Biology Section - I

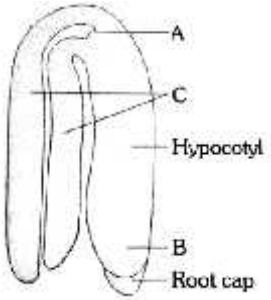
Straight Objective Type

Biology contains 90 multiple choice questions numbered 1 to 90. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. The polyestrous mammal is
   (A) Man (B) Rabbit (C) Cat (D) Horse

2. Sometimes, larva develops gonads and reproduces by normal sexual reproduction. It is called
   (A) Regeneration (B) Neoteny (C) Autotomy (D) Paedogenesis

3. Study the given figure of a typical dicot embryo. Select the right option in which all the labelled parts as A,B and C are correctly matched with their respective functions.

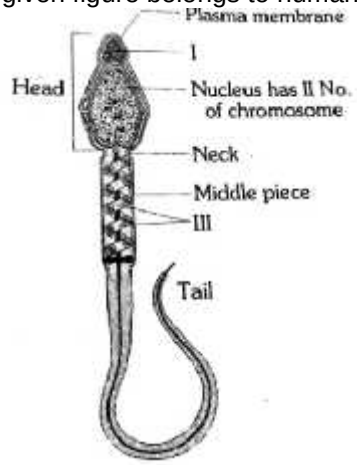


	A	B	C
(A)	Radicle, root system formation	Plumule, shoot system formation	Endosperm, food storage
(B)	Radicle, root system formation	Plumule, shoot system formation	Cotyledon, food storage
(C)	Plumule, shoot system formation	Radicle, root system formation	Cotyledon, food storage
(D)	Plumule, shoot system formation	Radicle, root system formation	Hypophysis, formation of radicle

4. The plant part which consists of two generations one within the other, is
   (A) Germinated pollen grain (B) Embryo (C) Unfertilized ovule (D) Seed

Space for rough work

5. The given figure belongs to human sperm. Identify I, II and III respectively



(A) I – Acrosome, II – 23, III – Spirilum
(B) I – Lysosome, II-23, III-Mitochondria
(C) I – Acrosome, II – 23, III – Mitochondria
(D) I – Acrosome, II – 46, III – Mitochondria

6. In human female, menstruation can be deferred by the administration of
(A) LH only
(B) Combination of FSH and LH
(C) Combination of estrogen and progesterone
(D) FSH only

7. In human secretion which of the following is used to confirm implantation of embryo?
(A) Gastrula (B) Trophoblast (C) Inner mass of cell (D) Blastocyst

8. What is false for ZIFT?
(A) ZIFT – zygote intra fallopian transfer
(B) It follows IVF
(C) Zygote or early embryo is transferred
(D) Embryos with more than 8 blastomeres are transferred to the uterus

9. Which of the following **cannot** be detected in a developing foetus by amniocentesis?
(A) Jaundice
(B) Klinefelter syndrome
(C) Sex of the foetus
(D) Down syndrome

10. A man having the genotype EEFfGgHH can produce P number of genetically different sperms, and a woman of genotype liLLMmNn can generate Q number of genetically different eggs. Determine the value of P and Q
(A) P = 4, Q = 4 (B) P = 4, Q = 8 (C) P = 8, Q = 4 (D) P = 8, Q = 8

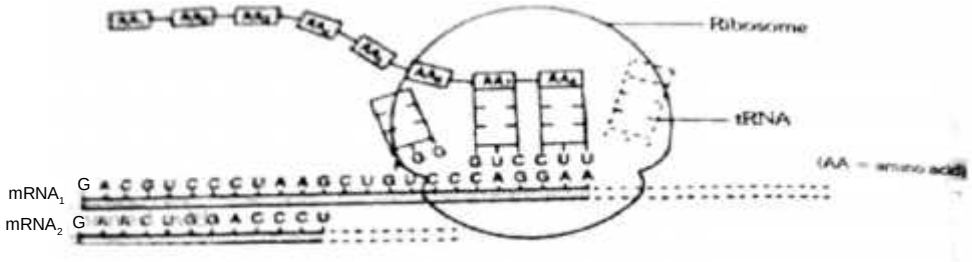
Space for rough work

11. The distance between the genes a, b, c and d in mapping units are a-d = 3.5; b – c = 1; a-b=6; c – d = 1.5; a – c = 5. Find out the sequence of arrangement of the these genes
(A) adcb (B) abcd (C) acbd (D) adbc

