MADE EASY & NEXT IAS GROUP

PRESENT

MENIIT

NEET | IIT-JEE | FOUNDATION

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Maximum Marks: 720 **Time : 3 Hours**

Paper Code

F

NEET (UG) - 2015

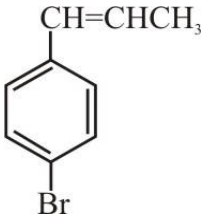
IMPORTANT INSTRUCTIONS

1. I he Answer Sheet is inside the Test Booklet. When you arc 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 toll point pen only.
2. The test is of 3 hours duration and lest Booklet contains 180 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 **720.**
3. Use **Blue/Black Ball Point Pen only** for writing particulars on this page / marking responses.
4. Rough work o to be done on the space provided for this purpose in the Test Booklet only.
5. **On completion of the test, the candidate must handover the Answer Sheet to the invigilator in the Room/Hall. The candidate are allowed to take away this Test Booklet with them**.
6. The CODE forth it Booklet is **S**. 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 Booklet and the Answer Sheet.
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 /vAnswer Sheet.
8. Use of white fluid for correction is NOT permissible on the Answer Sheet.
9. Each candidate must show on demand his/her Admission Card to the Invigilator.
10. No candidates, without special permission of the Superintendent or Invigilator would leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign the Attendance Sheet twice. Cases where a candidate has not signed the Attendance Sheet the second time will be deemed not to have handed over Answer Sheet and dealt with as an unfair means ease.
12. Use of Electronic / Manual Calculator is prohibited
13. The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.

SECTION - I (CHEMISTRY) 180 MARKS

1.[M] The reaction of $C_6H_5CH{=}CHCH_3$ with HBr produces:

(1) $C_6H_5CH_2\underset{\displaystyle Br}{\underset{|}{C}}HCH_3$ **(2)** $C_6H_5CH_2CH_2CH_2Br$

(3)  **(4)** $C_6H_5\underset{\displaystyle Br}{\underset{|}{C}}HCH_2CH_3$

2.[M] In Duma's method for estimation of nitrogen, 0.25 g of an organic compound gave 43 mL of nitrogen collected at 300 K temperature and 725 mm pressure. If the aqueous tension at 300 K is 25 mm, the percentage of nitrogen in the compound is:

(1) 18.20 **(2)** 16.76 **(3)** 15.76 **(4)** 17.36

3.[M] The K_{sp} of Ag_2CrO_4, AgCl, AgBr and AgI are retrospectively, 1.1×10^{-10}, 5.0×10^{-13}, 8.3×10^{-17}. Which one of the following salts will precipitate last if $AgNO_3$ solution is added to the solution containing equal moles of NaCl, NaBr, NaI and Na_2CrO_4?

(1) AgCl **(2)** AgBr **(3)** Ag_2CrO_4 **(4)** AgI

4.[E] Bithional is generally added to the soaps as an additive to function as a/an:

(1) Dryer **(2)** Buffering agent **(3)** Antiseptic **(4)** Softener

5.[E] "Metals are usually not found as nitrates in their ores".

Out of the following two (a and b) reasons which is/are true for the above observation?

(a) Metal nitrates are highly unstable. (b) Metal nitrates are highly soluble in water.

(1) a and b are false **(2)** a is false but his true

(3) a is true but b is false **(4)** a and b are true

6.[E] The correct bond order in the following species is:

(1) $O_2^{2+} < O_2^- < O_2^+$ **(2)** $O_2^{2+} < O_2^- < O_2^{2+}$

(3) $O_2^- < O_2^+ < O_2^{2+}$ **(4)** $O_2^{2+} < O_2^+ < O_2^-$

7.[E] The species Ar, K^+ and Ca^{2+} contain the same number of electrons. In which order do their radii increase?

(1) $Ca^{2+} < Ar < K^+$ **(2)** $Ca^{2+} < K^+ < Ar$

(3) $K^+ < Ar < Ca^{2+}$ **(4)** $Ar < K^+ < Ca^{2+}$

8.[E] The activation energy of a reaction can be determined from the slope of which of the following graphs?

(1) $\frac{\ln K}{T}$ vs.T **(2)** $\ln K$ vs.$\frac{1}{T}$ **(3)** $\frac{T}{\ln K}$ vs.$\frac{1}{T}$ **(4)** $\ln K$ vs.T

9.[E] Which of the following pairs of ions are isoelectronic and isostructural?

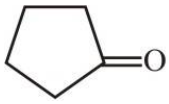
(1) ClO_3^-, CO_3^{2-} **(2)** SO_3^{2-}, NO_3^- **(3)** ClO_3^-, SO_3^{2-} **(4)** CO_3^{2-}, SO_3^{2-}

10.[E] An organic compound 'X' having molecular formula $C_5H_{10}O$ yields phenyl hydrazone and gives negative response to the Iodoform test and Tollen's test. It produces n–pentane on reduction. 'X' could be:

(1) 2–pentanone **(2)** 3–pentanone **(3)** n–amyl alcohol **(4)** pentanal

11.[E] Which of the options represent the correct bond order?

(1) $O_2^- < O_2 < O_2^+$ **(2)** $O_2^- > O_2 < O_2^+$ **(3)** $O_2^- < O_2 > O_2^+$ **(4)** $O_2^- > O_2 > O_2^+$

12.[D] Treatment of cyclopentanone  with methyl lithium gives which of the following species?

(1) Cyclopentanonyl cation **(2)** Cyclopentanonyl radical
(3) Cyclopentanonyl biradical **(4)** Cyclopentanonyl anion

13.[M] The electrolytic reduction of nitrobenzene strongly acidic medium produces:

(1) Azoxybenzene **(2)** Azobenzene **(3)** Aniline **(4)** p-Aminophenol

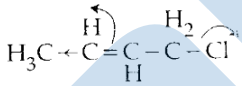
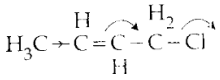
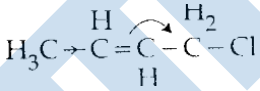
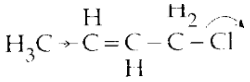
14.[E] Magnetic moment 2.84 B.M. is given by:
(At. Nos. Ni = 28, Ti = 22, Cr = 24, Co = 27)

(1) Ti^{3+} **(2)** Cr^{2+} **(3)** Co^{2+} **(4)** Ni^{2+}

15.[E] A given metal crystallizes out with a cubic structure having edge length of 361 pm If there are four metal atoms in one unit cell, what is the radius of one atom?

(1) 127 pm **(2)** 80 pm **(3)** 108 pm **(4)** 40 pm

16.[M] Which of the following is the most correct electron displacement for a nucleophilic reaction to take place?

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

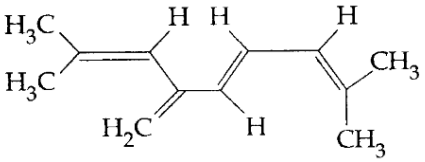
17.[E] Which one of the following electrolytes has the same value of Van't Hoff factor (i) as that of $Al_2(SO_4)_3$ (if all are 100 % ionized)?

(1) $K_3[Fe(CN)_6]$ **(2)** $Al(NO_3)_3$ **(3)** $K_4[Fe(CN)_6]$ **(4)** K_2SO_4

18.[E] Nitrogen dioxide and sulphur dioxide have some properties in common. Which property is shown by one of these compounds, but not by the other?

