B
CODE

All India Pre-Medical/Pre-Dental Common Entrance Examination Conducted by CBSE [AIPMT (Pre.)-2011]

Date : 03-04-2011 **Duration : 3 Hours** **Max. Marks : 800**

IMPORTANT INSTRUCTIONS

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on **Side-1** and **Side-2** carefully with **blue/black** ball point pen only.

2. The test is of **3 hours** duration and Test Booklet contains 200 questions. Each question carries 4 marks. For each correct response, the candidate will get **4 marks**. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **800**.

3. Use **Blue/Black Ball Point Pen** only for writing particulars on this page/marking responses.

4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

5. **On completion of the test, the candidate must havdover the Answer Sheet to the invigilator in the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**

6. The CODE for this Booklet if B. Make sure that the CODE printed on **Side-2** of the Answer Sheet is the same as that on this Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklets and the Answer Sheets.

7. The Candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your roll no. anywhere else except in the specified space in the Test Booklet/Answer Sheet.

8. Use of white fluid for correction is NOT permissible on the Answer Sheet.

Name of the Candidate (in Capitals): _____

Roll Number : in figures _____

Centre of Examination (in Capitals) : _____

Candidate's Signature: _____ Invigilator's Signature: _____

Fascimile signature stamp of
Centre Superintendent : _____

PART - A (CHEMISTRY)

1. Considering the state of hybridization of carbon atoms, find out the molecule among the following which is linear ?

(1) $CH_3–CH=CH–CH_3$ (2) $CH_3–C\equiv C–CH_3$

(3) $CH_2=CH–CH_2–C\equiv CH$ (4) $CH_3–CH_2–CH_2–CH_3$

2. In the following reactions,

(a) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3 \xrightarrow{H^+/\text{Heat}} \underset{\text{(Major product)}}{A} + \underset{\text{(Minor product)}}{B}$

(b) $A \xrightarrow[\text{in absence of peroxide}]{\text{HBr, dark}} \underset{\text{(Major product)}}{C} + \underset{\text{(Minor product)}}{D}$

the major products (A) and (C) are respecitvely :

(1) $CH_2=\underset{\displaystyle CH_3}{\underset{|}{C}}-CH_2-CH_3$ and $CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-CH_3$ (Br)

(2) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}=CH-CH_3$ and $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}-CH_2-CH_3$ (Br)

(3) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}=CH-CH_3$ and $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH-CH_3$ (Br)

(4) $CH_2=\underset{\displaystyle CH_3}{\underset{|}{C}}-CH_2-CH_3$ and $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}-CH_2-CH_3$ (Br)

3. Standard electrode potential of three metals X, Y and Z are – 1.2 V, + 0.5 V and – 3.0 V respectively. The reducing power of these metals will be :

(1) Y > Z > X (2) X > Y > Z (3) Z > X > Y (4) X > Y > Z

4. The total number of atomic orbitals in fourth energy level of an atom is :

(1) 8 (2) 16 (3) 32 (4) 4

5. Which of the following has the minimum bond length ?

(1) O_2^+ (2) O_2^- (3) O_2^{2-} (4) O_2

6. If x is amount of adsorbate and m is amount of adsorbent, which of the following relations is not related to adsorption process ?

(1) $x / m = f(p)$ at constant T. (2) $x / m = f(T)$ at constant p.

(3) $p = f(T)$ at constant (x / m). (4) $\frac{x}{m} = p \times T$

7. A buffer solution is prepared in which the concentration of NH_3 is 0.30 M and the concentration of NH_4^+ is 0.20 M. If the equilibrium constant, K_b for NH_3 equals 1.8×10^{-5}, what is the pH of this solution ? (log 2.7 = 0.433).

(1) 9.08 (2) 9.43 (3) 11.72 (4) 8.73

8. The electrode potentials for

$Cu^{2+}_{(aq)} + e^- \longrightarrow Cu^{+}_{(aq)}$ and $Cu^{+}_{(aq)} + e^- \longrightarrow Cu_{(s)}$

are +0.15 V and + 0.50 respectively. The value of $E^\circ_{Cu^{2+}/Cu}$ will be :

(1) 0.500 V (2) 0.325 V (3) 0.650 V (4) 0.150 V

9. For the four successive transion elements (Cr, Mn, Fe and Co), the stability of +2 oxidation state will be there in which of the following order ?

(1) Mn > Fe > Cr > Co (2) Fe > Mn > Co > Cr

(3) Co > Mn > Fe > Cr (4) Cr > Mn > Co > Fe

(At. nos. Cr = 24, Mn = 25, Fe = 26, Co = 27)

10. Which one of the following statements for the order of a reaction is incorrect ?

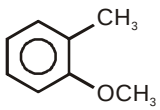
(1) Order can be determined only experimentally.

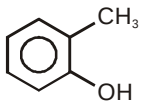
(2) Order is not influenced by stoichiometric coefficient of the reactants.

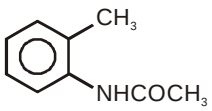
(3) Order of reaction is sum of power to the concentration terms of reactants to express the rate of reaction.

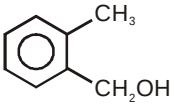
(4) Order of reaction is always whole number.

11. Which one of the following is most reactive towards electrophilic reagent ?

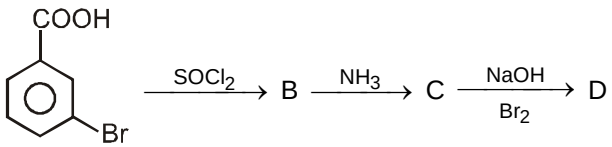
(1) 

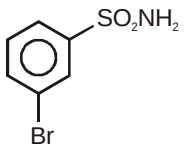
(2) 

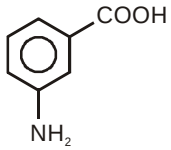
(3) 

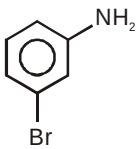
(4) 

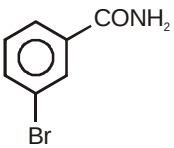
12. In a set of reactions m-bromobenzoic acid gave a product D. Identify the product D.



(1) 

(2) 

(3) 

(4) 

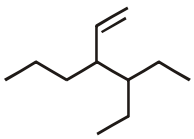
13. Which of the two ions from the list given below that have the geometry that is explained by the same hybridization of orbitals, NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^- ?
(1) NO_2^- and NO_3^- (2) NO_4^+ and NO_3^- (3) SCN^- and NH_2^- (4) NO_2^- and NH_2^-

14. Which of the following is least likely to behave as Lewis base ?
(1) H_2O (2) NH_3 (3) BF_3 (4) OH^-

15. Which one of the following statements is not true regarding (+) Lactose ?
(1) On hydrolysis (+) Lactose gives equal amount of D(+) glucose and D(+) galactose.
(2) (+) Lactose is a β-glycoside formed by the union of a molecule of D(+) glucose and a molecule of D(+) galactose.
(3) (+) Lactose is a reducting sugar and does not exhibit mutarotation.
(4) (+) Lactose, $C_{12}H_{22}O_{11}$ contains 8-OH groups.

