



MITTAL CLASSES

IIT-JEE | MEDICAL | FOUNDATION

Paper Code:12M-SP-1

SAMPLE PAPER

Class – XII Med

Time: 2 Hour

M. Marks: 480

General Instructions:

1. Answers have to be marked on the OMR sheet.
2. The question paper consists of 120 multiple choice questions (single correct option) divided into five sections.
Section – A contains 30 questions (Q1 to Q30) of Physics.
Section – B contains 30 questions (Q31 to Q60) of Chemistry.
Section – C contains 60 questions (Q61 to Q120) of Biology.
3. Each question carries **+4** marks for correct answer and **–1** mark for wrong answer.
4. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.
5. Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.
6. Write your Name, Father Name, Class, and Date in the space provided at the bottom of this sheet.

NAME: _____

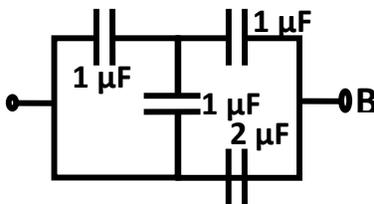
FATHER NAME: _____

CLASS: _____

DATE: _____

7. When a capacitor of value $200 \mu F$ charged to $200V$ is discharged separately through resistance of 2 ohms and 8 ohms, then heat produced in joule will respectively be:
 (A) 4 and 16
 (B) 16 and 4
 (C) 4 and 8
 (D) 4 and 4

8. The equivalent capacitance between points A and B of the circuit shown will be :



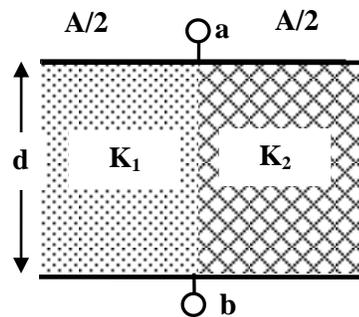
- (A) $\frac{2}{3} \mu F$
 (B) $\frac{5}{3} \mu F$
 (C) $\frac{8}{3} \mu F$
 (D) $\frac{7}{3} \mu F$

9. Two spheres of radii R_1 and R_2 having equal charges are joined together with a copper wire. If V is the potential of each sphere after they are separated from each other, then the initial charge on both spheres was :

- (A) $\frac{V}{k}(R_1 + R_2)$
 (B) $\frac{V}{2k}(R_1 + R_2)$

- (C) $\frac{V}{3k}(R_1 + R_2)$
 (D) $\frac{V(R_1 R_2)}{k(R_1 + R_2)}$

10. The capacity of a parallel plate air capacitor is $10 \mu F$. As shown in the figure this capacitor is divided into two equal parts; these parts are filled by media of dielectric constants $K_1=2$ and $K_2=4$. Capacity of this arrangement will be :



- (A) $20 \mu F$
 (B) $30 \mu F$
 (C) $10 \mu F$
 (D) $40 \mu F$

11. If 10^6 electron/s are flowing through an area of cross section of $10^{-4} m^2$ then the current will be:

- (A) $1.6 \times 10^{-7} A$
 (B) $1.6 \times 10^{-13} A$
 (C) $1 \times 10^{-6} A$
 (D) $1 \times 10^2 A$

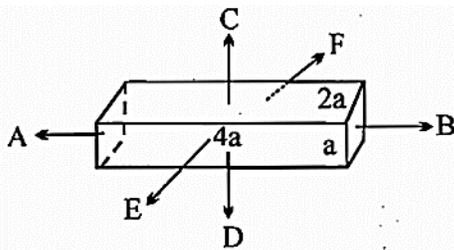
12. Two wires each of radius of cross section r but of different materials are connected together end to end (in series). If the densities of charge

Space for rough work

carriers in the two wires are in the ratio 1:4, the drift velocity of electrons in the two wires will be in the ratio:

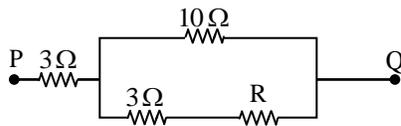
- (A) 1 : 2
- (B) 2 : 1
- (C) 4 : 1
- (D) 1 : 4

13. A conductor with rectangular cross-section has dimensions ($a \times 2a \times 4a$) as shown in figure. Resistance across AB is x , across CD is y and across EF is z . Then