(1) is a reducing agent **(2)** is soluble in water
(3) is used as a food-preservative **(4)** forms 'acid-rain'

19.[E] The total number of π–bond electrons in the following structure is:



(1) 8 **(2)** 12 **(3)** 16 **(4)** 4

20.[E] Solubility of the alkaline earth's metal sulphates in water decreases in the sequence:

(1) Ca > Sr > Ba > Mg **(2)** Sr > Ca > Mg > Ba

(3) Ba > Mg > Sr > Ca **(4)** Mg > Ca > Sr > Ba

21.[E] Maximum bond angle at nitrogen present in which of the following?

(1) NO_2^- **(2)** NO_2^+ **(3)** NO_3^- **(4)** NO_2

22.[E] If the value of an equilibrium constant for a particular reaction is 1.6×10^{12}, then at equilibrium the system will contain:

(1) mostly reactants. **(2)** mostly products.

(3) similar amounts of reactants and products.

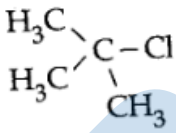
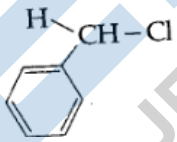
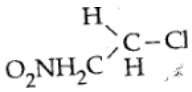
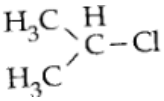
(4) all reactants.

23.[E] The number of d-electrons in Fe^{2+}(Z = 26) is not equal to the number of electrons in which one of the following?

(1) p - electrons in Cl (Z = 17) **(2)** d - electrons in Fe (Z = 26)

(3) p - electrons in Ne (Z = 10) **(4)** s - electrons in Mg (Z = 12)

24.[E] In which of the following compounds the C–Cl bond ionization shall give most stable carbonium ion?

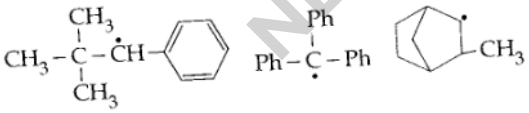
(1)  **(2)**  **(3)**  **(4)** 

25.[E] A device that converts energy of combustion or fuels like hydrogen and methane, directly into electrical energy is known as:

(1) Electrolytic Cell **(2)** Dynamo

(3) Ni-Cd cell **(4)** Fuel Cell

26.[M] Consider the following compounds

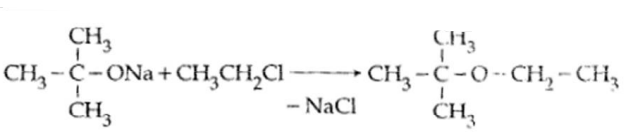


(I) (II) (III)

Hyperconjugation occurs in:

(1) II only **(2)** III only **(3)** I and III **(4)** I only

27.[E] The reaction



is called:

(1) Williamson continuous etherisation process

(2) Etard reaction

(3) Gattermann- Koch reaction

(4) Williamson Synthesis

28. [M] Cobalt (III) chloride forms several octahedral complexes with ammonia. Which of the following will not give test from chloride ions with silver nitrate at 25°C?

(1) $CoCl_3.4NH_3$ **(2)** $COCl_3.5NH_3$ **(3)** $CoCl_3.6NH_3$ **(4)** $CoCl_3.3NH_3$

29. [E] A mixture of gases contains H_2 and O_2 gases in the ratio of 1: 4 (w/w). What is the molar ratio of the two gases in the mixture?

(1) 4:1 **(2)** 16:1 **(3)** 2:1 **(4)** 1:4

30. [E] Which of the following processes does not involve oxidation of iron?

(1) Decolorization of blue $CuSO_4$ solution by iron

(2) Formation of $Fe(CO)_5$ from Fe

(3) Liberation of H_2 from steam by iron at high temperature

(4) Rusting of iron sheets

31. [M] Because of lanthanoid contraction, which of the flowing pairs of elements have nearly same radii? (Numbers in the parenthesis are atomic numbers).

(1) Zr (40) and Nb (41) **(2)** Zr (40) and Hf (72)

(3) Zr (40) and Ta (73) **(4)** Ti (22) and Zr (40)

32. [E] Which of the following statements is correct for a reversible process in a state of equilibrium?

(1) $\Delta G = 2.30RT\log K$ **(2)** $\Delta G^\circ = -2.30RT\log K$

(3) $\Delta G^\circ = 2.30RT\log K$ **(4)** $\Delta G = -2.30RT\log K$

33. [E] The angular momentum of electron in 'd' orbital is equal to:10

(1) $\sqrt{2}\hbar$ **(2)** $2\sqrt{3}\hbar$ **(3)** $0\hbar$ **(4)** $\sqrt{6}\hbar$

34. [E] The boiling point of 0.2 mol kg^{-1} solution of X in water is greater than equimolal solution of Y in water. Which one of the following statements is true in this case?

(1) Molecular mass of X is greater than the molecular mass of Y.

(2) Molecular mass of X is less than the molecular mass of Y.

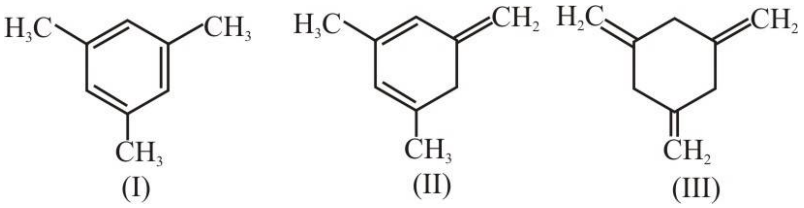
(3) Y is undergoing dissociation in water while X undergoes no change.

(4) X is undergoing dissociation in water.

35. [E] The function of "Sodium pump' is a biological process operating in each and every cell of all animals. Which of the folic wing biologically important ions is also a constituent of this pump?

(1) Mg^{2+} **(2)** K^+ **(3)** Fe^{2+} **(4)** Ca^{2+}

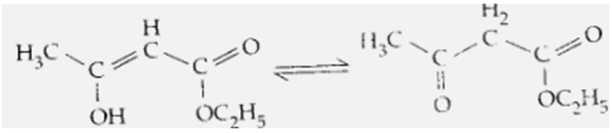
36. [M] Given:



The enthalpy of hydrogenation of these compounds will be in the order as:

(1) III > II > I **(2)** II > III > I **(3)** II >I >III **(4)** I > II > III

37. [E] The enolic form of ethyl acetoacetate below has:



(1) 16 sigma bonds and 1 pi- bond **(2)** 9 sigma bonds and 2 pi - bonds

(3) 0 sigma bonds and 1 pi – bond **(4)** 18 sigma bonds and 2 pi – bonds

38. [E] Biodegradable polymer which can be produced from glycine and aminocaproic acid is:

(1) PHBV **(2)** Buna – N **(3)** Nylon 6, 6 **(4)** Nylon 2 - nylon 6

39. [E] Which of the following species contains equal number of σ– and π–bonds?

(1) XeO_4 **(2)** $(CN)_2$ **(3)** $CH(CN)_2$ **(4)** HCO_3^-

40. [M] Which of the these statements about $[Co(CN)_6]^{3-}$ is true?

(1) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a low–spin configuration.

(2) $[Co(CN)_6]^{3-}$ has for unpaired electrons and will be in a high–spin configuration

(3) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a high–spin configuration

(4) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be a low–spin configuration

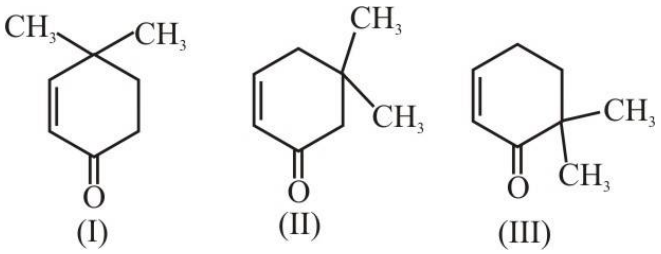
41. [E] Which one is not equal to zero for an ideal solution?