16. The freezing point depression constant for water is – 1.86ºC m^{-1}. If 5.00 g Na_2SO_4 is dissolved in 45.0 g H_2O, the freezing point is changed by – 3.82ºC. Calculate the van't Hoff factor for Na_2SO_4.
(1) 2.05 (2) 2.63 (3) 3.11 (4) 0.381

17. Of the following complex ions, which is diamagnetic in nature ?
(1) $[NiCl_4]^{2-}$ (2) $[Ni(CN)_4]^{2-}$ (3) $[CuCl_4]^{2-}$ (4) $[CoF_6]^{3-}$

18. The correct IUPAC name of the compound  is :

(1) 4-Ethyl-3-propyl hex-1-ene
(2) 3-Ethyl-4-ethenyl heptane
(3) 3-Ethyl-4-propyl hex-1-ene
(4) 3-(1-ethylpropyl) hex-1-ene

19. By what factor does the average velocity of a gaseous molecule increase when the temperature (in Kelvin) is doubled ?
(1) 2.0 (2) 2.8 (3) 4.0 (4) 1.4

20. Which one of the following statement is **not** true ?
(1) pH of drinking water should be between 5.5 - 9.5.
(2) Concentration of DO below 6 ppm is good for the growth of fish.
(3) Clean water would have a BOD value of less than 5 ppm.
(4) Oxides of sulphur, nitrogen and carbon are the most widespread air pollutant.

21. Name the type of the structure of silicate in which one oxygen atom of $[SiO_4]^{4-}$ is shared ?
(1) Linear chain silicate
(2) Sheet silicate
(3) Pyrosilicate
(4) Three dimensional

22. Two gases A and B having the same volume diffuse through a porous partition in 20 and 10 seconds respectively. The molecular mass of A is 49 u. Molecular mass of B will be :

(1) 50.00 u (2) 12.25 u (3) 6.50 u (4) 25.00 u

23. In Dumans' method of estimation of nitrogen 0.35 g of an organic compound gave 55 mL of nitrogen collected at 300 K temperature and 715 mm pressure. The percentage composition of nitrogen in the compound would be : (Aqueous tension at 300 K = 15 mm)

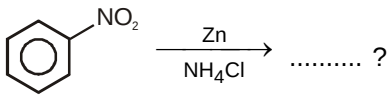
(1) 15.45 (2) 16.45 (3) 17.45 (4) 14.45

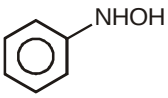
24. Which one of the following is employed as Antihistamine ?

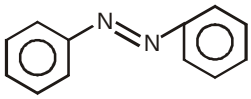
(1) Chloramphenicol (2) Diphenyl hydramine

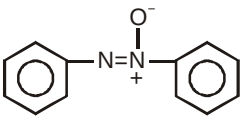
(3) Norothindrone (4) Omeprazole

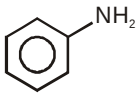
25. What is the product obtained in the following reaction :



(1) 

(2) 

(3) 

(4) 

26. Standard electrode potential for Sn^{4+} / Sn^{2+} couple is + 0.15 V and that for the Cr^{3+} / Cr couple is – 0.74 V. These two couples in their standard state are connected to make a cell. The cell potential will be :

(1) +1.19 V (2) +0.89 V (3) +0.18 V (4) +1.83 V

27. The van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively :

(1) less than one and greater than one. (2) less than one and less than one.

(3) greater than one and less than one. (4) greater than one and greater than one.

28. The Lassaigne's extract is boiled with conc. HNO_3 while testing for halogens. By doing so it :

(1) decomposes Na_2S and NaCN, if formed. (2) helps in the precipitation of AgCl.

(3) increases the solubility product of AgCl. (4) increases the concentration of NO_3^- ions.

29. The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths i.e. λ_1 and λ_2 will be :

(1) $\lambda_1 = \lambda_2$ (2) $\lambda_1 = 2\lambda_2$ (3) $\lambda_1 = 4\lambda_2$ (4) $\lambda_1 = \frac{1}{2}\lambda_2$

30. A gaseous mixture was prepared by taking equal mole of CO and N_2. If the total pressure of the mixture was found 1 atmosphere, the partial pressure of the nitrogen (N_2) in the mixture is :
(1) 0.5 atm (2) 0.8 atm (3) 0.9 atm (4) 1 atm

31. Mole fraction of the solute in a 1.00 molal aqueous solution is :
(1) 0.1770 (2) 0.0177 (3) 0.0344 (4) 1.7700

32. Clemmensen reduction of a ketone is carried out in the presence of which of the following ?
(1) Glycol with KOH (2) Zn-Hg with HCl (3) Li Al H_4 (4) H_2 and Pt as catalyst

33. Acidified $K_2Cr_2O_7$ solution turns green when Na_2SO_3 is added to it. This is due to the formation of :
(1) $Cr_2(SO_4)_3$ (2) CrO_4^{2-} (3) $Cr_2(SO_3)_3$ (4) $CrSO_4$

34. Which of the following elements is present as the impurity to the maximum extent in the pig iron ?
(1) Manganese (2) Carbon (3) Silicon (4) Phosphorus

35. If the enthalpy change for the transition of liquid water to steam is 30 kJ mol^{-1} at 27ºC, the entropy change for the process would be :
(1) 10 J mol^{-1} K^{-1} (2) 1.0 J mol^{-1} K^{-1} (3) 0.1 J mol^{-1} K^{-1} (4) 100 J mol^{-1} K^{-1}

36. Which of the following compounds has the lowest melting point ?
(1) $CaCl_2$ (2) $CaBr_2$ (3) CaI_2 (4) CaF_2

37. The complexes $[Co(NH_3)_6]$ $[Cr(CN)_6]$ and $[Cr(NH_3)_6]$ $[Co(CN)_6]$ are the examples of which type of isomerism?
(1) Linkage isomerism (2) Ionization isomerism
(3) Coordination isomerism (4) Geometrical isomerism

38. The complex, $[Pt(Py)(NH_3)BrCl]$ will have how many geometrical isomers ?
(1) 3 (2) 4 (3) 0 (4) 2

39. Enthalpy change for the reaction, $4H_{(g)} \longrightarrow 2H_{2(g)}$ is – 869.6 kJ.
The dissociation energy of H–H bond is :
(1) – 434.8 kJ (2) – 869.6 kJ (3) + 434.8 kJ (4) + 217.4 kJ

40. The d-electron configurations of Cr^{2+}, Mn^{2+}, Fe^{2+} and Co^{2+} are d^4, d^5, d^6 and d^7 respectively. Which one of the following will exhibit minimum paramagnetic behaviour ?
(1) $[Mn(H_2O)_6]^{2+}$ (2) $[Fe(H_2O)_6]^{2+}$ (3) $[Co(H_2O)_6]^{2+}$ (4) $[Cr(H_2O)_6]^{2+}$
(At, nos. Cr = 24, Mn = 25, Fe = 26, Co = 27)

41. Which of the following is correct option for free expansion of an ideal gas under adiabatic condition ?
(1) $q = 0, \Delta T \neq 0, w = 0$ (2) $q \neq 0, \Delta T = 0, w = 0$
(3) $q = 0, \Delta T = 0, w = 0$ (4) $q = 0, \Delta T < 0, w \neq 0$

42. The value of ΔH for the reaction

$X_{2(g)} + 4Y_{2(g)} \rightleftharpoons 2XY_{2(g)}$ is less than zero. Formation of $XY_{4(g)}$ will be favoured at :

(1) High temperature and high pressure. (2) Low pressure and low temperature.