- (A) $x = y = z$
- (B) $x > y > z$
- (C) $y > x > z$
- (D) $x > z > y$

14. In the circuit shown here, what is the value of the unknown resistance R so that the total resistance of the circuit between point 'P' and 'Q' is also equal to R :



- (A) 3Ω
- (B) $\sqrt{39}\Omega$
- (C) $\sqrt{69}\Omega$
- (D) 10Ω

15. Length of a potentiometer wire is kept long and uniform to achieve:
- (A) uniform and more potential gradient
 - (B) non-uniform and more potential gradient
 - (C) uniform and less potential gradient
 - (D) non-uniform and less potential gradient

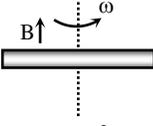
16. A stationary magnet does not interact with
- (A) iron rod
 - (B) moving charge
 - (C) moving magnet
 - (D) stationary charge

17. Radius of current carrying coil is 'R'. Then ratio of magnetic fields at the centre of the coil to the axial point, which is $R\sqrt{3}$ distance away from the centre of the coil :-
- (A) 1:1
 - (B) 1 : 2
 - (C) 1 : 4
 - (D) 8 : 1

18. Which of the following particle will experiences maximum magnetic force, when projected with the same velocity perpendicular to a magnetic field
- (A) electron
 - (B) proton
 - (C) He^+
 - (D) Li^{++}

Space for rough work



19. An electron having mass 'm' and kinetic energy E enters in uniform magnetic field B perpendicularly, then its frequency of uniform circular motion will be: -
- (A) $\frac{eE}{qVB}$
(B) $\frac{2\pi m}{eB}$
(C) $\frac{eB}{2\pi m}$
(D) $\frac{2m}{eBE}$
20. Magnetic field is parallel to the plane of coil then torque will be
(A) Maximum
(B) Minimum
(C) Zero
(D) None of these
21. Susceptibility of a magnetic substance is found to depend on temperature and the strength of the magnetising field. The material is a :-
(A) Diamagnetic
(B) Ferromagnetic
(C) Paramagnetic
(D) Superconductor
22. Which one of the following is ferro-magnetic:-
(A) Co
(B) Zn
(C) Hg
(D) Pt
23. 'SI' unit of magnetic flux is
(A) ampere/meter²
(B) weber
(C) gauss
(D) orested
24. A coil having an area of 2 m² is placed in a magnetic field which changes from 1 Weber/m² to 4 Weber/m² in 2 seconds. The e.m.f. induced in the coil will be:
(A) 4 volt
(B) 3 volt
(C) 2 volt
(D) 1 volt
25. A conducting rod of length 2l is rotating with constant angular speed ω about its perpendicular bisector. A uniform magnetic field \vec{B} exists parallel to the axis of rotation. The emf induced between two ends of the rod is:
- 
- (A) $B\omega\ell^2$
(B) $\frac{1}{2}B\omega\ell^2$
(C) $\frac{1}{8}B\omega\ell^2$
(D) Zero
26. In an AC generator, a coil with N turns, all of the same area A and total resistance R, rotates with frequency ω in a magnetic field B. The maximum value of emf generated in the coil is:
(A) $NAB\omega$
(B) $NABR\omega$
(C) NAB
(D) NABR

Space for rough work



27. A bulb and a capacitor are connected in series to a source of alternating current. If its frequency is increased, while keeping the voltage of the source constant, then
(A) Bulb will give more intense light.
(B) Bulb will give less intense light.
(C) Bulb will give light of same intensity as before
(D) Bulb will stop radiating light.
28. In an AC Circuit decrease in impedance with increase in frequency indicates that circuit has/have :-
(A) Only resistance
(B) Resistance & inductance.
(C) Resistance & capacitance
(D) Resistance, capacitance & inductance
29. An inductor of inductance L and resistor of resistance R are joined in series and connected by a source of frequency ω . Power dissipated in the circuit is :-
(A) $\frac{(R^2 + \omega^2 L^2)}{V}$
(B) $\frac{V^2 R}{(R^2 + \omega^2 L^2)}$
(C) $\frac{V}{(R^2 + \omega^2 L^2)}$
(D) $\frac{\sqrt{R^2 + \omega^2 L^2}}{V^2}$
30. Power dissipated in pure inductance will be :
(A) $\frac{LI^2}{2}$
(B) $2LI^2$
(C) $\frac{LI^2}{4}$
(D) Zero