12. In human female, barr bodies are formed by
(A) Inactivation of mother's X chromosome
(B) Inactivation of father's X chromosome
(C) Inactivation of both mother's and father's x chromosomes
(D) Inactivation of either mother's and father's X chromosome

13. In lac – operon if mutation occurs in the middle gene of the 'structural gene' then
(A) Permease will not be synthesized (B) β - Galactosidase will not be synthesized
(C) Transacetylase will not be synthesized (D) Lactose digestion will be rapid

14. Study the following figure which shows the synthesis of part of a protein molecule



The DNA strand by which $mRNA_2$ was synthesised of
(A) CUUGACCUGGGA (B) GAACUGGACCCU (C) CTTGACCTGGGA (D) GAACTGGACCCT

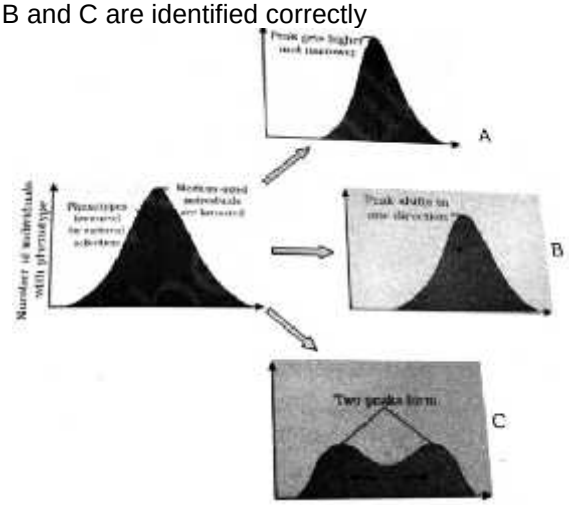
15. In genetic fingerprinting, the 'probe' refers to…
(A) A radioactively labelled single stranded DNA molecule
(B) A radioactively labelled single stranded RNA molecule
(C) A radioactively labelled double stranded RNA molecule
(D) A radioactively labelled double stranded DNA molecule

16. Gases found in primitive atmospheres are
(A) CH_4, NH_3, H_2, H_2O (vapour form) (B) CH_4, NH_3, CO_2, H_2O
(C) CH_4, H_2O, CO_2 (D) CH_4, O_2, CO_2

Space for rough work

17. Which one of the following sets represents the correct sequence of the evolution of man?
    (A) *Kenyapithecus – Australopithecus – Homo habilis – Pithecanthropus – Homo sapiens*
    (B) *Kenyapithecus – Australopithecus – Pithecanthropus – Homo habilis – Homo sapiens*
    (C) *Australopithecus – Kenyapithecus – Homo habilis – Pithecanthropus – Homo sapiens*
    (D) *Pithecanthropus – Australopithecus Kenyapithecus – Homo habilis – Homo sapiens*

18. Following diagrammatic representation refers the natural selection on different trails. Choose the right option on which all the three graphs A, B and C are identified correctly



    (A) A – Directional, B – Disruptive, C – Stabilising
    (B) A – Stabilising, B – Disruptive, C – Directional
    (C) A – Stabilising, B – Directional, C- Disruptive
    (D) A – Directional, B – Stabilising, C – Disruptive

19. A person suffering from malaria, feels fever when
    (A) Exoerythrocytic cycle is completed
    (B) Signet ring stage is formed
    (C) When RBC generally ruptured and haemozoin granules are released into blood
    (D) All the above