(3) High temperature and low pressure. (4) High pressure and low temperature.

43. The correct order of increasing bond length of C–H, C–O, C–C and C=C is :

(1) C–H < C=C < C–O < C–C (2) C–C < C=C < C–O < C–H

(3) C–O < C–H < C–C < C=C (4) C–H < C–O < C–C < C=C

44. If the E°_{cell} for a given reaction has a negative value, then which of the following gives the correct relationships for the values of ΔG° and K_{eq} ?

(1) $\Delta G^{\circ} > 0$; $K_{eq} > 1$ (2) $\Delta G^{\circ} < 0$; $K_{eq} > 1$ (3) $\Delta G^{\circ} < 0$; $K_{eq} < 1$ (4) $\Delta G^{\circ} > 0$; $K_{eq} < 1$

45. Which one is a nucleophilic substitution reaction among the following ?

(1) $CH_3–CH=CH_2 + H_2O \xrightarrow{H^+} CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

(2) $RCHO + R'MgX \longrightarrow R-\underset{\displaystyle OH}{\underset{|}{CH}}-R'$

(3) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2Br \longrightarrow CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2NH_2$

(4) $CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN$

46. Which of the following pairs of metals is purified by van Arkel method ?

(1) Ga and In (2) Zr and Ti (3) Ag and Au (4) Ni and Fe

47. For the reaction $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$, the equilibrium constant is K_1. The equilibrium constant is K_2 for the reaction $2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$. What is K for the reaction $NO_2(g) \rightleftharpoons \frac{1}{2}N_2(g) + O_2(g)$?

(1) $1 / (2K_1K_2)$ (2) $1 / (4K_1K_2)$ (3) $[1 / K_1K_2]^{1/2}$ (4) $1 / (K_1K_2)$

48. Which one of the following is present as an active ingredient in bleaching powder for bleaching action ?
(1) $CaOCl_2$ (2) $Ca(OCl)_2$ (3) CaO_2Cl (4) $CaCl_2$

49. Of the following which one is classified as polyester polymer ?
(1) Tertylene (2) Backelite (3) Melamine (4) Nylone-66

50. If n = 6, the correct sequence for filling of electrons will be :
(1) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$ (2) $ns \rightarrow (n-1)d \rightarrow (n-2)f \rightarrow np$
(3) $ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$ (4) $ns \rightarrow np(n-1)d \rightarrow (n-2)f$

PART - B (BIOLOGY)

51. What will you look for to identify the sex of the following
(1) Female Ascaris-Sharply curved posterior end
(2) Male frog-A copulatory pad on the first digit of the hind limb
(3) Female cokroach- Anal cerci
(4) Male shark -Claspers borne on pelvic fins

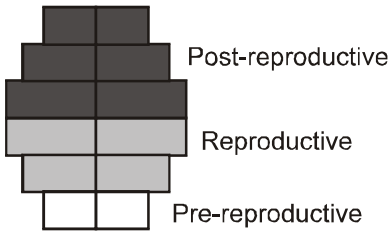
52. 'Filiform apparattus is a characteristic feature of:
(1) Suspensor (2) Egg (3) Synergid (4) Zygote

53. "Jaya" and "Ratna" dveloped for green revolution in India are the varieties of
(1) Maize (2) Rice (3) Wheat (4) Bajra

54. A prokaryotic autotrophicnitrogen fixing symbiont is found in :
(1) Alnus (2) Cycas (3) Cicer (4) Pisum

55. One very special feature in the earthworm pheretima is that
(1) Fertilisation for eggs occurs inside the body
(2) The typhlosole greatly increases the effective absorption area of the digested food in the intestine
(3) The S- shaped setae embedded in the integument are the defensive weapons used against the enemies
(4) It has a long dorsal tubular heart

56. What type of human population is represented by the following age pyramid



(1) Vanishing population (2) Stable population (3) Declining population (4) Expanding population

57. Mass of living matter ata trophic level in an area at any time is called
(1) Standing crop (2) Deteritus (3) Humus (4) Standing state

58. Given below is a sample of a portion of DNA strand. What is so special shown in it
5' —— GAATTC ——3'
3' —— CTTAAG ——5'
(1) Replication completed (2) Deletion mutation
(3) Start codon at the 5' end (4) Palindromic sequence of base pairs

59. The most common substrate used in distilleries for the production of ethanol is
(1) Corn meal (2) Soya meal (3) Ground gram (4) Molasses

60. Ground tissue includes
(1) All tissues external to endodermis (2) All tissues except epidermis and vascular bundles
(3) Epidermis and cortex (4) All tissues is internal to endodermis

61. Eutrophication is often seen in
(1) Deserts (2) Fresh water lakes (3) Ocean (4) Mountains

62. Which one of the following elements in plants is not remobilised
(1) Phosphorus (2) Calcium (3) Potassium (4) Sulphur

63. Where will you look for the sporozoites of the malarial parasite?
(1) Saliva of infected female Anophelesmosquito
(2) red blood corpuscles of humans suffering from malaria
(3) Spleen of infectd humans
(4) Salivary glands of freshly moulted female Anopheles mosquito

64. 'Himgiri' developed by hybridisation and selection for disease resistance against rust pathogens is a variety of
(1) Chilli (2) Maize (3) Sugarcane (4) Wheat

65. Of the total incident solar radiation the proportion of PAR is :
(1) About 70% (2) About 60% (3) Less than 50% (4) More than 80%

66. Which one of the following is not a part of a renal pyramid.
(1) Peritubular capillaries (2) Convoluted tubules
(3) Collecting ducts (4) Loops of Henle

67. Which one of the following expanded forms of the following acronyms is **correct**
(1) IPCC= International Panel for Climate Change
(2) UNEP = United Nations Environmental Policy
(3) EPA = Environmental Pollution Agency
(4) IUCN = International Union for Conservation of Nature and Natural Resources

68. Which one of following pairs of gases are the major cause of "Greenhouse effect"
(1) CO_2 and O_3 (2) CO_2 and CO (3) CFCs and SO_2 (4) CO_2 and N_2O

69. Which one of the following conditions **correctly** describes the manner of determining the sex in the given example
(1) Homozygous sex chromosomes (ZZ) determine female sex in Birds .
(2) XO type of sex chromosomes determine male sex in grasshopper
(3) XO condition in human as found in Turner Syndrome, determines female sex.
(4) Homozygous sex chromosomes (XX) produce male in *Drosophila.*

70. Nucellar polyembryony is reported in species
(1) Citrus (2) Gossypium (3) Triticum (4) Brassica

71. Important site for formatition of glycoproteins and Glycolipids in
(1) Vacuole (2) Golgi apparatus (3) Plastid (4) Lysosome

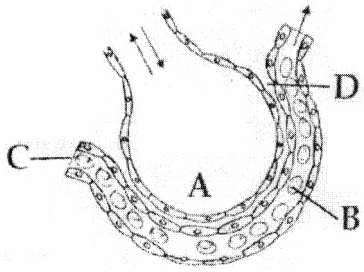
72. Which one of the following is not a biofertilizer
(1) Agrobacterium (2) Rhizobium (3) Nostoc (4) Mycorrhiza

73. Secondary sewage treatment is mainly a
(1) Physical process (2) Mechanical process (3) Chemical process (4) Biological process

74. At which stage of HIV infection does one usually show symptoms of AIDS
(1) When the infecting retrovirus enters host cells
(2) When viral DNA is produced by reverse trancriptase
(3) When HIV repliates reapidly in helper T-lymphocytes and damages large number of these
(4) Within 15 day of sexual contact with an infected person.