CHEMISTRY

31. $a \neq b \neq c, \alpha = \gamma = 90^\circ \beta \neq 90^\circ$ represents:
(A) tetragonal system
(B) orthorhombic system
(C) monoclinic system
(D) triclinic system
32. Schottky as well as frenkel defects are observed in the crystal of
(A) NaCl
(B) AgBr
(C) AgCl
(D) $MgCl_2$
33. 4 : 4 Co-ordination is found in
(A) ZnS
(B) CuCl
(C) AgI
(D) All
34. The positions of Cl^- ions in NaCl structure are
(A) Corners of the cube
(B) Centres of faces of the cube
(C) Corners as well as centres of the faces of the cube
(D) Edge centres of the cube

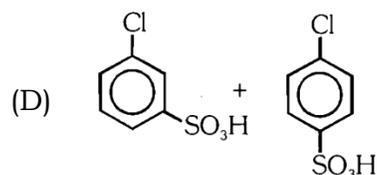
Space for rough work



35. If the coordination number of an element in its crystal lattice is 8, then packing is:
(A) FCC
(B) HCP
(C) BCC
(D) None of the above
36. A tetrahedral void in a crystal implies that
(A) shape of the void is tetrahedral
(B) molecules forming the void are tetrahedral in shape
(C) the void is surrounded tetrahedrally by four spheres
(D) the void is surrounded by six spheres
37. Close packing is maximum in the crystal lattice of
(A) Simple cubic
(B) Face centred
(C) Body centred
(D) Simple cubic and body centred
38. 8g NaOH is dissolved in one liter of solution Its molarity is
(A) 0.8 M
(B) 0.4 M
(C) 0.2 M
(D) 0.1 M
39. What is the normality of 1M H_3PO_4 solution?
(A) 0.5 N
(B) 1.0 N
(C) 2.0 N
(D) 3.0 N
40. Normality of 10% (w/V) H_2SO_4 solution is nearly
(A) 0.1
(B) 0.2
(C) 0.5
(D) 2
41. 1 mol of heptanes ($V.P = 92\text{mm of Hg}$) was mixed with 4 mol of octane ($V.P = 31\text{mm of Hg}$). The vapour pressure of resulting ideal solution is
(A) 46.2 mm of Hg
(B) 40.0 mm of Hg
(C) 43.2 mm of Hg
(D) 38.4 mm of Hg
42. At constant temperature, the osmotic pressure of a solution is:
(A) Directly proportional to the concentration
(B) Inversely proportional to the concentration
(C) Directly proportional to the square of concentration
(D) Directly proportional to the square root of concentration
43. BrF_5 is a :
(A) Interhalogen compound
(B) Pseudohalogen compound
(C) Both the above
(D) None of the above
44. The gas which is used in Holme's signals-
(A) SO_2
(B) PH_3
(C) SO_3
(D) NH_3

Space for rough work

45. SO_2 is not used as :
 (A) Bleaching agent
 (B) Preservative
 (C) Refining petroleum and Sugar
 (D) Germicide –

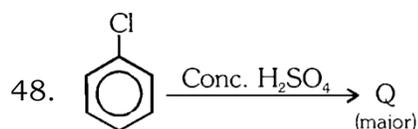


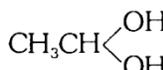
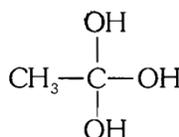
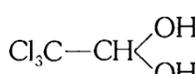
46. Which 16th group element have only positive oxidation state only
 (A) S
 (B) Se
 (C) Te
 (D) Po

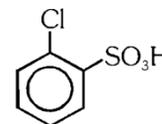
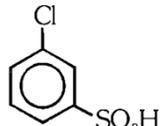
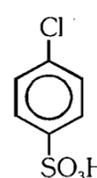
49. Incorrect match is
 (A) Iodoform –Antiseptic
 (B) Pyrene - Fire extinguisher
 (C) Freon 12 - aerosol propellants
 (D) DDT - Fat insoluble

47. NH_3 act as a –
 (A) Lewis acid
 (B) Lewis base
 (C) Amphoteric
 (D) None

50. A compound containing two –OH groups attached with one carbon atoms is unstable but which one of the following is stable



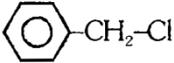
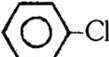
- (A) 
 (B) 
 (C) 
 (D) All

- (A) 
 (B) 
 (C) 