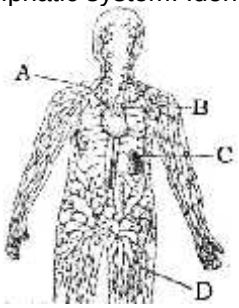
20. Match Column – I with Column II and choose the correction answer

	Column – I		**Column - II**
(A)	Neoplasm	(1)	Haematopoietic cell tumours
(B)	Benign tumour	(2)	Bone, cartilage tissue cancers
(C)	Carcinomas	(3)	Malignant tumour
(D)	Sarcomas	(4)	Cancer of epithelial tissues
(E)	Lymphomas	(5)	Non – Cancerous tumour
		(6)	Initiation of new tumours

    (A) (A) – (6), (B) – (5), (C) –(4), (D) – (2), (E) – (1)
    (B) (A) – (3), (B) – (5), (C) –(4), (D) – (1), (E) – (2)
    (C) (A) – (6), (B) – (3), (C) – (4), (D) – (2), (E) – (1)
    (D) (A) – (6) ,(B) – (4),(C) – (3), (D) – (2), (E) – (1)

Space for rough work

21. The following diagram show the human lymphatic system. Identify the labelled sequences A, B C and D



(A) A – lymph nodes (primary lymphoid organ), B – thymus (secondary lymphoid organ), C – spleen (secondary lymphoid organ), D – bone marrow (secondary lymphoid organ)
(B) A – Lymph nodes (secondary lymphoid organ), B – thymus (primary lymphoid organ), C – spleen (secondary lymphoid organ), D – bone marrow (primary lymphoid organ)
(C) A – Lymph nodes (primary lymphoid organ), B – thymus (secondary Lymphoid organ), C- spleen (primary lymphoid organ), D – bone marrow (primary lymphoid organ)
(D) A – lymph nodes (primary lymphoid organ), B – thymus (primary lymphoid organ), C – spleen (secondary lymphoid organ), D – bone marrow (secondary lymphoid organ)

22. Which of the following is a hallucinogen?
(A) Lysergic acid diethylamide (B) Psilocybin (C) Mescaline (D) All of these

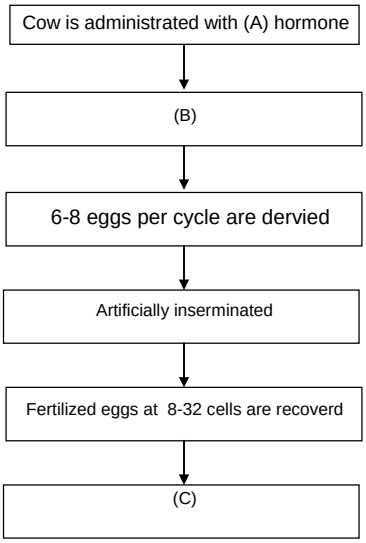
23. Breeding of crops with high levels of minerals, vitamins and proteins is called
(A) Micropropagation (B) Somatic hybridisation
(C) Biofortification (D) Biomagnification

24. Which of the following two hormones are essential for induced breeding of fishes
(A) TSH and ACTH (B) Oestrogen and progesterone
(C) FSH and LH (D) Vasorpressin and oxytocin

25. If the source is opposite to the direction of sun, then honey bee will convey the direction by
(A) Clockwise round dance (B) Upright down tail wagging dance
(C) Anticlockwise round dance (D) Opposite to (b)

Space for rough work

26. The following flow chart shows methodology which has been used for cattle, sheep, buffaloes etc. Identify missing steps (A, B and C)



(A) A – Estrogen, B – Super ovulation due to induced follicular maturation, C – Transfer to surrogate mother
(B) A – Progesterone, B – Super ovulation due to induced follicular maturation, 3 – Transfer to surrogate mother
(C) A – LH, B – Super ovulation due to induced follicular maturation, C – Transfer to surrogate mother
(D) A – FSH, B – super ovulation due to induced follicular maturation, C – Transfer to surrogate mother