75. In which one of the following pollination is autogamous
(1) Geitonogamy (2) Xenogamy (3) Chasmogamy (4) Cleistogamy

76. The figure given below shows a small part of human lung where exchange of gases takes place. In which one of the options given below, the one part **A, B, C or D** is **correctly** indentified along with its function.



Options :
(1) **C :** arterial capillary - passes oxygen to tissues
(2) **A :** alveolar cavity - mains site of exchange of respiratory gases
(3) **D :** Capillary wall - exchange of O_2 and CO_2 takes place here.
(4) **B :** red blood cell - transport of CO_2 mainly

77. 'Bundle of His' is a part of which one of the following organs is humans
(1) Brain (2) Heart (3) Kidney (4) Pancreas

78. Which of the following is mainly produced by the activity of anaerobic bacteria on sewage
(1) Laughing gas (2) Propane (3) Mustard gas (4) Marsh gas

79. The "Eyes" of the potato tuber are
(1) root buds (2) flower buds (3) shoot buds (4) axillary buds

80. Match the source gland with respective hormone as well the function.

	Source gland	**Hormone**	**Function**
1	Anterior pituitary	Oxytocin	Contraction of uterus muscles during child birht
2	Posterior pituitary	Vasopressin	Stimulates resorption of water in the distal tubules in the nephron
3	Corpus luteum	Estrogen	Supports pregnancy
4	Thyroid	Thyroxine	Regulates blood calcium level

81. Which one of the following have the highest number of species is nature
(1) Fungi (2) Insects (3) Birds (4) Angiosperms

82. Which one of the following statements is correct ?
(1) In tomato, fruit is a capsule (2) Seeds of orchids have oil-rich endosperm
(3) Placentation in primose is basal (4) Flower of tulip is a modified shoot

83. Peptide synthesis inside a cell takes place in :
(1) Chloroplast (2) Mitochondria (3) Chromoplast (4) Ribosomes

84. Which one of the following groups of animals is correctly matched with its one characteristic feature without even a single exception ?
(1) Reptilia : possess 3 - chambered heart with one incompletely divided ventricle
(2) Chordata : possess a mouth provided with an upper and lower jaw
(3) Chondrichthyes : possess cartilanginous endoskeleton
(4) Mammalia : give birth to young one.

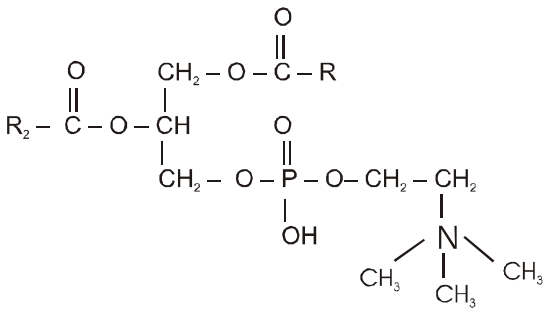
85. Large Woody Vines are more commonly found in :
(1) Temperate forest (2) Mangroves (3) Tropical rainforests (4) Alpine forests

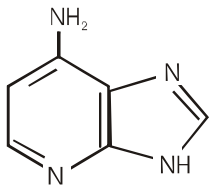
86. An organism used as a biofertilizer for raising soyabean crops is :
(1) Azotobacter (2) Azospirillum (3) Rhizobium (4) Nostoc

87. Which one of the following plasma proteins is involved in the coagulation of blood ?
(1) an albumin (2) serum amylase (3) a globulin (4) Fibrinogen

88. Ethanol is commercially produced through a particular species of :
(1) Saccharomyces (2) Clostridium (3) Trichoderma (4) Aspergillus

89. Which one of the following structural formulae of two organic compounds is correctly identified along with its related function ?





(1) B : Adenine - a nucleotide that makes up nucleic acids
(2) A : Triglyceride - major source of energy
(3) B : Uracil - a component of DNA
(4) A : Lecithin - a component of cell membrane

90. Which one of the following organisms is not an example of eukaryotic cells ?
(1) Paramecium caudatum (2) Escherichia coli
(3) Euglena viridis (4) Amoeba proteus

91. Given below is an incomplete table about certain hormones, their source glands and one major effect of each on the body in humans. Identify the correct option for the three blanks A, B and C.

GLAND	SECRETION	EFFECT ON BODY
A	Oestrogen	Maintenance of secondary sexual characters
Alpha cells of islets of Langerhans	B	Raises blood sugar level
Anterior pituitary	C	Over secretion leads to gigantism

Options :

	A	B	C
(1)	Ovary	Glucagon	Growth hormone
(2)	Placenta	Insulin	Vasopressin
(3)	Ovary	Insulin	Calcitonin
(4)	Placenta	Glucagon	Calcitonin

92. What are those structures that appear as beads - on - string in the chromosomes when viewed under electron microscope ?
(1) Genes (2) Nucleotides (3) Nucleosomes (4) Base pairs

93. Nitrifying bacteria :
(1) Oxidize ammonia to nitrates (2) Convert free nitrogen to nitrogen compounds
(3) Convert proteins into ammonia (4) reduce nitrates to free nitrogen

94. Archegoniophore is present in :
(1) Marchantia (2) Chara (3) Adiantum (4) Funaria

95. There is a restriction endonuclease called EcoRI. What does 'co' part in it stand for ?
(1) colon (2) coelom (3) coenzyme (4) coli

96. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2 :
(1) acts as a reserve during muscular exercise
(2) raise the pCO_2 of blood to 75 mm of Hg.
(3) is enough to keep oxyhaemoglobin saturation at 96%
(4) helps in releasing more O_2 to the epithelial tissues.

97. In land plants, the guard cells differ from other epidermal cells in having :
(1) Cytoskeleton (2) Mitochondria (3) Endoplasmic reticulum (4) Chloroplasts

98. Which one of the following is the most widely accepted method of contraception in India, as at present ?
(1) Cervical caps (2) Tubectomy (3) Diaphragms (4) IUDs' (Intra uterine devices)

99. The ciliated columnar epithelial cells in humans are known to occur in :
(1) Eustachian tube and stomach lining (2) Bronchioles and Fallopian tubes
(3) Bile duct and oesophagus (4) Fallopian tubes and urethra

100. Two friends are eating together on a dining table. One of them suddenly starts coughing while swallowing some food. This coughing would have been due to improper movement of :
(1) Epiglottis (2) Diaphragm (3) Neck (4) Tongue

101. What would be the number of chromosome of the aleurone cells of a plant with 42 chromosomes in its root tip cells ?
(1) 42 (2) 63 (3) 84 (4) 21

102. Consider the following four conditions (a - d) and select the correct pair of them as adaptation to environment in desert lizards.
The conditions :
(a) burrowing in soil to escape high temperature
(b) losing heat rapidly from the body during high temperature
(c) bask in sun when temperature is low
(d) insulating body due to thick fatty dermis
Options :
(1) (c), (d) (2) (a) , (c) (3) (b), (d) (4) (a), (b)