(1) ΔS_{mix} **(2)** ΔV_{mix} **(3)** $\Delta P = P_{observed} - P_{Raoult}$ **(4)** ΔH_{mix}

42. [E] Which property of colloidal solution is independent of charge on the colloidal particles?

(1) Electrophoresis **(2)** Electro–osmosis **(3)** Tyndall effect **(4)** Coagulation

43. [M] Given:



Which of the given compounds can exhibit tautomerism?

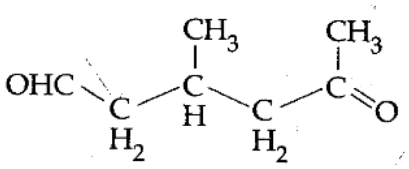
(1) I and III **(2)** II and III **(3)** I, II and III **(4)** I and II

44.[E] When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is:

(1) First **(2)** Second **(3)** More than zero but less than first

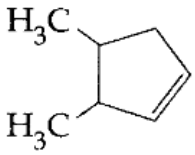
(4) Zero

45.[E] A single compound of the structure

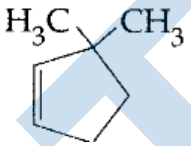


is obtainable from ozonolysis of which of the following cyclic compounds?

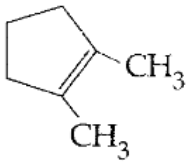
(1)



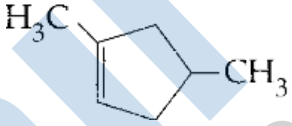
(2)



(3)



(4)



SECTION - II (BIOLOGY) 360 MARKS

46. Which of the following endoparasites of humans does show viviparity?

(1) *Enterobius vermicularis* **(2)** *Trichinella spiralis*

(3) *Ascaris lumbricoides* **(4)** *Ancylostoma duodenale*

47. Cryopreservation of gametes of threatened species in viable and fertile condition can be referred to as:

(1) Advanced ex situ conservation of biodiversity

(2) In situ conservation by sacred groves **(3)** In situ cryo-conservation of biodiversity

(4) In situ conservation of biodiversity

48. Which one of the following matches is correct?

(1)	*Alternaria*	Sexual reproduction absent	Deuteromycetes
(2)	*Mucor*	Reproduction by Conjugation	Ascomycetes
(3)	*Agaricus*	Parasitic fungus	Basidiomycetes
(4)	*Phytophthora*	Aseptate mycelium	Basidiomycetes

49. Minerals known to be required in large amounts for plant growth include:

(1) calcium, magnesium, manganese, copper

(2) potassium, phosphorus, selenium, boron

(3) magnesium, sulphur, iron, zinc

(4) phosphorus, potassium, sulphur, calcium

50. Which of the following enhances or induces fusion of protoplasts?

(1) Polyethylene glycol and sodium nitrate

(2) IAA and kinetin

(3) IAA and gibberellins **(4)** Sodium chloride and potassium chloride

51. Which of these is not an important component of initiation of parturition in humans?
(1) Synthesis of prostaglandins **(2)** Release of oxytocin
(3) Release of prolactin **(4)** Increase in estrogen and progesterone ratio

52. In which of the following gametophyte is not independent free living?
(1) *Marchantia* **(2)** *Pteris* **(3)** *Pinus* **(4)** *Funaria*

53. Which of the following is not a sexually transmitted disease?
(1) Acquired Immuno Deficiency Syndrome (AIDS)
(2) Trichomoniasis
(3) Encephalitis
(4) Syphilis

54. Leaves become modified into spines in:
(1) Pea **(2)** Onion **(3)** Silk Cotton **(4)** *Opuntia*

55. Which one gives the most valid and recent explanation for stomatal movements?
(1) Potassium influx and efflux **(2)** Starch hydrolysis
(3) Guard cell photosynthesis **(4)** Transpiration

56. Which of the following had the smallest brain capacity?
(1) *Homo sapiens* **(2)** *Homo neanderthalensis*
(3) *Homo habilis* **(4)** *Homo erectus*

57. High value of BOD (Biochemical Oxygen Demand) indicates that:
(1) water is highly polluted **(2)** water is less polluted
(3) consumption of organic matter in the water is higher by the microbes
(4) water is pure

58. Sliding filament theory can be best explained as:
(1) Actin and Myosin filaments shorten and slide pass each other
(2) Actin and Myosin filaments do not shorten but rather slide pass each other
(3) When myofilaments slide pass each other, Myosin filaments shorten while Actin filaments do not shorten
(4) When myofilaments slide pass each other, Actin filaments shorten while Myosin filament do not shorten

59. A gymnast is able to balance his body upside down even in the total darkness because of:
(1) Vestibular apparatus **(2)** Tectorial membrane
(3) Organ of corti **(4)** Cochlea

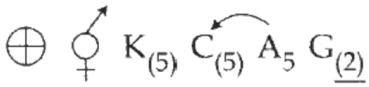
60. A man with blood group 'A' marries a woman with blood group 'B'. What are all the possible blood groups of their offsprings ?
(1) A, B and AB only **(2)** A, B, AB and O
(3) O only **(4)** A and B only

61. Typical growth curve in plants is:
(1) Linear **(2)** Stair-steps shaped
(3) Parabolic **(4)** Sigmoid

62. The UN Conference of Parties on climate change in the year 2011 was held in:
(1) South Africa **(2)** Peru **(3)** Qatar **(4)** Poland

63. A technique of micropropagation is:
(1) Somatic embryogenesis **(2)** Protoplast fusion
(3) Embryo rescue **(4)** Somatic hybridization

64. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?
(1) Six **(2)** Eight **(3)** Seven **(4)** Five

65.  is the floral formula of:
(1) *Sesbania* **(2)** *Petunia* **(3)** *Brassica* **(4)** *Allium*

66. The crops engineered for glyphosate are resistant/ tolerant to:
(1) Bacteria **(2)** Insects **(3)** Herbicides **(4)** Fungi

67. Which of the following statements is not correct?
(1) Goblet cells are present in the mucosa of intestine and secrete mucus
(2) Oxyntic cells are present in the mucosa of stomach and secrete HCl
(3) Acini are present in the pancreas and secrete carboxypeptidase
(4) Brunner's glands are present in the submucosa of stomach and secrete pepsinogen

68. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are:
(1) G 17%, A 16.5%, T 32.5% **(2)** G 17%, A 33%, T 33%
(3) G 8.5%, A 50%, T 24.5% **(4)** G 34%, A 24.5%, T 24.5%

69. In Bt cotton, the Bt toxin present in plant tissue as pro - toxin is converted into active toxin due to:
(1) acidic pH of the insect gut **(2)** action of gut micro-organisms
(3) presence of conversion factors in insect gut
(4) alkaline pH of the insect gut

70. Cytochromes are found in:
(1) Outer wall of mitochondria **(2)** Cristae of mitochondria
(3) Lysosomes **(4)** Matrix of mitochondria

71. Read the following five statements (A to E) and select the option with all correct statements:
(A) Mosses and Lichens are the first organisms to colonise a bare rock.
(B) *Selaginella* is a homosporous pteridophyte.
(C) Coralloid roots in *Cycas* have VAM.
(D) Main plant body in bryophytes is gametophytic, whereas in pteridophytes it is sporophytic.
(E) In gymnosperms, male and female gametophytes are present within sporangia located on sporophyte.
(1) (B), (C) and (D) **(2)** (A), (D) and (E)
(3) (B), (C) and (E) **(4)** (A), (C) and (D)