27. What gases are produced in anaerobic sludge digesters?
(A) Methane, hydrogen sulphide and O_2
(B) Hydrogen sulphide and CO_2
(C) Methane and CO_2 only
(D) Methane, hydrogen sulphide and CO_2

28. The fruit juices turn bitter in taste if they are kept in open place for sometime, because of
(A) Bacteria of the atmosphere react with the juice
(B) Fermentation of the juice by yeast
(C) Some internal factors
(D) All the above three statements are correct

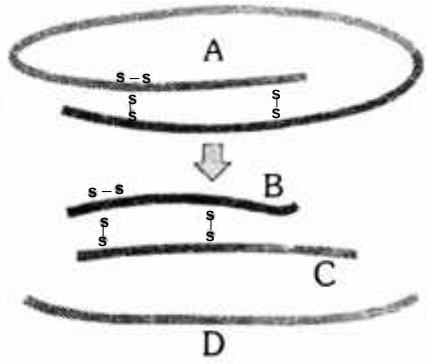
29. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of
(A) Inactivation of glycosidase enzyme in recombinant bacteria
(B) Non – recombinant bacteria containing betagalactosidase
(C) Insertional inactivation of alpha-galactosidase in non recombinant bacteria
(D) Insertional inactivation of alpha-galactosidase in recombinant bacteria

Space for rough work

30. Chimeric DNA is
    (A) A part of recombinant DNA
    (B) In fact passenger DNA
    (C) Recombinant DNA formed by combining vector DNA and passenger DNA
    (D) Residual DNA that has no role in genetic engineering

31. Choose the correct option for the toxic protein produced by *B. thuringiensis*
    (A) It acts in acidic medium and binds to epithelial cells of foregut
    (B) It acts in neutral medium and binds to epithelial cells of hindgut
    (C) It acts in alkaline medium and binds to epithelial cells of foregut
    (D) It acts in alkaline medium and binds to epithelial cells of midgut

32. Following is a diagrammatic representation of maturation of insulin., Select the correct set of the names labelled A, B, C and D



	A	B	C	D
(A)	Proinsulin	B – Peptide	A – Peptide	Free C Peptide
(B)	Proinsulin	A – Peptide	B – Peptide	Insulin
(C)	Proinsulin	A – Peptide	B-Peptide	Free C Peptide
(D)	Proinsulin	B – Peptide	A – Peptide	Insulin

33. Which one of the following is a population?
    (A) A spider and some trapped files in its web
    (B) Earthworm that lives in a grassland along with other arthropods
    (C) All the plants in a forest
    (D) All the oak trees in a forest

Space for rough work

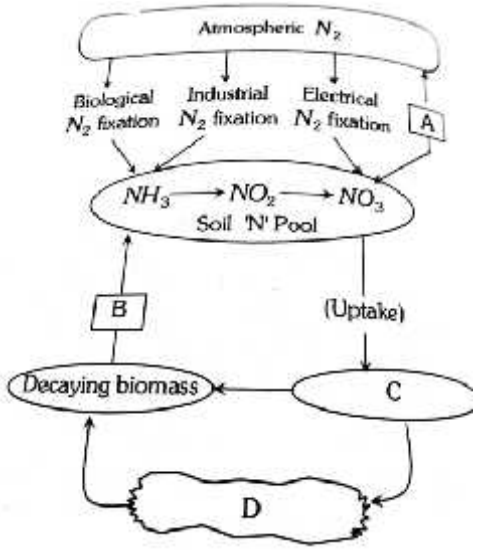
34. Population growth curve in most animals, except humans is
(A) S – shaped (B) J – shaped (C) J – shaped with tail (D) S – shaped with tail

35. Mass of living matter at a trophic level in an area at any time is called
(A) Standing state (B) Standing crop (C) Detritus (D) Humus