103. Maximum number of existing transgenic animals is of :
(1) Fish (2) Mice (3) Cow (4) Pig

104. Which one of the following statements is correct for secondary succession ?
(1) It begins on a bare rock
(2) It occurs on a deforested site
(3) It follows primary succession
(4) It is similar to primary succession except that it has a relatively fast pace

105. In eubacteria, a cellular component that resembles eukaryotic cells is :
(1) Plasma membrane (2) Nucleus (3) Ribosomes (4) Cell wall

106. A collection of plants and seeds having diverse alleles of all the genes of a crop is called :
(1) Herbarium (2) Germplasm (3) Gene library (4) Genome

107. If for some reason, the vasa efferentia in the human reproductive system get blocked, the gametes will not be transported from :
(1) testes to epididymis (2) epididymis to vas deferencs
(3) ovary to uterus (4) vagina to uterus

108. Which one of the following correctly explains the function of a specifice part of a human nephron ?
(1) Podocytes : Create minute spaces (slite pores) for the filtration of blood into the Bowman's capsule
(2) Henle's loop : most reabsorption of the major substances from the glomerular filtrate
(3) Distal convoluted tubule : reabsorption of K^+ ions into the surrounding blood capilaries
(4) Afferent arteriole : carries the blood away from the glomerulus towards renal vein.

109. The correct floral formula of chilli is :

(1) $\oplus\,\varphi\,\sigma\, K_{(5)}C_5A_5G_{(2)}$ (2) $\oplus\,\varphi\,\sigma\, K_{(5)}\overset{\curvearrowleft}{C_{(5)}}A_5G_{(2)}$ (3) $\oplus\,\varphi\,\sigma\, K_{(5)}C_{(5)}A_{(5)}G_{(2)}$ (4) $\oplus\,\varphi\,\sigma\, K_{(5)}\overset{\curvearrowleft}{C_5}A_{(5)}G_{(2)}$

110. Arteries are best defined as the vessels which :
(1) supply oxygenated blood to the different organs
(2) break up into capillaries which reunite to form one visceral organ
(3) break up into capillaries which reunite to form a vein
(4) carry blood from one visceral organ to another visceral organ

111. Which one of the following is categorised as a parasite in true sense ?
(1) The female Anopheles bites and sucks blood from humans
(2) Human foetus developing inside the uterus draws nourishment from the mother
(3) Head louse living on the human scalp as well as laying eggs on human hair
(4) The cuckoo (koel) lays its eggs in crow's nest.

112. The testes in humans are situated outside the abdominal cavity insides pouch called scrotum. The abdominal cavity inside a pouch called scrotum. The pupose served is for :
(1) maintaining the scrotal temperature lower than the internal body temperature
(2) escaping any possible compression by the visceral organs
(3) providing more space for the growth of epididymis
(4) providing a secondary sexual feature for exhibiting the male sex

113. Which one of the following statements is correct with respect to kidney function regulation ?
(1) When someone drinks lot of water, ADH release is suppressed.
(2) Exposure to cold temperature blood flow stimulates formation of Angiotensin II.
(3) An in crease in glomerular blood flow stimulates formation of Angiotensin II.
(4) During summer when body loses lot of water by evaporation, the release of ADH is suppressed.

114. Agarose extracted from sea weeds finds use in :
(1) Spectrophotometry (2) Tissue Culture (3) PCR (4) Gel electrophoresis

115. Which of the following is correctly stated as it happens in the common cockroach ?
(1) Malpighian tubules are excretory organs projecting out from the colon.
(2) Oxygen is transported by haemoglobin in blood
(3) Nitrogenous excretory product is urea.
(4) The food is ground by mandibles and gizzard

116. Which one of the following also acts asa catalyst in a bacterial cell ?
(1) 5 sr RNA (2) sn RNA (3) hn RNA (4) 23 sr RNA

117. Which one of the following acts as a physiological barrier to the entry of microorganisms in human body ?
(1) Epithelium of urogenital tract (2) Tears
(3) Monocytes (4) Skin

118. The function of leghaemoglobin in the root nodules of legumes is :
(I) inhibition of nitrogenase activity (2) oxygen removal
(3) nodule differentiation (4) expression of nif gene

119. The process of RNA interference ha.been used in the development of plants resistant to
(1) Nematodes (2) Fungi ' (3) Viruses (4) Insects

120. Compared with the gametophytes of the bryophytes the qametophytes of vascular plan
(1) smaller but to have larger sex organs (2) iarger but to have srnallter sex organs
(3) Ic3rgerand to have larger sex organs (4) smaller and to have smaller sex organs

121. The gametophyte is not an independent, free living generation in :
(1) Polytrichum (2) Adiantum (3) Marchantia . (4) Pinus

122. The cork cambium, cork and secondary cortex are collectively called:
(1) Phelloderm' (2) Phelloqen '. (3) Periderm (4) Phellem

123. Which one of the following staternents for pyramid of energy is incorrect, whereas the remaining three are correct ?
(1) Its base is broad
(2) II show s energy cont I1t of different trophic level organisms
(3) It is inverted in shape
(4) It is upright in shape

124. Select the correct option with respect to mitosis.
(1) Chromatid separate but remain in the centre of the cell in anaphase.
(2) Chromatids tart moving towards opposite poles in telophase.
(3) Golgi complex and endoplasmic reticulurn are still visible at the end of prophase.
(4) Chromosome move to the spindle equator and get aligned along equatorial plate in metaphase

125. Uricoteli mode of passing out nitrogenous wastes is found in :
(1) Reptiles and Bird (2) Birds and Annelids
(C) Amphibians and Reptiles (4) Insects and Amphibians

126. Flower. are Zygomorphic in :
(1) Mustard (2) Culmohur (3) Ioruato (4) Datura

127. Which one of the following statements is correct regarding blood pressure :
(1) 130/90 mmHg is considered high and requires tr atment
(2) 100/55 rnmHg is considered an ideal blood pressure
(3) 105/50 mmHg makes one very active
(4) 190/110 mmHg may harm vital organs like brain and kidney

128. Medical Termination of Pregnancy (MTP) is considered safe up to how man' weeks of pregnancy?
(1) Eight weeks t2) Twelve weeks (3) Eighteen week' (4) Six weeks

129. The ovary is half inferior in flowers of
(1) Peach (2) Cucumber (3) Cotton (4) Guava

130. When two unrelated individuals or lines are crossed, the performance of F_1 hybrid is often superior to both is parents. This phenomenon is called:
(1) Heterosis (2) Transfortnation (3) Splicing (4) Metamorphosis

131. Mutations can be induced with :
(1) Infral red radiations (2) I A A (3) Ethylene (4) Gamma radiations

132. Which one of the in absorption of phosphorus from soil by plants?
(1) Glomus (2) Rhizobium (3) Frankia (4) Anabaena

133. When a neuron is in resting state i.e. not conducting anv impulse, the axonal membrane is:
(1) Comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions
(2) Equally permeable to both ion's Na^+' and K^+ ions
(3) lmpermeable to both Na^+' and K^+ ions
(4) Comparatively more permeable to K^+ ions and nearly impermeable to Na^+' ions

134. A certain patient is suspected to be suffering from Acquired Immune Deficiency syndrome. Which diag nostic technique will you recommend for its detection?
(1) ELISA (2) MRI (3) Ultra sound (4) WIDAL