72. Which one of the following is correct?
(1) Serum = Blood + Fibrinogen **(2)** Lymph = Plasma + RBC + WBC
(3) Blood = Plasma + RBC + WBC + Platelets
(4) Plasma = Blood - Lymphocytes

73. The movement of a gene from one linkage group to another is called:
(1) Duplication **(2)** Translocation **(3)** Crossing over **(4)** Inversion

74. Which body of the Government of India regulates GM research and safety of introducing GM organisms for public services?
(1) Indian Council of Agricultural Research
(2) Genetic Engineering Approval Committee
(3) Research Committee on Genetic Manipulation
(4) Bio - safety committee

75. Rachel Carson's famous book "Silent Spring" is related to:
(1) Noise pollution **(2)** Population explosion
(3) Ecosystem management **(4)** Pesticide pollution

76. Gastric juice of infants contains:
(1) nuclease, pepsinogen, lipase **(2)** pepsinogen, lipase, rennin
(3) amylase, rennin, pepsinogen **(4)** maltase, pepsinogen, rennin

77. Which of the following is not one of the prime health risks associated with greater UV radiation through the atmosphere due to depletion of stratospheric ozone?
(1) Reduced Immune System **(2)** Damage to eyes
(3) Increased liver cancer **(4)** Increased skin cancer

78. Capacitation refers to changes in the:
(1) ovum before fertilization **(2)** ovum after fertilization
(3) sperm after fertilization **(4)** sperm before fertilization

79. Most animals are tree dwellers in a:
(1) thorn woodland **(2)** temperate deciduous forest
(3) tropical rain forest **(4)** coniferous forest

80. True nucleus is absent in :
(1) *Mucor* **(2)** *Vaucheria* **(3)** *Volvox* **(4)** *Anabaena*

81. Glenoid cavity articulates:
(1) scapula with acromion **(2)** clavicle with scapula
(3) humerus with scapula **(4)** clavicle with acromion

82. Transmission tissue is characteristic feature of:
(1) Solid style **(2)** Dry stigma
(3) Wet stigma **(4)** Hollow style

83. DNA is not present in:
(1) Ribosomes **(2)** Nuclei **(3)** Mitochondria **(4)** Chloroplast

84. Gene regulation governing lactose operon of *E. coli* that involves the lac I gene product is:

(1) negative and inducible because repressor protein prevents transcription.

(2) negative and repressive because repressor protein prevents transcription

(3) Feedback inhibitor because excess of β-galactosidase can switch off transcription

(4) Positive and inducible because it can be induced by lactose

85. Which of the following does not favour the formation of large quantities of dilute urine?

(1) Caffeine **(2)** Renin

(3) Atrial-natriuretic factor **(4)** Alcohol

86. What causes a green plant exposed to the light on only one side, to bend toward the source of light as it grows?

(1) Green plants seek light because they are phototropic.

(2) Light stimulates plant cells on the lighted side to grow faster.

(3) Auxin accumulates on the shaded side, stimulating greater cell elongation there.

(4) Green plants need light to perform photosynthesis.

87. Nuclear envelope is a derivative of:

(1) Membrane of Golgi complex **(2)** Microtubules

(3) Rough endoplasmic reticulum **(4)** Smooth endoplasmic reticulum

88. Select the correct option:

	I		II
(a)	Synapsis aligns homologous chromosomes	(i)	Anaphase-II
(b)	Synthesis of RNA and protein	(ii)	Zygotene
(c)	Action of enzyme recombinase	(iii)	G2-phase
(d)	Centromeres do not separate but chromatids move towards opposite poles	(iv)	Anaphase-I
		(v)	Pachytene

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

89. Keel is the characteristic feature of flower of:

(1) *Indigofera* **(2)** *Aloe* **(3)** Tomato **(4)** Tulip

90. Perigynous flowers are found in:

(1) Cucumber **(2)** China rose **(3)** Rose **(4)** Guava

91. A chemical signal that has both endocrine and neural roles is:

(1) Calcitonin **(2)** Epinephrine **(3)** Cortisol **(4)** Melatonin

92. In which of the following both pairs have correct combination?

(1) In situ conservation: Cryopreservation
Ex situ conservation: Wildlife Sanctuary

(2) In situ conservation: Seed Bank
Ex situ conservation: National Park

(3) In situ conservation: Tissue culture
Ex situ conservation: Sacred groves

(4) In situ conservation: National Park
Ex situ conservation: Botanical Garden

93. HIV that causes AIDS, first starts destroying:

(1) Leucocytes **(2)** Helper T – Lymphocytes
(3) Thrombocytes **(4)** B – Lymphocytes

94. Hysterectomy is surgical removal of:

(1) Prostate gland **(2)** Vas-deference
(3) Mammary glands **(4)** Uterus

95. Removal of proximal convoluted tubule from the nephron will result in:

(1) More concentrated urine
(2) No change in quality and quantity of urine
(3) No urine formation
(4) More diluted urine

96. A major characteristic of the monocot root is the presence of:

(1) Scattered vascular bundles
(2) Vasculature without cambium
(3) Cambium sandwiched between phloem and xylem along the radius
(4) Open vascular bundles

97. Which of the following characteristics is mainly responsible for diversification of insects on land?

(1) Bilateral symmetry **(2)** Exoskeleton
(3) Eyes **(4)** Segmentation

98. Which of the following cells during gametogenesis is normally diploid?

(1) Spermatid **(2)** Spermatogonia
(3) Secondary polar body **(4)** Primary polar body

99. The structures that are formed by stacking of organized flattened membranous sacs in the chloroplasts are:

(1) Grana **(2)** Stroma lamellae **(3)** Stroma **(4)** Cristae

100. The chromosomes in which centromere is situated close to one end are:

(1) Acrocentric **(2)** Telocentric **(3)** Sub-metacentric **(4)** Metacentric

101. In ring girdled plant:

(1) The root dies first **(2)** The shoot and root die together
(3) Neither root nor shoot will die **(4)** The shoot dies first

102. Vertical distribution of different species occupying different levels in a biotic community is known as:
(1) Stratification **(2)** Zonation **(3)** Pyramid **(4)** Divergence

103. Multiple alleles are present:
(1) At different loci on the same chromosome
(2) At the same locus of the chromosome
(3) On non-sister chromatids
(4) On different chromosomes

104. The mass of living material at a trophic level at a particular time is called:
(1) Standing state **(2)** Net primary productivity
(3) Standing crop **(4)** Gross primary productivity

105. Which of the following animals is not viviparous?
(1) Elephant **(2)** *Platypus* **(3)** Whale **(4)** Flying fox (Bat)

106. In an ecosystem the rate of production of organic matter during photosynthesis is termed as:
(1) Gross primary productivity **(2)** Secondary productivity
(3) Net productivity **(4)** Net primary productivity

107. Erythropoiesis starts in:
(1) Liver **(2)** Spleen **(3)** Red bone marrow **(4)** Kidney

108. Which is the most common mechanism of genetic variation in the population of a sexually-reproducing organism?
(1) Chromosomal aberrations **(2)** Genetic drift
(3) Recombination **(4)** Transduction

109. Blood pressure in the mammalian aorta is maximum during:
(1) Diastole of the right ventricle **(2)** Systole of the left ventricle
(3) Diastole of the right atrium **(4)** Systole of the left atrium

110. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe?
(1) rising CO_2 concentration **(2)** falling CO_2 concentration
(3) rising CO_2 and falling O_2 concentration **(4)** falling O_2 concentration