51. Chloroform on reaction with acetone gives:
 (A) Acetylene
 (B) Chloretone
 (C) Nitrochloroform
 (D) Chloroacetone

Space for rough work

52. Which of the following undergoes nucleophilic substitution by S_N1 mechanism at fastest rate

- (A) $\text{CH}_3\text{-CH}_2\text{-Cl}$
 (B) $\text{CH}_3\text{-CH}(\text{Cl})\text{-CH}_3$
 (C) 
 (D) 

53. Which of the following does not turn orange colour of chromic acid to green

- (A) 1° alcohol
 (B) 2° alcohol
 (C) 3° alcohol
 (D) Allyl alcohol

54. Deoxygenation of phenol can be achieved by distillation with:

- (A) Raney nickel
 (B) Lithium aluminium hydride
 (C) Sodium borohydride
 (D) Zinc dust

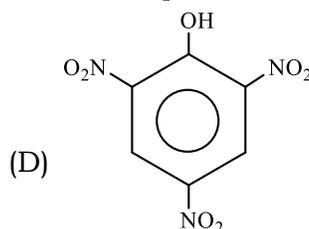
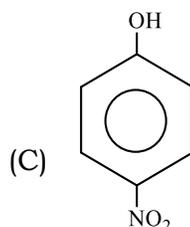
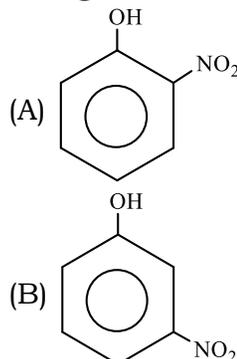
55. The compound A, B and C in the reaction sequence



are given by the set

- (A) $\text{C}_2\text{H}_5\text{Br}$, $\text{CH}_3\text{CH}_2\text{OH}$, CH_3CHBr_2
 (B) $\text{C}_2\text{H}_5\text{Br}$, $\text{CH}\equiv\text{CH}$, $\text{CH}_2=\text{CHBr}$
 (C) $\text{C}_2\text{H}_5\text{Br}$, $\text{CH}_2=\text{CH}_2$, $\text{CH}_2\text{Br}-\text{CH}_2\text{Br}$
 (D) $\text{C}_2\text{H}_5\text{Br}$, $\text{CH}_3\text{CH}_2\text{OH}$, $\text{BrCH}_2-\text{CH}_2\text{Br}$

56. Nitration of phenol with conc. Nitric acid gives:



57. Which of the following alcohols gives a red colour in Victor Meyer Test

- (A) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$
 (B) $\text{CH}_3\text{-CH}(\text{CH}_3)\text{-OH}$
 (C) $(\text{CH}_3)_3\text{C-OH}$
 (D) $\text{CH}_3\text{-CH}(\text{OH})\text{-CH}_2\text{-CH}_3$

Space for rough work



58. The change in the optical rotation of freshly prepared solution of glucose is known as
(A) tautomerism
(B) racemisation
(C) specific rotation
(D) mutarotation
59. Which of the following B group vitamins can be stored in our body.
(A) Vitamin B₁
(B) Vitamin B₂
(C) Vitamin B₆
(D) Vitamin B₁₂
60. Which of the following are polysaccharides-
(a) Starch
(b) Cellulose
(c) Dextrins
(d) Glycogen
(A) a, b and c
(B) a, b, d
(C) a and c
(D) a, b, c, d
63. Megasporophyll is called:
(A) Stamen
(B) Carpel
(C) Ovary
(D) Stigma
64. Which of the following types of embryosac is mostly found in Angiosperm
(A) Bisporic polygonum type
(B) Tetrasporic type
(C) Monosporic - onograd type
(D) Monosporic - polygonum type
65. In Angiosperms all the four microspores of tetrad are covered by a layer which is made up of
(A) Pectocellulose
(B) Callose
(C) Cellulose
(D) Sporopollenin
66. Nucellus is found in
(A) Cell
(B) Pollen
(C) Ovule
(D) Leaf

BIOLOGY

61. Essential whorls of a flowers are
(A) Calyx and Corolla
(B) Corolla and Gynoecium
(C) Androecium and Gynoecium
(D) All of the above
62. Which one is female gametophyte
(A) Embryo
(B) Embryosac
(C) Endosperm
(D) Pistil
67. Pollen grains are able to withstand extremes of temperature and dessication because their exine is composed of
(A) Cutin
(B) Suberin
(C) Sporopollenin
(D) Callose
68. Which structure of the ovule is diploid
(A) Nucellus
(B) Integuments
(C) Sec. nucleus
(D) All of the above