135. Continuous addition of sugars in 'fed batch' fermentation is done to:
(1) produce methane (2) obtain antibiotics (3) purify enzymes (4) degrade sewage

136. The purplish red pigment rhodopsin contained in the rods type of photoreceptor cells of the human eye, is a derivative of:
(1) Vitamin B (2) Vitamin C (3) Vitamin D (4) Vitamin A

137. Wind pollination is common in :
(1) Legumes (2) Lilies (3) Grasses (4) Orchids

138. Which one of the following is wrongly matched ?
(1) Root pressure - Guttation (2) Puccinia - Smut
(3) Root - Exarch protoxylem (4) Cassia - Imbricate aestivation

139. A drupe develops in:
(1) Mango (2) Wheat (3) Pea (4) Tomato

140. Which one of the following enzymes carries out the initial step in the digestion of milk in humans ?
(1) Pepsin (2) Rennin (3) Lipase (4) Trypsin

141. CAM helps the plants in :
(1) Conserving water (2) Secondary growth
(3) Disease resistance (4) Reproduction

142. Which one of the following animals is correctly matched with its particular named taxonomic category ?
(1) Tiger - tigris, the species (2) Cuttlefish - Mollusca, a class
(3) Humans - Primata, the family (4) Housefly - Musca an order

143. Organisrn called Metaanogens are most abundant in a :
(1) Sulphur rock (2) Cattle yard (3) Polluted stream (4) Hot spring

144. What was the most significant trend in evolution of modern man (Homosapiens) from his ancestors ?
(1) Upright posture (2) Shortening of jaws (3) Binocular vision (4) Increasing brain capacity

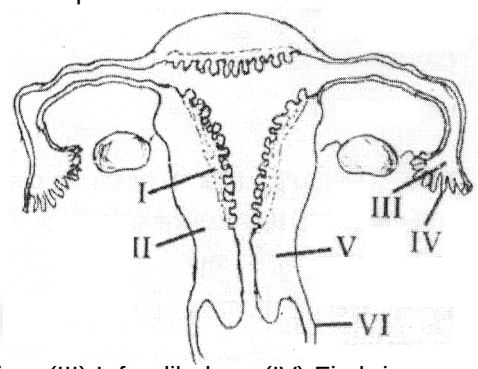
145. In which one of the folllowing the genus name, its two characters and its, class/phylum are correctly matched?

	Genus name		Two characters	Class/phylum
1	Ascaris	(a)	Body segmented	Annelida
		(b)	Males and females distinct	
2	Salamandra	(a)	A tympanum represents ear	Amphibia
		(b)	Fertilization is external	
3	Pteropus	(a)	Skin possesses hair	Mammalia
		(b)	Oviparous	
4	Aurelia	(a)	Cnidoblasts	Coelenterata
		(b)	Organ level of organization	

146. Which one of the following statements is wrong in Case of Bhopal tragedy ?
(1) Methyl lsocyanate gas leakage took place (2) Thousands of human beings died.
(3) Radioactive fall out engulfed Bhopal (4) It took place in the night of December 2/3 1984.

147. Which one of the following shows maximum genetic diversity in India ?
(1) Groundnut (2) Rice (3) Maize (4) Mango

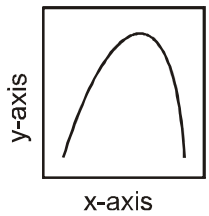
148. The figure given below depicts a diagrammatic sectional view of th female reproductive system of humans, Which one set of three parts out of I-VI have been correctly identified ?



(1) (II) Endometrium (III) Infundibulum, (IV) Fimbriae
(2) (III) Infundibulum, (IV) Fimbriae, (V) Cervix,
(3) (IV) Oviducal funnel, (V) Uterus, (VI) Cervix
(4) (I) Perimetriurn, (II) Myometrium, (Ill) Fallopian tube

149. A person with unknown blood group under ABO system, has suffered much blood loss in an accident and needs immediate blood transfusion. His one friend who has a valid certificate of his own blood type. offers blood donation without delay. What would have been the type of blood group of the donor friend.
(1) Type B (2) Type AB (3) Type O (4) Type A

150. The curve given below shows enzymatic activity with relation to three conditions (pH, temperature and substrate concentration.



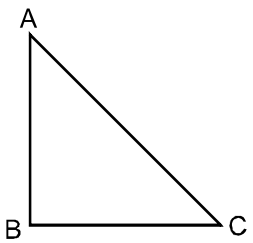
What do the two axises (x and y) represent ?

x - axis	**y-axis**
(1) enzymatic activity	pH
(2) temperature	enzyme activity
(3) Substrate concentration,	enzymatic activity
(4 enzymatic activity	temperature

PART - C (PHYSICS)

151. Photoelectric emmision occurs only when the incident light has more than a certain minimum:
(1) power (2) wavelength (3) intensity (4) frequency

152. A current carrying loop in the form of a right angle isosceles triangle ABC is placed in a uniform magnetic field acting along AB. If the magnetic force on the arm BC is $\vec{F}$, the force on the arm AC is :



(1) $-\sqrt{2}\vec{F}$ (2) $\vec{F}$ (3) $\vec{F}$ (4) $\sqrt{2}\vec{F}$

153. A particle moves in a circle of radius 5 cm with constant speed and time period 0.2 πs. The acceleraiton of the particle is :

(1) 15 m/s^2 (2) 25 m/s^2 (3) 36 m/s^2 (4) 5 m/s^2

154. Which of the is not due to total internal reflection?

(1) working of optical fibre (2) difference between apparent and real depth of pond

(3) mirage on hot summer days (4) brillance of diamond

155. A missile is fired for maximum range with an initial velocity of 20 m/s. If g = 10 m/s^2, the range of the missile is :

(1) 40 m (2) 50 m (3) 60 m (4) 20 m

156. The wavelength of the first line of Lyman series for hydrogen atom is equal to that of the second line of Balmer series for a hydrogen like ion. The atomic number Z of hydrogen like ion is :

(1) 3 (2) 4 (3) 1 (4) 2

157. The half life of a radioactive isotope 'X' is 50 years. It decay to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio of 1 : 15 in a sample of a given rock. The age of the rock was estimated to be :

(1) 150 years (2) 200 years (3) 250 years (4) 100 years

158. The potential energy of a system increases if work is done :

(1) upon the system by a nonconservative force
(2) by the system against a conservative force
(3) by the system against a nonconservative force
(4) upon the system by a conservative force

159. A charge Q is enclosed by a Gaussian spherical surface of radius R. If the radius is doubled, then the outward electric flux will :

(1) increase four times (2) be reduced to half (3) remain the same (4) be doubled

160. The power obtained in a reactor using U^{235} disintegration is 1000 kW. The mass decay of U^{235} per hour is :

(1) 10 microgram (2) 20 microgram (3) 40 microgram (4) 1 microgram

161. A radioactive nucleus of mass M emits a photon of frequency υ and the nucleus recoils. The recoil energy will be :

(1) $Mc^2 - h\upsilon$ (2) $h^2v^2 / 2Mc^2$ (3) zero (4) $h\upsilon$

162. The electric and the magnetic field associated with an e.m. wave, propagating along the +z–axis, can be represented by :