111. Vascular bundles in monocotyledons are considered closed because:
(1) Cambium is absent
(2) There are no vessels with perforations
(3) Xylem is surrounded all around by phloem
(4) A bundle sheath surrounded each bundle

112 Male gametes are flagellated is:
(1) *Anabaena* **(2)** *Ectocarpus* **(3)** *Spirogyra* **(4)** *Polysiphonia*

113. Which one of the following may require pollinators, but is genetically similar to autogamy?
(1) Xenogamy **(2)** Apogamy **(3)** Cleistogamy **(4)** Geitonogamy

114. In ginger vegetative propagation occurs through:

(1) Offsets **(2)** Bulbils **(3)** Runners **(4)** Rhizome

115. Which one of the following is not an inclusion body found in prokaryotes?

(1) Cyanophycean granule **(2)** Glycogen granule

(3) Polysome **(4)** Phosphate granule

116. A somatic cell that has just completed the S phase of its cell cycle, as compared to gamete of the same species, has:

(1) same number of chromosomes but twice the amount of DNA

(2) twice the number of chromosomes and four times the amount of DNA

(3) four times the number of chromosomes and twice the amount of DNA

(4) twice the number of chromosomes and twice the amount of DNA

117. Alleles are:

(1) true breeding homozygotes **(2)** different molecular forms of a gene

(3) heterozygotes **(4)** different phenotype

118. Select the correct matching in the following pairs:

(1) Smooth ER - Synthesis of lipids **(2)** Rough ER - Synthesis of glycogen

(3) Rough ER - Oxidation of fatty acids **(4)** Smooth ER - Oxidation of phospholipids

119. The terga, sterna and pleura of cockroach body are joined by:

(1) Muscular tissue **(2)** Arthrodial membrane

(3) Cartilage **(4)** Cementing glue

120. Which of the following represents the combination without any exception?

	Characteristics	Class
(1)	Mouth ventral; gills without operculum; skin with placoid scales; persistent notochord	Chondrichthyes
(2)	Sucking and circular mouth; jaws absent, integument without scales; paired appendages	Cyclostomata
(3)	Body covered with feathers; skin moist and glandular; fore-limbs form wings; lungs with air sacs	Aves
(4)	Mammary gland; hair on body; pinnae; two pairs of limbs	Mammalia

121. Which one of the following statements is incorrect?

(1) In competitive inhibition, the inhibitor molecule is not chemically changed by the enzyme.

(2) The competitive inhibitor does not affect the rate of breakdown of the enzyme-substrate complex.

(3) The presence of the competitive inhibitor decreases the Km of the enzyme for the substrate.

(4) A competitive inhibitor reacts reversibly with the enzyme to form an enzyme-inhibitor complex.

122. Which of the following regions of the brain is incorrectly paired with its function?
(1) Cerebellum - language comprehension
(2) Corpus callosum - communication between the left and right cerebral cortices
(3) Cerebrum - calculation and contemplation
(4) Medulla oblongata - homeostatic control

123. Which one of the following statements is not true?
(1) Pollen grains of some plants cause severe allergies and bronchial afflictions in some people
(2) The flowers pollinated by flies and bats secrete foul odour to attract them
(3) Honey is made by bees by digesting pollen collected from flowers
(4) Pollen grains are rich in nutrients, and they are used in the form of tablets and syrups

124. The active form of *Entamoeba histolytica* feeds upon:
(1) mucosa and submucosa of colon only
(2) food in intestine
(3) blood only
(4) erythrocytes; mucosa and submucosa of colon

125. Which of the following viruses is not transferred through semen of an infected male?
(1) Human immunodeficiency virus
(2) Chikungunya virus
(3) Ebola virus
(4) Hepatitis B virus

126. A population will not exist in Hardy-Weinberg equilibrium if:
(1) there are no mutations **(2)** there is no migration
(3) the population is large **(4)** individuals mate selectively

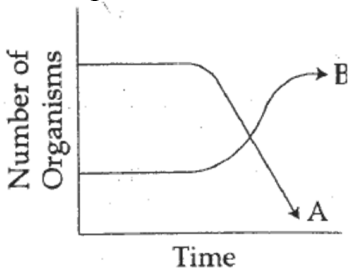
127. The guts of cow and buffalo possess:
(1) *Chlorella* spp **(2)** Methanogens **(3)** Cyanobacteria **(4)** *Fucus* spp

128. The hilum is a scar on the:
(1) Fruit, where it was attached to pedicel
(2) Fruit, where style was present
(3) Seed, where micropyle was present
(4) Seed, where funicle was attached

129. Secondary Succession takes place on / in:
(1) Degraded forest **(2)** Newly created pond
(3) Newly cooled lava **(4)** Bare rock

130. Which one of the following statements is wrong?
(1) Agar-agar is obtained from *Gelidium* and *Gracilaria*
(2) *Chlorella* and *Spirulina* are used as space food
(3) Mannitol is stored food in Rhodophyceae
(4) Algin and carragen are products of algae

131. The following graph depicts changes in two populations (A and B) of herbivores in a grassy field. A possible reason for these changes is that:



(1) Population B competed more successfully for food than population A
(2) Population A produced more offspring than population B
(3) Population A consumed the members of population B
(4) Both plant populations in this habitat decreased

132. Match each disease with its correct type of vaccine:

(a)	tuberculosis	(i)	harmless virus
(b)	whooping cough	(ii)	inactivated toxin
(c)	diphtheria	(iii)	killed bacteria
(d)	polio	(iv)	harmless bacteria

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

133. Which of the following are the important floral rewards to the animal pollinators?
(1) Nectar and pollen grains
(2) Floral fragrance and calcium crystals
(3) Protein pellicle and stigmatic exudates
(4) Colour and large size of flower

134. An abnormal human baby with 'XXX' sex chromosomes was born due to:
(1) formation of abnormal ova in the mother
(2) fusion of two ova and one sperm
(3) fusion of two sperms and one ovum
(4) formation of abnormal sperms in the father

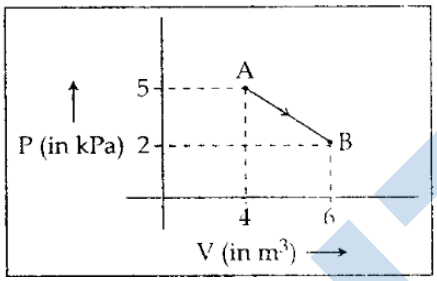
135. Transpiration and root pressure cause water to rise in plants by:
(1) pulling and pushing it, respectively
(2) pushing it upward
(3) pushing and pulling it, respectively
(4) pulling it upward

SECTION - III (PHYSICS) 180 MARKS

136. An electron moving in a circular orbit of radius r makes n rotations per second. The magnetic field produced at the centre has magnitude:

(1) Zero **(2)** $\frac{\mu_0 n^2 e}{2r}$ **(3)** $\frac{\mu_0 ne}{2r}$ **(4)** $\frac{\mu_0 ne}{2\pi r}$

137. One mole of an ideal diatomic gas undergoes a transition from A to B along a path AB as shown in the figure,



The change in internal energy of the gas the during the transition is:

(1) – 20 kJ **(2)** 20 J **(3)** –12 kJ **(4)** 20 kJ

138. When two displacements represented by y_1 a sin (ωt) are superimposed the motion is:

(1) simple harmonic with amplitude $\frac{a}{b}$ **(2)** simple harmonic with amplitude $\sqrt{a^2+b^2}$

(3) simple harmonic with amplitude $\frac{(a+b)}{2}$ **(4)** not a simple harmonic

139. A particle of unit mass undergoes one–dimensional motion such that its velocity varies according to $v(x) = \beta x^{-2n}$

where β and n are constant and x is the position of the particle. The acceleration of the particle as a function of x, is given by:

(1) $-2n\beta^2 x^{-4n-1}$ **(2)** $-2\beta^2 x^{-2n+1}$ **(3)** $-2n\beta^2 e^{-4n+1}$ **(4)** $-2n\beta^2 e^{-2n-1}$

140. If radius of the $^{27}_{13}Al$ nucleus is taken to be R_{Al} then the radius of $^{125}_{53}Te$ nucleus is nearly:

(1) $\frac{5}{3}R_{Al}$ **(2)** $\frac{3}{5}R_{Al}$ **(3)** $\left(\frac{13}{53}\right)^{1/3}R_{Al}$ **(4)** $\left(\frac{53}{13}\right)^{1/3}R_{Al}$

141. In a double slit experiment, the two slits arc 1 mm apart and the screen is placed 1 m away. A monochromatic light of wavelength 50(1 nm is used. What will be the width of each slit for obtaining ten maxima of double slit within the central maxima of single slit pattern?