36. If 20 J of energy is trapped at producer level, then how much energy will be available to peacock as food in the following chain
plant → Mice → snake → Peacock
(A) 0.2 J (B) 0.0002 J (C) 0.02 J (D) 0.002 J

37. Mr.X is eating curd/yoghurt. For this food intake in a food chain he should be considered as occupying
(A) First trophic level (B) Second trophic level
(C) Third trophic level (D) Fourth trophic level

38. Study the cycle shown below and select the option which gives correct words for all the four balnks A, B , C and D



Options:

	A	B	C	D
(A)	Nitrification	Ammonification	Animals	Plants
(B)	Denitrification	Ammonification	Plants	Animals
(C)	Nitrification	Denitrification	Animals	Plants
(D)	Denitrification	Nitrification	Plants	Animals

Space for rough work

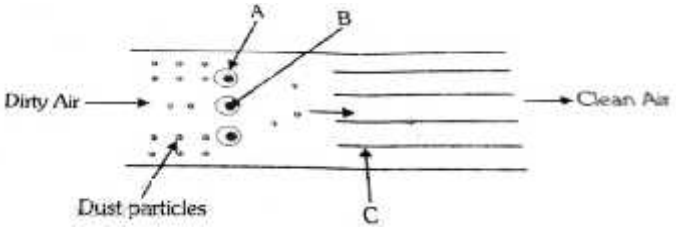
39. The term alpha diversity refers to
(A) Genetic diversity (B) Community and ecosystem diversity
(C) Species diversity (D) Diversity among the plants

40. What is the effect of destruction of wild life?
(A) Flood (B) Soil erosion
(C) Green house effect (D) Gene for disease resistance cannot be obtained

41. An example of ex situ conservation is
(or)
Which is the best method of germplasm conservation ?
(A) Wildlife Sanctuary (B) Sacred Grove (C) National Park (D) Seed Bank

42. Steps taken by the Government of India to control air pollution include
(A) Compulsory mixing of 20% ethyl alcohol with petrol and 20% biodiesel with diesel
(B) Compulsory PUC (Pollution Under Control) certification of petrol driven vehicles which tests for carbon monoxide and hydrocarbons
(C) Permission to use only pure diesel with a maximum of 500 ppm sulphur as fuel for vehicles
(D) Use of non – polluting compressed Natural Gas (CNG) only as fuel by all buses and trucks in Delhi

43. The given figure represents electrostatic precipitator. Select the right option in which A, B and C are correctly identified.



(A) A – Uncharge corona, B – Positively charged wire, C – Collection plate never ground
(B) A – Discharge corona, B – Negatively charged wire, C – Collection plate burnt
(C) A – Discharge corona, B – Positively charged wire, C – Collection plate grounded
(D) A – Discharge corona, B – Negatively charged wire, C- Collection plate grounded

44. Biometry refers to
(A) Measurement of evolutionary rate in humans (B) Measurement of living things and processes
(C) measurement of fertility and mortality rate (D) None of these

Space for rough work

45. Carbohydrates the most abundant, biomolecules on earth, are produced by
(A) Some bacteria, algae and green plant cells (B) Fungi, algae and green plant cells
(C) All bacteria, fungi and algae (D) Viruses, fungi and bacteria

46. Which of the following is required as equivalent to subspecies of classical Taxonomy?
(A) Ecospecies (B) Ecotype (C) Cenospecies (D) Comparium

47. Which one of the following statement correctly define the term homonym?
(A) Identical name of two different taxon
(B) Two or more names belonging to the same taxon
(C) when species name repeats the generic name
(D) Other name of a taxon given in a language other than the language of zoological/botanical nomenclature

48. Sometimes prothallus of fern give rise to a fern plant. It is an example of
(A) Apospory (B) Parthenogenesis (C) Parthenocarpy (D) Apogamy