(1) $\left[\vec{E} = E_0\hat{i}, \vec{B} = B_0\hat{j}\right]$ (2) $\left[\vec{E} = E_0\hat{k}, \vec{B} = B_0\hat{i}\right]$ (3) $\left[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{i}\right]$ (4) $\left[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{k}\right]$

163. During an isothermal expansion, a confined ideal gas does –150 J of work against its surroundings. This implies that :

(1) 150 J heat has been removed from the gas
(2) 300 J of heat has been added to the gas
(3) no heat is transferred because the process is isothermal
(4) 150 J of heat has been added to the gas

164. Two waves are represented by the equations $y_1 = a\sin(\omega t + kx + 0.57)$m and $y_2 = a\cos(\omega t + kx)$m, where x is in meter and t in sec.The phase difference between them is :

(1) 1.0 radian (2) 1.25 radian (3) 1.57 radian (4) 0.57 radian

165. The instantaneous angular position of a point on a rotating wheel is given by the equation $\theta(t) = 2t^3 - 6t^2$. The torque on the wheel becomes zero at :

(1) t = 1s (2) t = 0.5 s (3) t = 0.25 s (4) t = 2s

166. A boy standing at the top of a tower of 20m height drops a stone. Assuming $g = 10\ ms^{-2}$, the velocity with which it hits the ground is :

(1) 10.0 m/s (2) 20.0 m/s (3) 40.0 m/s (4) 5.0 m/s

167. The moment of inertia of a thin uniform rod of mass M and length L about an axis passing through its midpoint and perpendicular to its length is I_0. Its moment of inertia about an axis passing through one of its ends and perpendicular to its length is :

(1) $I_0 + ML^2/2$ (2) $I_0 + ML^2/4$ (3) $I_0 + 2ML^2$ (4) $I_0 + ML^2$

168. A nucleus ${}^{m}_{n}X$ emits one α–particle and two β^- particles. The resulting nucleus is :

(1) ${}^{m-6}_{n-4}Z$ (2) ${}^{m-6}_{n}Z$ (3) ${}^{m-4}_{n}X$ (4) ${}^{m-4}_{n-2}Y$

169. A parallel plate condenser has a uniform electric field E(V/m) in the space between the plates. If the distance between the plates is d(m) and area of each plate is A(m^2) the enrgy (joules) stored in the condenser is :

(1) $E^2Ad/\in_0$ (2) $\frac{1}{2}\in_0 E^2$ (3) $\in_0 EAd$ (4) $\frac{1}{2}\in_0 E^2Ad$

170. A planet moving along an elliptical orbit is closest to the sun at a distance r_1 and farthest away at a distance of r_2. If v_1 and v_2 are the linear velocities at these points respectively, then the ratio $\frac{v_1}{v_2}$ is :

(1) $(r_1/r_2)^2$ (2) r_2/r_1 (3) $(r_2/r_1)^2$ (4) r_1/r_2

171. A body is moving with velocity 30 m/s towards east. After 10 seconds its velocity becomes 40 m/s towards north. The average acceleration of the body is :

(1) 1 m/s^2 (2) 7 m/s^2 (3) $\sqrt{7}$ m/s^2 (4) 5 m/s^2

172. Fusion reaction takes place at high temperature because :
(1) nuclei break up at high temperature
(2) atoms get ionised at high temperature
(3) kinetic energy is high enough to overcome the coulomb repulsion between nuclei
(4) molecules break up at high temperature

173. A body projected vertically from the earth reaches a height equal to earth's radius before returning to the earth. The power exerted by the gravitational force is greatest :
(1) at the highest position of the body
(2) at the instant just before the body hits the earth
(3) it remains constant all through
(4) at the instant just after the body is projected

174. The dimensions of $(\mu_0 \in_0)^{-1/2}$ are :
(1) $[L^{1/2}\ T^{-1/2}]$ (2) $[L^{-1}\ T]$ (3) $[\ L\ T^{-1}]$ (4) $[L^{-1/2}\ T^{1/2}]$

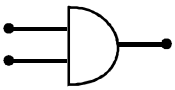
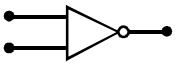
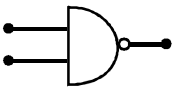
175. A ac voltage is applied to a resistance R and an inductor L in series. If R and the inductive reactance are both equal to 3Ω, the phase difference between the applied voltage and the current in the circuit is :
(1) $\pi/6$ (2) $\pi/4$ (3) $\pi/2$ (4) zero

176. A transistor is operated in common emitter configuration at $V_C = 2V$ such that a change in the base current from 100 μA to 300 μA produces a change in the collector current from 10 mA to 20 mA. The current gain is:
(1) 50 (2) 75 (3) 100 (4) 25

177. In forward biasing of the p–n junction :
(1) the positive terminal of the battery is connected to p–side and the depletion region becomes thick
(2) the positive terminal of the battery is connected to n–side and the depletion region becomes thin
(3) the positive terminal of the battery is connected to n–side and the depletion region becomes thick
(4) the positive terminal of the battery is connected to p–side and the depletion region becomes thin

178. There are four light–weight–rod samples A,B,C,D separtely suspended by threads. A bar magnet is slowly brought near each sample and the following observations are noted :
(i) A is feebly repelled (ii) B is feebly attacted
(iii) C is strongly attracted (iv) D remains unaffected
Which one of the following is true ?
(1) B is of a paramagnetic material (2) C is of a diamagnetic material
(3) D is of a ferromagnetic material (4) A is of a non–magnetic material

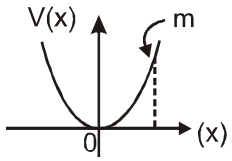
179. A person of mass 60 kg is inside a lift of mass 940 kg and presses the button on control panel. The lift starts moving upwards with an acceleration 1.0 m/s^2. If g = 10 ms^{-2}, the tension in the supporting cable is :
(1) 8600 N (2) 9680 N (3) 11000 N (4) 1200 N

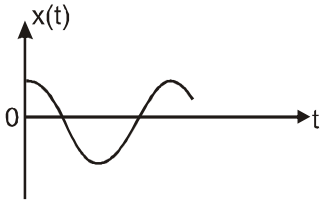
180. Symbolic representation of four logic gate are shown as :
(i)  (ii)  (iii)  (iv) 
Pick out which ones are for AND, NAND and NOT gates, respectively :
(1) (ii), (iii) and (iv) (2) (iii), (ii) and (i) (3) (iii), (iii) and (iv) (4) (ii), (iv) and (iii)

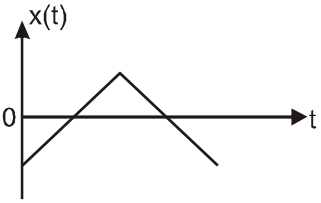
181. In an ac circuit an alternating voltage e = $200\sqrt{2}$ sin 100 t volts is connected to a capacitor of capacity 1 μF. The r.m.s. value of the current in the circuit is :
(1) 10 mA (2) 100 mA (3) 200 mA (4) 20 mA

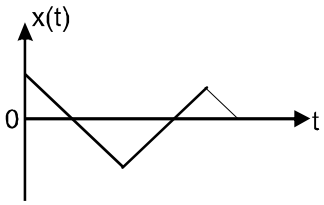
182. A current of 2A flows through a 2Ω resistor when connected across abattery. The same battery supplies a current of 0.5 A when connected across a 9Ω reisstor. The internal resistance of the battery is :
(1) 0.5 Ω (2) 1/3 Ω (3) 1/4 Ω (4) 1 Ω