(1) 0.1 mm **(2)** 0.5 mm **(3)** 0.02 mm **(4)** 0.2 mm

142. For a parallel beam of monochromatic light of wavelength 'λ', diffraction is produced by a single slit whose width 'a' is of the order of the wavelength of the light. If 'D' is the distance of the screen from the slit, the width of the central maxima will be:

(1) $\frac{D\lambda}{a}$ **(2)** $\frac{Da}{\lambda}$ **(3)** $\frac{2Da}{\lambda}$ **(4)** $\frac{2D\lambda}{a}$

143. Across a metallic conductor of non-uniform cross section a constant potential difference is applied. The quantity which remains constant along the conductor is: '

(1) current **(2)** drift velocity **(3)** electric field **(4)** current density

144. On observing light from three different stars P, Q and R, it was found that intensity of violet colour is maximum in the spectrum of P, the intensity of green colour is maximum in the spectrum of R and the intensity of red colour is maximum in the spectrum of Q. If T_P, T_Q and I_R are the respective absolute temperatures of P, Q and R, then it can be concluded from the above observations that:

(1) $T_P > T_R > T_Q$ **(2)** $T_P < T_R < T_Q$ **(3)** $T_P < T_Q < T_R$ **(4)** $T_P > T_Q > T_R$

145. A potentiometer wire has length 4 m and resistance 8Ω. The resistance that must be connected in series with the wire and an accumulator of e.m.f. 2V, so as to get a potential gradient 1 mV per cm on the wire is:

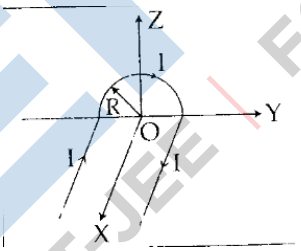
(1) 40 Ω **(2)** 44 Ω **(3)** 48 Ω **(4)** 32 Ω

146. Consider 3rd orbit of He^+ (Helium), using non–relativistic approach, the speed of electron in this orbit will be [Given K = 9×10^9 constant, Z = 2 and h(Planck's Constant) = 6.6×10^{-34} J s]

(1) 1.46×10^6 m/s **(2)** 0.73×10^6 m/s

(3) 3.0×10^8 m/s **(4)** 2.92×10^6 m/s

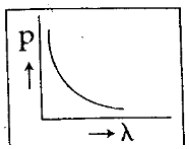
147. A wire carrying current I has the shape as shown in adjoining figure. Linear parts of the wire are very long and parallel to X-axis while semicircular portion of radius R is lying in Y-Z plane. Magnetic- field at point O is:

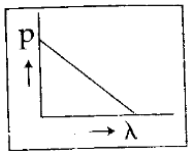


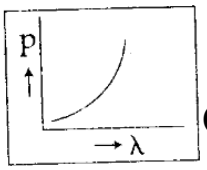
(1) $\vec{B} = -\frac{\mu_0}{4\pi}\frac{I}{R}(\pi\hat{i} - 2\hat{k})$ **(2)** $\vec{B} = -\frac{\mu_0}{4\pi}\frac{I}{R}(\pi\hat{i} + 2\hat{k})$

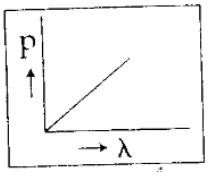
(3) $\vec{B} = \frac{\mu_0}{4\pi}\frac{I}{R}(\pi\hat{i} - 2\hat{k})$ **(4)** $\vec{B} = \frac{\mu_0}{4\pi}\frac{I}{R}(\pi\hat{i} + 2\hat{k})$

148. Which of the following figures represent the variation of particle momentum and the associated de-Broglie wavelength?

(1) 

(2) 

(3) 

(4) 

149. A parallel plate air capacitor of capacitance C is connected to a cell of e.m.f. V and then disconnected from it. A dielectric slab of dielectric constant K, which can just fill the air gap of the capacitor, is now inserted in it. Which of the following is incorrect?

(1) The energy stored in the capacitor decreases K times

(2) The change in energy stored is $\frac{1}{2}CV^2\left(\frac{1}{K}-1\right)$

(3) The charge on the capacitor is not conserved

(4) The potential difference between the plates decreases K times

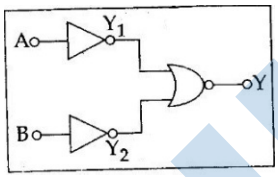
150. The fundamental frequency of a closed organ pipe of length 20 cm is equal to the second overtone of an organ pipe open at both the ends. The length of organ pipe open at both the ends is:

(1) 100 cm **(2)** 120 cm **(3)** 140 cm **(4)** 80 cm

151. The refracting angle of a prism is A, and refractive index of the material of the prism is cot(A/2). The angle of minimum deviation is

(1) 180°– 2A **(2)** 90°–A **(3)** 180°+2A **(4)** 180° – 3A

152. Which logic gate is represented by the following combination of logic gates?



(1) NAND **(2)** AND **(3)** NOR **(4)** OR

153. A carnot engine, having an efficiency of $\eta = \frac{1}{10}$ as heat engine, is used as a refrigerator. If the work done on the system is 10 J, the amount of energy absorbed from the reservoir at lower temperature is:

(1) 99 J **(2)** 90 J **(3)** 1 J **(4)** 100 J

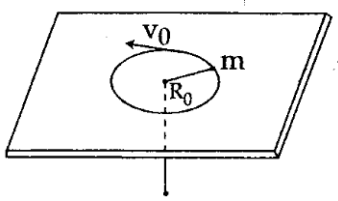
154. A certain metallic surface is illuminated with monochromatic light of wavelength, X. The stopping potential for photo-electric current for this light is $3V_0$. If the same surface is illuminated with light of wavelength 2 K the stopping potential is V0. The threshold wavelength -for this surface for photo-electric effect is:

(1) 4λ **(2)** $\frac{\lambda}{4}$ **(3)** $\frac{\lambda}{6}$ **(4)** 6λ

155. A radiation of energy 'E' falls normally on a perfectly reflecting surface. The momentum transferred to the surface is (C = Velocity of light):

(1) $\frac{2E}{C}$ **(2)** $\frac{2E}{C^2}$ **(3)** $\frac{E}{C^2}$ **(4)** $\frac{E}{C}$

156. A mass m moves in a circle on a smooth horizontal plane with velocity v_0 at a radius R_0, The mass is attached to a string which passes through a smooth hole in the plane as shown.