49. Read the following five statements (A- E) and answer as asked next to them.
(A) In *Equisetum* ,the female gametophyte is retained on the parent sporophyte
(B) In *Ginkgo*, male gametophyte is not independent
(C) The sporophyte in *Riccia* is more developed than in *Polytrichum*
(D) Sexual reproduction in *Volvox* is isogamous
(E) The spores of slime moulds lack cell walls
How many of the above statements are correct?
(A) Two (B) Three (C) Four (D) One

50. Number of cotyledons in *Zea*, *Cycas* and *Pinus* respectively are
(A) 1,1, many (B) 1, 2, 1 (C) 1, 1, 1 (D) 1, 2, many

51. See the following diagram and identify the name of the animal and the phylum to which it belong correctly
(A) *Nereis*, Annelida
(B) *Balanoglossus*, Urochordata
(C) *Balanoglossus*, Cephalochordata
(D) *Balanoglossus*, Hemichordata

52. Pneumatic bones of birds
(A) Increase the respiratory rate (B) Increase the heart beat rate
(C) Increase the CO_2 output (D) Increase the buoyancy

Space for rough work

53. Why do mammals lack mucus glands in their skin?
(A) The skin is not slippery (B) The skin is tough
(C) The epidermis has many layers of cells (D) The skin is not respiratory

54. When the anthers mature earlier that the stigma of ones own flower, the condition is know as
(A) Herkogamy (B) Protandry (C) Heterostyly (D) Heterogamy

55. Finely dissected leaves occur in
(A) Free floating plants (B) Rooted floating leaved plants
(C) Submerged plants (D) Emerged plants

56. Lenticles are found in
(A) Young dicot stem (B) Old dicot stem (C) Monocot root (D) Young root

57. Which will decay faster if exposed freely?
(A) Soft wood (B) Heart wood
(C) Sap wood (D) Wood with lots of fibres

58. Skin is a
(A) Cuboidal epithelium (B) Columnar epithelium
(C) Pseudostratified epithelium (D) Stratified epithelium

59. Ligaments and tendons are
(A) Connective tissues (B) Muscular tissue
(C) Fibrous connective tissue (D) Skeletal tissue

60. Which of the following ion is necessary for the contraction of muscles and nerve impulse transmission
(A) Na^+ (B) K^+ (C) Ca^{++} and Mg^{++} ions (D) None of these

61. F_1 Particles/oxysome are present in
(A) Endoplasmic reticulum (B) Chloroplast (C) Mitochondria (D) Golgi complex

62. The two sub – units of ribosome remain united at a critical ion level of
(A) Magnesium (B) Calcium (C) Copper (D) Manganese

63. Non – proteinaceous enzyme that acts as a catalyst for the formation of peptide bond is
(OR)
"All enzymes are Proteins." This statement is now modified because an apparent exception to this biological truth is
(A) Spliceosome (B) Ribozyme (C) RNA poly I (D) RNA poly II

Space for rough work

64. Non – Protein part of an enzyme is known as
(A) Holoenzyme (B) Apoenzyme (C) Coenzyme (D) All the above

65. Enzyme capable of changing their form are called
(A) Apoenzyme (B) Holoenzyme (C) Isoenzyme (D) Allosteric enzyme

66. Decision for division in a cell occur at
(A) S phase (B) G1 phase (C) G2 phase (D) before prophase

67. While working in a lab, a student forgot to add colchicine while karyotyping through blood culture technique, Then what will happen
(A) Mitosis will be arrested at metaphase
(B) Chromosomal division will discontinue and each chromosomes will have four arms
(C) Chromosomal division will continue
(D) Mitosis will be arrested at telophase

68. Which of the following criteria does not pertain to facilliated transport?
(A) Uphill transport (B) Requirement of special membrane proteins
(C) High selectivity (D) Transport saturation

69. Which of the following is true of passive transport?
(A) It requires a gradient (B) It uses the cell wall
(C) It includes endocytosis (D) It moves only water