Space for rough work

69. Which of the following promotes pollen germination and tube growth

- (A) Starch
- (B) Boron
- (C) Calcium
- (D) Potassium

70. After fertilization the seed is developed from

- (A) Ovule
- (B) Ovary
- (C) Nucellus
- (D) Endosperm

71. Water of coconut is

- (A) Endosperm
- (B) Nucellus
- (C) Endocarp
- (D) Mesocarp

72. In which part of embryo maximum growth takes place in hypogeal germination

- (A) Plumule
- (B) Radicle
- (C) Epicotyl
- (D) Hypocotyl

73. Humans are ____ and ____ organisms.

- (A) Sexually reproducing, oviparous
- (B) Asexually reproducing, ovoviviparous
- (C) Asexually reproducing, viviparous
- (D) Sexually reproducing, viviparous

74. The correct chronological order of the following events is

- (A) Gametogenesis → Fertilization → Insemination → Gestation → Implantation → Parturition

(B) Gametogenesis → Insemination → Fertilization → Implantation → Gestation → Parturition

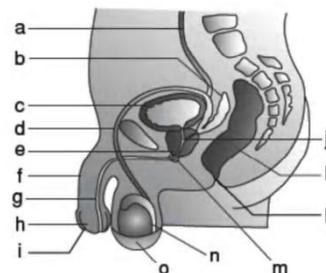
(C) Gametogenesis → Insemination → Fertilization → Implantation → Gestation → Parturition

(D) None of these

75. An adult testes is oval in shape. Its width is about ____ and length is about respectively.

- (A) 4 to 5 cm, 2 to 3 cm
- (B) 2 to 5 cm, 1 to 3 cm
- (C) 2 to 3 cm, 4 to 5 cm
- (D) 2 to 5 cm, 4 to 7 cm

76. What is indicated by 'b' in the figure?

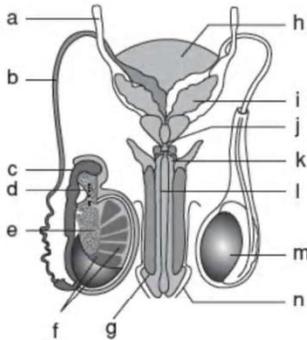


- (A) Prostate gland
- (B) Bulbourethral gland
- (C) Ureter
- (D) Seminal vesicle

Space for rough work

77. Select the correct anatomical sequence.
 (A) Seminiferous tubules → Rete testis → Vasa efferentia → Vasa deferens → Epididymis
 (B) Seminiferous tubules → Rete testis → Vasa efferentia → Epididymis → Vasa deferens
 (C) Seminiferous tubules → Vasa efferentia → Rete testis → Vasa deferens → Epididymis
 (D) None of these

78. What does 'k' represent?



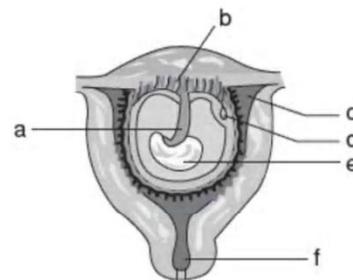
- (A) Prostate
 (B) Urinary bladder
 (C) Seminal vesicle
 (D) Bulbourethral gland
79. Which of the following statements about ovary is not true?
 (A) Ovaries are responsible for the production of several steroid hormones.
 (B) Each ovary is about 4 to 6 cm in length.
 (C) Ovary is connected to the pelvic wall.
 (D) Ovary produces female gamete (Ovum).

80. Each oviduct is about ____ long.
 (A) 5 to 6mm
 (B) 10 to 12 cm
 (C) 10 to 12 mm
 (D) 5 to 6 cm

81. Isthmus a part of oviduct. is a narrow lumen and joins
 (A) Uterus
 (B) Ampulla
 (C) Infundibulum
 (D) Both (A) and (B)

82. Birth canal is formed by
 (A) Cervical canal + Uterus
 (B) Cervical canal + Vagina
 (C) Cervical canal + Isthmus
 (D) Cervical canal + Fallopian tube

83. What does 'a' represent in the figure?



- (A) Umbilical cord
 (B) Embryo
 (C) Yolk sac
 (D) Placental villi
84. The layer of uterine tissues responsible for strong contractions during childbirth is
 (A) Perimetrium
 (B) Myometrium
 (C) Mesoderm
 (D) Myocardium