The tension in the string is increased gradually and finally m moves in a circle of radius $\frac{R_0}{2}$. The final value of the kinetic energy is:

(1) $\frac{1}{4}mv_0^2$ **(2)** $2mv_0^2$ **(3)** $\frac{1}{2}mv_0^2$ **(4)** mv_0^2

157. Two identical thin plano-convex glass lenses (refractive index 1.5) each having radius of curvature of 20 cm are placed with their convex surfaces in contact at the centre. The intervening space is filled with oil of refractive index 1.7. The focal length of the combination is:

(1) - 25 cm **(2)** -50 cm **(3)** 50 cm **(4)** -20 cm

158. A block A of mass m_1 rests on a horizontal table. A light string connected to it passes over a frictionless pulley at the edge of table and from its other end another block B of mass m_2 is suspended. The coefficient of kinetic friction between the block and the table is μ_k. When the block A is sliding on the table, the tension in the string is:

(1) $\frac{(m_2-\mu_k m_1)g}{(m_1+m_2)}$ **(2)** $\frac{m_1m_2(1+\mu_k)g}{(m_1+m_2)}$ **(3)** $\frac{m_1m_2(1-\mu_k)g}{(m_1+m_2)}$ **(4)** $\frac{(m_2-\mu_k m_1)g}{(m_1+m_2)}$

159. A particle is executing SHM along a straight line. Its velocities at distances x_1 and x_2 from the mean position are V_1 and V_2, respectively. Its time period is:

(1) $2\pi\sqrt{\frac{x_2^2-x_1^2}{V_1^2-V_2^2}}$ **(2)** $2\pi\sqrt{\frac{V_1^2+V_2^2}{x_1^2+x_2^2}}$ **(3)** $2\pi\sqrt{\frac{V_1^2-V_2^2}{x_1^2-x_2^2}}$ **(4)** $2\pi\sqrt{\frac{x_1^2+x_2^2}{V_1^2+V_2^2}}$

160. A ship A is moving Westwards with a speed of 10 km h^{-1} and a ship B100 km South of A, is moving Northwards with a speed of 10 km h^{-1}.The time after which the distance between them becomes shortest, is:

(1) 5 h **(2)** $5\sqrt{2}$h **(3)** $10\sqrt{2}$h **(4)** 0 h

161. A rod of weight W is supported by two parallel knife edges A and B and is in equilibrium in a horizontal position. The knives are at a distance d from each other. The centre of mass of the rod is at distance x from A. The normal reaction on A is:

(1) $\frac{Wd}{x}$ **(2)** $\frac{W(d-x)}{x}$ **(3)** $\frac{W(d-x)}{d}$ **(4)** $\frac{Wx}{d}$

162. The approximate depth of an ocean is 2700 m. The compressibility of water is 45.4×10^{-11} Pa^{-1} and density of water is 10^3 kg/m^3. What fractional compression of water will be obtained at the bottom of the ocean?

(1) 1.0×10^{-2} **(2)** 1.2×10^{-2} **(3)** 1.4×10^{-2} **(4)** 0.8×10^{-2}

163. Two particles of masses m_1, m_2 move with initial velocities u_1 and u_2. On collision, one of the particles get excited to higher level, after absorbing energy ε. If final velocities of particles be v_1 and v_2 then we must have.

(1) $\frac{1}{2}m_1u_1^2+\frac{1}{2}m_2u_2^2=\frac{1}{2}m_1v_1^2+\frac{1}{2}m_2v_2^2-\varepsilon$ **(2)** $\frac{1}{2}m_1u_1^2+\frac{1}{2}m_2u_2^2-\varepsilon=\frac{1}{2}m_1v_1^2+\frac{1}{2}m_2v_2^2$

(3) $\frac{1}{2}m_1^2u_1^2+\frac{1}{2}m_2^2u_2^2+\varepsilon=\frac{1}{2}m_1^2v_1^2+\frac{1}{2}m_2^2v_2^2$ **(4)** $m_1^2u_1+m_2^2u_2-\varepsilon=m_1^2v_1+m_2^2v_2$

164. Kepler's third law states that square of period of revolution (T) of a planet around the sun, is proportional to third power of average distance r between sun and planet i.e. $T^2 = Kr^3$
here K is constant.
If the masses of sun and planet are M and m respectively then as per Newton's law of gravitation force of attraction between them is

$F = \frac{GMm}{r^2}$, here G is gravitational constant . The relation between G and K is described as:

(1) $GMK = 4\pi^2$ **(2)** $K = G$ **(3)** $K = \frac{1}{G}$ **(4)** $GK = 4\pi^2$

165. A block of mass 10 kg, moving in x direction with a constant speed of 10 ms^{-1}, is subjected to a retarding force F = 0.1 x J/m during its travel from x = 20 m to 30m. Its final KE will be

(1) 450 J **(2)** 275 J **(3)** 250 J **(4)** 475J

166. A wind with speed 40 m/s blows parallel to the roof of a house. The area of the roof is 250 m^2. Assuming that the pressure inside the house is atmospheric pressure, the fore exerted by the wind on the roof and the direction of the force will be. $\left(P_{air} = 1.2 kg/m^3\right)$

1) 4.8×10^5 N , upwards **(2)** 2.4×10^5 N , upwards

(3) 2.4×10^5 N, downwards **(4)** 4.8×10^5 N , downwards

167. Two spherical bodies of mass M and 5 M and radii R and 2 R are released in free space with initial separation between their centres equal to 12 R. If they attract each other due to gravitational force only, then the distance covered by the smaller body before collision is :

(1) 4.5 R **(2)** 7.5 R **(3)** 1.5 R **(4)** 2.5 R

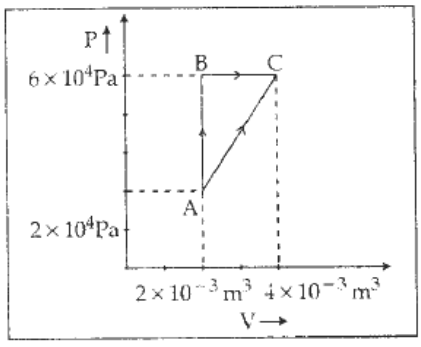
168. A resistance 'R' draws power 'P' when connected to an AC source. If an inductance is now placed is series with the resistance, such that the impedance of the circuit becomes 'Z', the power drawn will be.

(1) $P\sqrt{\frac{R}{Z}}$ **(2)** $P\left(\frac{R}{Z}\right)$ **(3)** P **(4)** $P\left(\frac{R}{Z}\right)^2$

169. The ratio of the specific heats $\frac{C_p}{C_v} = \gamma$ in terms of degrees of freedom (n) is given by:

(1) $\left(1+\frac{n}{3}\right)$ **(2)** $\left(1+\frac{2}{n}\right)$ **(3)** $\left(1+\frac{n}{2}\right)$ **(4)** $\left(1+\frac{1}{n}\right)$

170. Figure below shows two paths that may be taken by a gas to go from a state A to a state C.



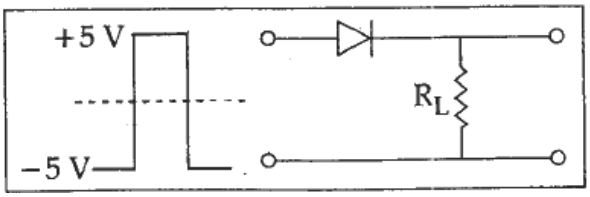
In process AB, 400 J of heat is added to the system and in process BC, 100 J of heat is added to the system. The heat absorbed by the system in the process AC will be:

(1) 500 J **(2)** 460 J **(3)** 300 J **(4)** 380 J

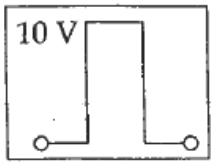
171. If energy (E), velocity (V) and time (T) are chosen as the fundamental quantities, the dimensional formula of surface tension will be:

