wire is stretched to make it 0.1 % longer. The percentage change in its resistance is
1. 0.2 % increase

2. 0.2% decrease

3. 0.1 % increase

4. 0.1 % decrease

156. A battery of 10 volt is connected to a resistance of 20 ohm through a variable resistance R. The amount of charge which has passed in the circuit in 4 minutes, if the variable resistance R is increased at the rate of 5 ohm/min.

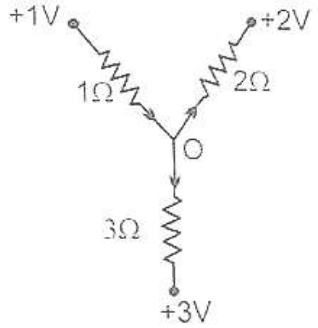
1.120 coulomb

2. 120 $\log_e 2$ coulomb

3. $\frac{120}{\log_e 2}$ coulomb

4. $\frac{60}{\log_e 2}$ coulomb

157. The potential of point O in the steady state circuit shown is :



1. 11/12V
2. 18/11V
3. 16/9V
4. none of the above

158. An electrical cable of copper has just one wire of radius 9 mm. Its resistance is 5 ΩΩ. This single wire of cable is replaced by 6 different well-insulated copper wires each of radius 3 mm. The total resistance of the cable will now be equal to?
1. 7.5 ΩΩ

2. 45 ΩΩ

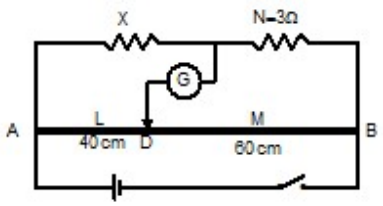
3. 90 ΩΩ

4. 270 ΩΩ

159. A wire 250 cm long and 1 mm^2 in cross-section carries a current of 4 A when connected to a 2 V battery. The resistivity of the wire is

1. 0.2×10^{-6} Ω m
2. 2.2×10^{-6} Ω m
3. 3.5×10^{-6} Ω m
4. 4.4×10^{-6} Ω m

160. The Wheatstone bridge shown in Fig. is balanced when the uniform slide wire AB is divided as shown. Find the value of the resistance X.



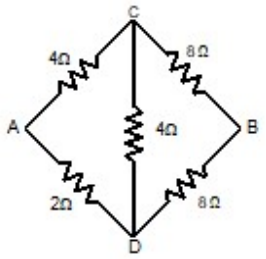
1. 3 Ω

2. 4 Ω

3. 2 Ω

4. 7 Ω

161. What is total resistance across AB in the following network ?



1. 6.4 Ω

2. 2.4 Ω

3. 7.4 Ω

4. 5.4 Ω

162. 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

163. A magnetic material of volume 30 cm^3 is placed in a magnetic field of intensity 5 oersted. The magnetic moment produced due to it is 6 amp-m^2. The value of magnetic induction will be-

1. 0.2517 Tesla

2. 0.025 Tesla

3. 0.0025 Tesla

4. 25 Tesla.

164. A circular disc of area $(4\hat{i}+5\hat{j})\times 10^{-3}$ m^2 is placed in a uniform magnetic field of intensity $(0.2\hat{i}+0.3\hat{j})$ Tesla. The flux crossing the disc will be-

1. 23 Weber

2. 23×10^{-2} Weber

3. 23×10^{-3} Weber

4. 23×10^{-4} Weber

165. Due to a small magnet , intensity at a distance x in the end on position is 9 Gauss. What will be the intensity at same distance in equatorial position ?
1. 9 Gauss

2. 4 Gauss

3. 36 Gauss

4. 4.5 Gauss

166. A magnet is parallel to a uniform magnetic field. If it is rotated by 60°, the work done is 0.8 J. How much work is done in moving it 30° further

1. 0.8×10^{7} ergs0.8×107 ergs

2. 0.4 J

3. 8 J

4. 0.8 ergs

167. A tangent galvanometer shows a deflection 45° when 10 mA current pass through it. If the horizontal component of the earth's field is 3.6×10^{-5} T3.6×10-5 T and radius of the coil is 10 cm. The number of turns in the coil is
1. 5700 turns

2. 57 turns

3. 570 turns

4. 5.7 turns

168. For the magnetic field, due to a small element ofa current carrying conductor at a point to bemaximum, the angle between the element and theline joining the element to point P must be-
1. 0º 2. 90º
3. 180º 4. 45º

169. Current of 30 A is flowing in a vertical straight wire. If the horizontal component of earth's magnetic field is 2 x 10^{-5} Tesla, then the position of null point will be-
1. 0.9 m