Space for rough work



85. What is the full form of WHO?
(A) Ware House Organization
(B) War and Health Organization
(C) World Health Office
(D) World Health Organization
86. The programme of 'Family Planning' was initiated in the year
(A) 1950
(B) 1947
(C) 1949
(D) 1951
87. Statutory ban has been laid on _____ to check female foeticide.
(A) Choriocentesis
(B) Amniocentesis
(C) Uterocentesis
(D) Embryocentesis
88. The world population was 2000 million in the year
(A) 1980
(B) 1970
(C) 1960
(D) 1990
89. IMR stands for
(A) Indigenous Mortality Rate
(B) Infant Migratory Rate
(C) Infant Mortality Rate
(D) Infant Mitigation Rate
90. Many couples in the urban working areas have adopted the _____ norm.
(A) Two child
(B) One child
(C) No child
(D) Three child
91. Mendel was born in
(A) 17th century
(B) 18th century
(C) 19th century
(D) 8th century
92. In 1900 CE. three biologists independently discovered Mendel's principles. They are
(A) De Vries, Correns and Tschermak
(B) Sutton, Morgan and Bridges
(C) Avery, MacLeod and McCarty
(D) Bateson, Punnet and Bridges
93. An allele is said to be dominant if
(A) It is expressed only in heterozygous combination.
(B) It is expressed only in homozygous combination.
(C) It is expressed in both homozygous and heterozygous condition.
(D) It is expressed only in second generation.
94. Which genotype characterizes an organism that is heterozygous for two genes?
(A) RRYy
(B) RrYY
(C) RRYy
(D) RrYy
95. Mendel's law of heredity can be explained with the help of
(A) Mitosis
(B) Meiosis
(C) Both mitosis and meiosis
(D) None of these

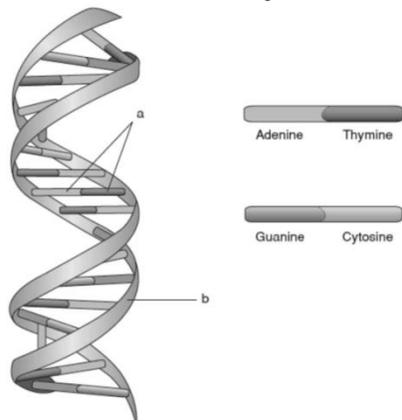
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96. A cross between a homozygous recessive and a heterozygous plant is called
(A) Monohybrid cross
(B) Dihybrid cross
(C) Test cross
(D) Back cross
97. In dihybrid cross, out of 16 plants obtained, the number of genotypes will be
(A) 4
(B) 9
(C) 16
(D) 12
98. From a cross $Aa BB \times aa BB$, which of the following genotypic ratio will be obtained in F_1 generation?
(A) 1 $Aa BB$: 1 $aa BB$
(B) 1 $Aa BB$: 3 $aa BB$
(C) 3 $Aa BB$: 1 $aa BB$
(D) All $Aa BB$: No $aa BB$
99. How many different types of genetically different gametes will be produced by a heterozygous plant having the genotype $AABbCc$?
(A) 2
(B) 4
(C) 6
(D) 9
100. How many contrasting traits are chosen by Mendel?
(A) 7
(B) 14
(C) 21
(D) 4
101. Select the false statement from the following:
(A) Mendel for the first time applied statistical analysis and mathematical logics to problems in biology.
(B) Mendel's experiment had a large sampling size, which gave greater credibility to the data that he collected.
(C) Mendel conducted artificial cross-pollination experiment using true-breeding pea lines.
(D) Mendel selected 14 true-breeding pea plant varieties, as pairs which were similar except for two characters with contrasting traits.
102. In Mendelian dihybrid cross, how many of progeny in F_2 generation possess genotype $rryy$?
(A) $\frac{1}{16}$
(B) $\frac{2}{16}$
(C) $\frac{3}{16}$
(D) $\frac{4}{16}$