70. On the basis of symptoms of chlorosis in leaves, a student inferred that this was due to the deficiency of nitrogen . This inference could be correct only if yellowing of leaves appeared first in
(A) Young leaves (B) Old leaves
(C) Young leaves followed by old leaves (D) Old leaves followed by young leaves

71. According to the well known theory of transport of solutes across a cell membrane, what happens when sugar is passed through it
(A) Na^+ flows in the direction of the sugar (B) Na^+ flows independent of sugar molecules
(C) Na^+ flows against the sugar molecules (D) Na^+ ions do not flow at all

72. One molecule of glucose in Calvin cycle is formed from
(A) $6CO_2$ + 12ATP (B) $6CO_2$ + 30ATP + 12NADPH
(C) $6CO_2$ + 18ATP + 12NADPH (D) $6CO_2$ + 18ATP + 30NADPH

Space for rough work

73. The C_4 plants are photosynthetically more efficient than C_3 plants because
(A) The CO_2 efflux is not prevented
(B) They have high density of chloroplast and rich in RuBisCo
(C) The CO_2 compensation point is more
(D) CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase

74. *Leptothrix* is a
(A) Nitrifying bacteria (B) Sulphur bacteria (C) Iron bacteria (D) Hydrogen bacteria

75. Pyruvic acids is converted into a compound before formation of oxaloacetic acid in the citric and acid cycle, this compound is
(A) Acetyl CoA (B) Acetoacetic acid (C) Lactic acid (D) Cis aconitic acid

76. When the dark period of short day plants is interrupted by a brief exposure of light, then the plant
(A) Will not flower at all (B) Flower immediately
(C) Give more flowers (D) Turn into a long day plant

77. An infant may be feeding entirely on mother's milk which is white in color but the stools which the infant passes out is quite yellowish. What is this yellow colour due to
(A) Intestinal juice (B) Bile pigments passed through bile
(C)Undigested milk protein casein (D) Pancreatic juice poured into duodenum

78. Surgical removal of gall bladder in human beings would lead to
(A) Impairment of the digestion of fat (B) Increased acidity in the intestine
(C) Jaundice (D) None of the above

79. Chloride shift is essential for the transport of
(A) CO_2 and O_2 (B) N_2 (C) CO_2 (D) O_2

80. Ravi, who lived at sea level, had around 5 million RBC per cubic millimeter of his blood. Later when he lived at an altitude of 18,000 ft, showed around 8 million RBC per cubic millimeter of blood. This is an adaptation because
(A) At high altitude he ate more nutritive food
(B) He had pollution free air to balance breathe
(C) At high altitude O_2 level is less hence more RBCs were required to absorb enough oxygen
(D) At high altitude there is more UV radiation which enhances RBCs production

Space for rough work

81. The pace-setter in the heart is called
(A) Purkinje fibres (B) Sino-aterial node(SAN)
(C) Papillary muscle (D) Atrio-ventricular node (AVN)

82. How many double circulations are normally completed by the human heart, in one minute
(A) Eight (B) Sixteen (C) Seventy two (D) Thirty six

83. Match the entries in Column – I with those in Column – II and choose the correct answer from the following

Column – I	**Column – II**
(A) Uremia	1. Excess of protein level in urine
(B) Hematuria	2. Presence of high ketone bodies in urine
(C) Ketonuria	3. Presence of blood cells in urine
(D) Glycosuria	4. Presence of glucose in urine
(E) Proteinuria	5. Presence of urea in urine

(A) A – 5, B – 3, C – 2, D – 4, E – 1 (B) A – 4, B – 5, C –3, D – 2, E – 1
(C) A – 5, B – 3, C – 4, D – 2, E – 1 (D) A – 3, B – 5, C – 2, D – 1, E – 4

84. Volume of urine is regulated by
(A) Aldosterone (B) Aldosterone, ADH and testosterone
(C) Aldosterone and ADH (D) ADH alone