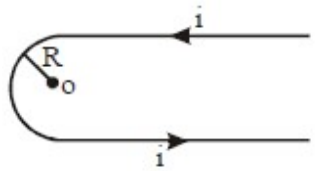
2. 0.3 mm

3. 0.3 cm

4. 0.3 m

170. A wire of length L carrying current I is bent intoa circle of one turn. The field at the center of thecoil is B_1. A similar wire of length L carryingcurrent I is bent into a square of one turn. Thefield at its center is B_2. Then-
1. $B_1 > B_2$
2. $B_1 < B_2$
3. $B_1 = B_2$
4. Nothing can be predicted

171. An electric current is flowing in a very long pin
as shown in the figure. The value of magnetic
flux density at point O will be-



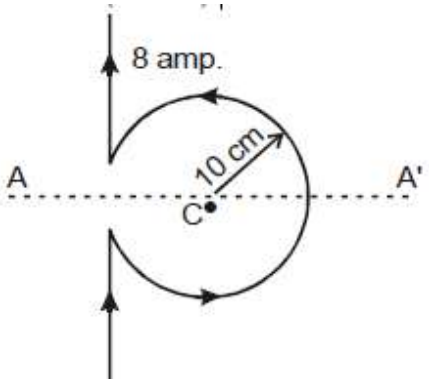
1. $\frac{\mu_0 i}{4\pi R}[\pi+2]$

2. $\frac{\mu_0 i}{4\pi R}[\pi+1]$

3. $\frac{\mu_0 i}{4\pi R}[\pi-2]$

4. $\frac{\mu_0 i}{4\pi R}[\pi-1]$

172. A long, straight wire is turned into a loop of radius 10 cm (as shown in figure). If a current of 8 ampere is passed through the loop, then the value of the magnetic field B at the centre C of the loop will be (Wb/m^2)-



1. 3.424×10^{-5}, vertically upward
2. 3.424×10^{-5} , vertically downward
3. 4.24×10^{-5} , vertically upward
4. 4.24×10^{-5}, vertically downward

173. A 6.28m long wire is turned into a coil of diameter 0.2m and a current of 1 amp. is passed in it. The magnetic induction at its centre will be-
1. 6.28×10^{-5} Tesla

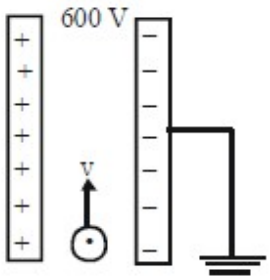
2. 0

3. 6.28 Tesla

4. 6.28×10^{-3} Tesla

174. An α particle is moving in a magnetic field of$(3\hat{\imath}+2\hat{\jmath})$ tesla with a velocity of $5\times10^{5}\ \hat{\imath}$ m/s. Themagnetic force acting on the particle will be-
1. 3.2×10^{-13} dyne
2. 3.2×10^{13} N
3. 0
4. 3.2×10^{-13} N

175. A potential difference of 600 volt is applied across the plates of a parallel plate condenser placed in a magnetic field. The separation between the plates is 3 mm. An electron projected horizontally upward parallel to the plates with a velocity of 2×10^{6} m/s moves undeflected between the plates. The magnitude and direction of the magnetic field in the region between the condenser plates will be (in Wb/m2m2) (Given charge of electron = -1.6×10^{-19} coulomb).



1. 0.1, vertically downward
2. 0.2 vertically downward
3. 0.3 vertically upward
4. 0.4 vertically downward.

176. An α-particle is describing a circle of radius 0.45 m in a field of magnetic induction 1.2 weber/m^2. The potential difference required to accelerate the particle, so as to give this much energy to it (The mass of α-partical is 6.8×10^{-27} kg and its charge is 3.2×10^{-19} coulomb.) will be-
1. 6×10^{6} V

2. 2.3×10^{-12} V

3. 7×10^{6} V

4. 3.2×10^{-12} V

177. A straight horizontal stretch of copper wirecarries a current i = 30 A. The linear mass densityof the wire is 45 g/m. What is the magnitude ofthe magnetic field needed to "float" the wire, that is to be balance its weight?
1. 147 G 2. 441 G
3. 14.7 G 4. 0 G

178. A loop of flexible conducting wire of length0.5 m lies in a magnetic field of 1.0 T perpendicularto the plane of the loop.

The tension developed in the wire if the current is of 1.57A. will be-
1. 0.15 N 2. 0.25 N
3. 0.125 N 4. 0.138 N

179. An ammeter and a voltmeter are connected in series to a battery with an emf E = 6 volt . When a certain resistance is connected in parallel with voltmeter, the reading of latter decreases two times, where as the reading of the ammeter increasing the same number of times. What is ratio of resistance of voltmeter to resistance of ammeter?
1. 2 2. 1/2

3. 1/3 4. 3

180. An ammeter and a voltmeter are connected in series to a battery of an emf E = 6 volt. When a certain resistance is connected in parallel with voltmeter, the reading of voltmeter decreases by two times, where as the reading of the ammeter increases by the same number of times. What would be voltmeter reading before connecting the resistance ?
1. 1 V 2. 2 V
3. 3 V 4. 4 V