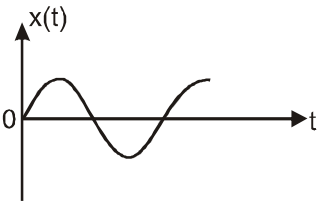
183. A particle of mass m isreleased from rest and follows a parabolic path as shown. Assuming that the displacement of the mass from the origin is small, which graph correctly depicts the position of the particle as a function of time



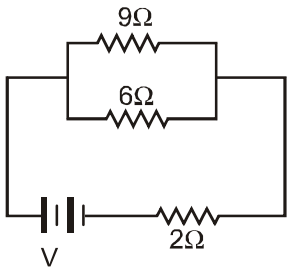
(1) 

(2) 

(3) 

(4) 

184. If power dissipated in the 9-Ω resistor in the circuit shown in 36 Watt, the potential difference across the 2-Ω resistor is



(1) 4 Volt (2) 8 Volt (3) 10 Volt (4) 2 Volt

185. A bioconvex lens has a radius of curvature of magnitude 20 cm. Which one of the following options describe best the image formed of an object of height 2 cm placed 30 cm from the lens ?

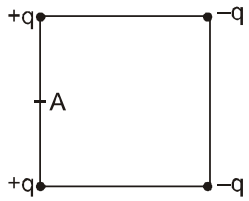
(1) Virtual, upright, height = 1 cm
(2) Virtual, upright, height = 0.5 cm
(3) Real, inverted, height = 4 cm
(4) Real, inverted, height = 1cm

186. In the Davisson and Germer experiment, the velocity of electrons emitted from the electron gun can be increased by :

(1) increasing the potential difference between the anode and filament
(2) increasing the filament current
(3) decreasing the filament current
(4) decreasing the potential difference between the anode and filament

187. The decreasing order of wavelength of infrared, microwave, ultraviolet and gamma rays is :
(1) microwave, infrared, ultraviolet, gamma rays
(2) gamma rays, ultraviolet, infrared, microwaves
(3) microwaves, gamma rays, infrared, ultraviolet
(4) infrared, microwave, ultraviolet, gamma rays

188. Four electric charges +q, +q, –q and –q are placed at the corners of a square of side 2I (see figure). The electric potential at point A, midway between the two charges +q and +q, is :



(1) $\frac{1}{4\pi\in_0}\frac{2q}{L}(1+\sqrt{5})$

(2) $\frac{1}{4\pi\in_0}\frac{2q}{L}\left(1+\frac{1}{\sqrt{5}}\right)$

(3) $\frac{1}{4\pi\in_0}\frac{2q}{L}\left(1-\frac{1}{\sqrt{5}}\right)$

(4) Zero

189. When 1 kg of ice at 0°C melts to water at 0°C, the resulting change in its entropy, taking latent heat of ice to be 80 Cal/°C, is :
(1) 273 Cal/K (2) 8×10^4 Cal/K (3) 80 Cal/K (4) 293 Cal/K

190. A uniform electric field and uniform magnetic field are acting along the same direction in a certain region. If an electron is projected in the region such that its velocity is pointed along the direction of fields, then the electron :
(1) will turn towards right of direction of motion (2) speed will decrease
(3) speed will increase (4) will turn towards left direction of motion

191. Sound waves travel at 350 m/s through a warm air and at 3500 m/s through brass. The wavelength of a 700 Hz acoustic wave as it enters brass from warm air :
(1) decreases by a factor 10 (2) increases by a factor 20
(3) increases by a factor 10 (4) decreases by a factor 20

192. Light of two different frequencies whose photons have energies 1 eV and 2.5 eV respectively illuminate a metallic surface whose work function is 0.5 eV successively. Ratio of maximum speeds emitted electrons will be :
(1) 1 : 4 (2) 1 : 2 (3) 1 : 1 (4) 1 : 5

193. A body of mass M hits normally a rigid wall with velocity V and bounces back with the same velocity. The impulse experienced by the body is :
(1) MV (2) 1.5 MV (3) 2 MV (4) Zero

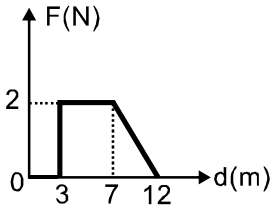
194. Electrons used in a electron microscope are accelerated by a voltage of 25 kV. If the voltage is increased to 100kV then the de–Broglie wavelength associated with the electrons would :
(1) increases by 2 times (2) decrease by 2 times
(3) decrease by 4 times (4) increases by 4 times

195. Out of the following functions representing motion of a particle which represents SHM :
(A) $y = \sin \omega t - \cos \omega t$ (B) $y = \sin^3 \omega t$
(C) $y = 5 \cos\left(\frac{3\pi}{4} - 3\omega t\right)$ (D) $y = 1 + \omega t + \omega^2 t^2$
(1) Only (A) (2) Only (D) does not represent SHM
(3) Only (A) and (C) (4) Only (A) and (B)

196. In photoelectric emission process from a metal of work function 1.8 eV, the kinetic energy of most energetic electrons is 0.5 eV. The corresponding stopping potential is :
(1) 1.8 V (2) 1.2 V (3) 0.5 V (4) 2.3 V

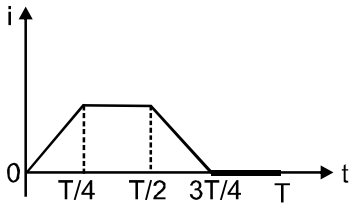
197. The rate of increase of thermo–e.m.f. with temperature at the neutral temperature of a thermocouple :
(1) is positive
(2) is zero
(3) depends upon the choice of the two materials of the thermocouple.
(4) is negative

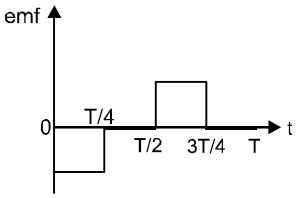
198. Force F on a particle moving in a straight line varies with distance d as shown in the figure. The work done on the particle during its displacement of 12 m is :

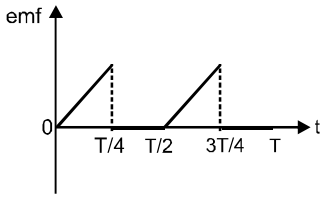


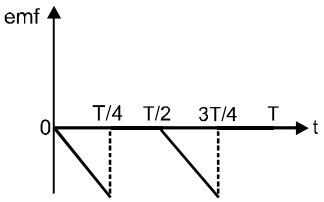
(1) 18 J (2) 21 J (3) 26 J (4) 13 J

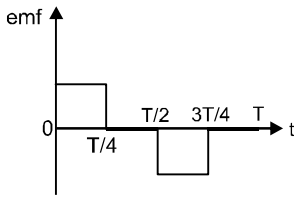
199. The current i in a coil varies with time as shown in the figure. The variation of induced emf with time would be :



(1)


(2)


(3)


(4)


200. If a small amount of antimony is added to germanium crystal :

(1) It becomes a p–type semiconductor

(2) the antimony becomes an acceptor atom

(3) there will be more free electrons than holes in the semiconductor

(4) its resistance is increased