Space for rough work

103. What is indicated by a' in the figure?

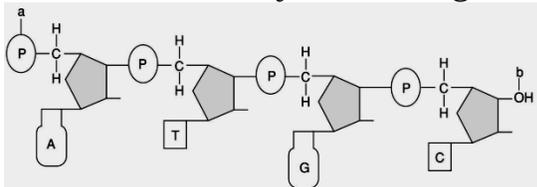


- (A) Sugar
- (B) Phosphate
- (C) Base pairs
- (D) Singular bases

104. The process of making RNA from DNA is termed as

- (A) Transaction
- (B) Transformation
- (C) Transcription
- (D) Transduction

105. What is indicated by 'b' in the figure?

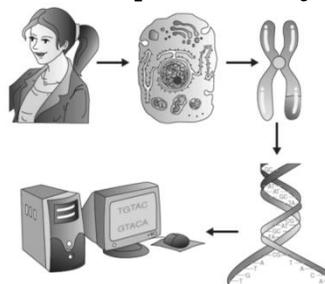


- (A) 5' phosphate
- (B) 3' phosphate
- (C) Ribose sugar
- (D) Nitrogen base

106. Bacteriophage lambda has _____ base pairs in nucleic acid (genetic material).

- (A) 48205
- (B) 5386
- (C) 48502
- (D) 45802

107. What is represented by the figure?



- (A) Criminal/Suspect identification
- (B) Human genome project
- (C) Recombinant DNA technology
- (D) Development of Bioinformatics

108. Uracil is associated with which sugar?

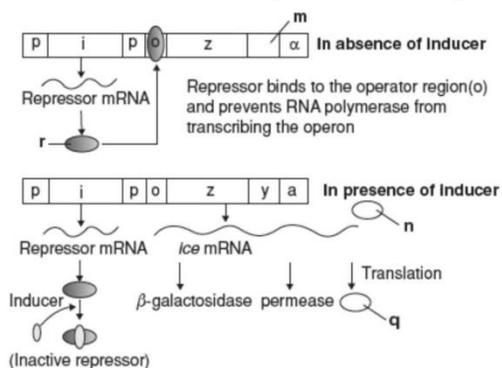
- (A) Generally Deoxyribose
- (B) Sometimes Ribose
- (C) Only ribose
- (D) Hexose

109. Thymine can also be designated as

- (A) 3 - Methyl uracil
- (B) 2 - Methyl uracil
- (C) 4 - Methyl uracil
- (D) 5 - Methyl Uracil

Space for rough work

110. What is indicated by 'n' in the figure?



- (A) Induction
- (B) Replication
- (C) Transcription
- (D) Derepression

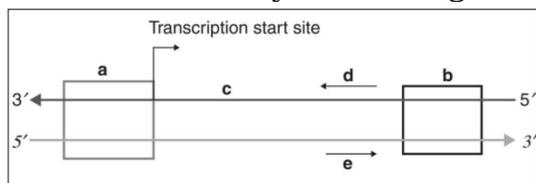
111. DNA has two strands which are _____ to each other.

- (A) Supplementary
- (B) Complementary
- (C) Opposite
- (D) Perpendicular

112. Which of the following holds true in case of DNA?

- (A) A = T
- (B) Adenine forms two H-bond with thymine
- (C) Adenine forms one π bond with thymine
- (D) Both (A) and (B)

113. What is indicated by 'b' in the figure?



- (A) Promoter
- (B) Terminator
- (C) Structural gene
- (D) Template strand
- (e) Coding strand

114. Which of the unusual metabolic process is shown by viruses?

- (A) DNA to RNA
- (B) RNA to DNA
- (C) Proteins to RNA
- (D) None of these

115. Amniocentesis is:-

- (A) Analysis of chemical composition of fluids of pregnant woman
- (B) Withdrawal of allantoic fluid from pregnant women
- (C) An in vitro diagnosis
- (D) Culturing of cells and study of metaphase chromosomes from amniotic fluid to identify chromosomal abnormality

116. Purpose of tubectomy is to prevent:-

- (A) Egg formation
- (B) Embryonic development
- (C) Fertilization
- (D) Coitus

117. A contraceptive pill contains:

- (A) Progesterone and estrogen
- (B) Spermicidal salts
- (C) Chemicals that cause automatic abortion
- (D) Chemicals that prevent fertilization of ovum

118. Oral contraceptives contain :-

- (A) Progesterone
- (B) LH
- (C) Oxytocin
- (D) Steroles

Space for rough work



119. Which is related to males
(A) I.U.C.D.
(B) Tubectomy
(C) Vesectomy
(D) None of the above
120. First country of world which adopt family planning programme –
(A) Japan
(B) USA
(C) India
(D) Bangladesh

Space for rough work