(1) $[EV^{-1}T^{-2}]$ **(2)** $[EV^{-2}T^{-2}]$ **(3)** $[E^{-2}V^{-1}T^{-3}]$ **(4)** $[EV^{-2}$

172. If in a p-n junction, a square input signal of 10 V is applied, as shown,

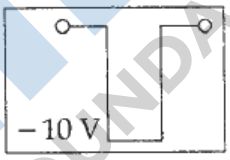


Then the output across R_1, will be

(1) 

(2) 

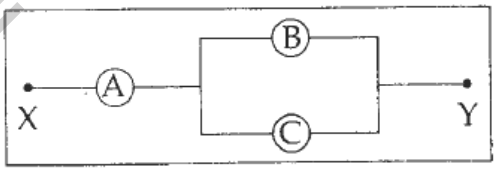
(3) 

(4) 

173. Three blocks A, B and C, of masses 4 kg, 2 kg and 1 kg respectively, are in contact on a frictionless surface, as shown. If a force of 14 N is applied on the 4 kg block, then the contact force between A and B is:

(1) 6N **(2)** 8 N **(3)** 18 N **(4)** 2 N

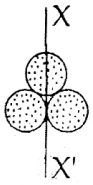
174. A, B and C are voltmeters of resistance R, 1.5R and 3R respectively as shown in the figure. When some potential difference is applied between X and Y, the voltmeter readings are V_A, V_B and V_C respectively. Then :



(1) $V_A \neq V_B = V_C$ **(2)** $V_A = V_B \neq V_C$

(3) $V_A \neq V_B \neq V_C$ **(4)** $V_A = V_B = V_C$

175. Three identical spherical shells, each of mass m and radius r are placed as shown in figure. Consider an axis XX' which is touching to two shells and passing through diameter of third shell. Moment of inertia of the system consisting of these three spherical shells about XX' axis is



(1) $3\ mr^2$ **(2)** $\frac{16}{5}mr^2$ **(3)** $4mr^2$ **(4)** $\frac{11}{5}mr^2$

176. The electric field in a certain region is acting radially outward and is given by E = Ar. A charged contained in a sphere of radius 'a' centred at the origin of the field, will be given by

(1) $A \in_0 a^2$ **(2)** $4\pi \in_0 Aa^3$ **(3)** $\in_0 Aa^3$ **(4)** $4\pi \in_0 Aa^2$]

177. The two ends of a metal rod are maintained at temperatures 100°C. The rate of heat flow in the rod is found to be 4.0 J/s. If the ends are maintained at temperatures 200°C and 210°C, the rate of heat flow will be:

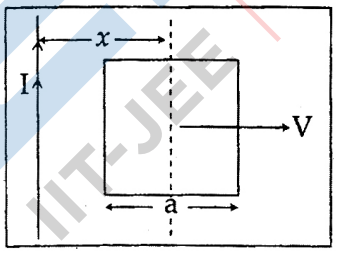
(1) 16.8 J/s **(2)** 8.0 J/s **(3)** 4.0 J/s **(4)** 44.0 J/s

178. Two similar springs P and Q have spring constants K_P and K_Q, such that $K_P > K_Q$. They are stretched, first by the same amount (case a), then by the same force (case b). The work done by the springs W_P and W_Q are related as, in case (a) and case (b), respectively:

(1) $W_P = W_Q; W_P = W_Q$ **(2)** $W_P > W_Q; W_Q > W_P$

(3) $W_P < W_Q; W_Q < W_P$ **(4)** $W_P = W_Q; W_P > W_Q$

179. A conducting square frame of side 'a' and a long straight wire carrying current I are located in the same plane as shown in the figure. The frame moves induced in the frame will be proportional to



(1) $\frac{1}{(2x-a)^2}$ **(2)** $\frac{1}{(2x+a)^2}$ **(3)** $\frac{1}{(2x-a)(2x+a)}$ **(4)** $\frac{1}{x^2}$

180. A particle of mass m is driven by a machine that delivers a constant power k watts. If the particle starts from rest the force on the particle at time t is

(1) $\sqrt{mk}\,t^{-1/2}$ **(2)** $\sqrt{2mk}\,t^{-1/2}$ **(3)** $\frac{1}{2}\sqrt{mk}\,t^{-1/2}$ **(4)** $\sqrt{\frac{mk}{2}}\,t^{-1/2}$

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ANSWER KEY

CHEMISTRY		BIOLOGY				PHYSICS	
1.	(4)	46.	(2)	91.	(2)	136.	(3)
2.	(2)	47.	(1)	92.	(4)	137.	(1)
3.	(3)	48.	(1)	93.	(2)	138.	(2)
4.	(3)	49.	(4)	94.	(4)	139.	(1)
5.	(4)	50.	(1)	95.	(4)	140.	(1)
6.	(3)	51.	(3)	96.	(2)	141.	(4)
7.	(2)	52.	(3)	97.	(2)	142.	(4)
8.	(2)	53.	(3)	98.	(2)	143.	(1)
9.	(3)	54.	(4)	99.	(1)	144.	(1)
10.	(2)	55.	(1)	100.	(1)	145.	(4)
11.	(1)	56.	(3)	101.	(1)	146.	(1)
12.	(4)	57.	(3)	102.	(1)	147.	(2)
13.	(4)	58.	(4)	103.	(2)	148.	(1)
14.	(4)	59.	(1)	104.	(3)	149.	(3)
15.	(1)	60.	(2)	105.	(2)	150.	(2)
16.	(2)	61.	(4)	106.	(1)	151.	(1)
17.	(3)	62.	(1)	107.	(1)	152.	(2)
18.	(1)	63.	(1)	108.	(3)	153.	(2)
19.	(1)	64.	(3)	109.	(2)	154.	(1)
20.	(4)	65.	(2)	110.	(1)	155.	(1)
21.	(2)	66.	(3)	111.	(1)	156.	(2)
22.	(2)	67.	(4)	112.	(2)	157.	(2)
23.	(1)	68.	(2)	113.	(4)	158.	(2)
24.	(1)	69.	(4)	114.	(4)	159.	(1)
25.	(4)	70.	(2)	115.	(3)	160.	(1)
26.	(2)	71.	(2)	116.	(4)	161.	(3)
27.	(4)	72.	(3)	117.	(2)	162.	(2)
28.	(4)	73.	(2)	118.	(1)	163.	(2)
29.	(1)	74.	(2)	119.	(2)	164.	(1)
30.	(2)	75.	(4)	120.	(1)	165.	(4)
31.	(2)	76.	(2)	121.	(3)	166.	(2)
32.	(2)	77.	(3)	122.	(1)	167.	(2)
33.	(4)	78.	(4)	123.	(2)	168.	(4)
34.	(4)	79.	(3)	124.	(1)	169.	(2)
35.	(2)	80.	(4)	125.	(2)	170.	(2)
36.	(1)	81.	(3)	126.	(4)	171.	(2)
37.	(4)	82.	(1)	127.	(2)	172.	(3)
38.	(4)	83.	(1)	128.	(4)	173.	(1)
39.	(1)	84.	(1)	129.	(1)	174.	(4)
40.	(4)	85.	(2)	130.	(3)	175.	(3)
41.	(1)	86.	(3)	131.	(1)	176.	(2)
42.	(3)	87.	(3)	132.	(2)	177.	(3)
43.	(3)	88.	(1)	133.	(1)	178.	(2)
44.	(1)	89.	(1)	134.	(1)	179.	(3)
45.	(1)	90.	(3)	135.	(1)	180.	(4)