85. In mammals, the largest vertebra is
(A) Cervical (B) Lumbar (C) Caudal (D) Sacral

86. Number of cervical vertebrae in camel is
(A) More than that of Rabbit (B) Less than that of Rabbit
(C) Same as that of whale (D) More than that of horse

87. Body posture, equilibrium and rapid muscular activities are controlled by
(A) Cerebellum (B) Thalamus
(C) Hippocampus (D) Temporal lobe of cerebrum

88. A boy learns typewriting and harmonium at the same time. He finds harmonium more easy to learn. This is
(A) Conditioned reflex (B) Short term homeostasis
(C) Long term homeostasis (D) Residual learning

89. In the homeostatic control of blood sugar level, which organs function respectively as modulator and effector
(A) Liver and islets of Langerhans (B) Hypothalamus and liver
(C) Hypothalamus and islets of Langerhans (D) Islets of Langerhans and hypothalamus

90. The urine of a man is very dilute and the quantity of urine if too much and dehydration has started in his body and he is very thirsty by the cause of
(A) Hypersecretion of ADH (B) Hyposecretion of ADH
(C) Both (a) and (b) (D) None of the above

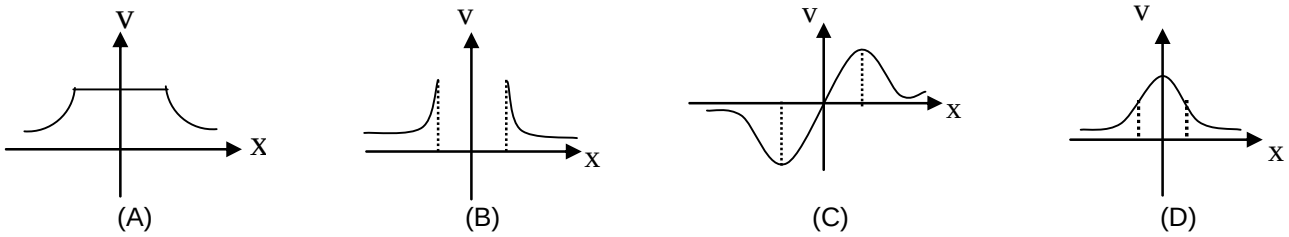
Space for rough work

Physics Section - II

Straight Objective Type

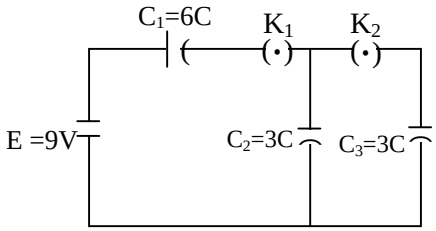
Physics contains 45 multiple choice questions numbered 1 to 45. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. A sphere contains charge at uniform charge density ρ. Which of the graph correctly describes potential as a function of distance from its centre. (x-axis is passing through centre, which is origin)

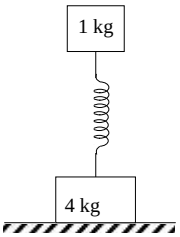


2. The molar heat capacity of an ideal mono-atomic gas, during a process obeying $P\sqrt{T} = \text{constant}$ is
(A) – 3 R (B) 2.5 R (C) 3 R (D) 2 R

3. In the circuit shown in figure initially K_1 is closed and K_2 is open for a long time. Then K_1 was opened and K_2 was closed (order is important), what will be the charge on C_2 & C_3 now?
[$C = 1«F$]
(A) 18 μC, 0 μC (B) 0 μC, 18 μC
(C) 9 μC, 9 μC (D) 4.5 μC, 4.5 μC



4. Two bodies of masses 1 kg and 4 kg are connected to a vertical spring, as shown in the following figure. The smaller mass executes simple harmonic motion of angular frequency 25 rad/s, and amplitude 1.6 cm while the bigger mass remains stationary on the ground. The maximum force exerted by the system on the floor is (take g = 10m/s^2).
(A) 20 N (B) 10 N
(C) 60 N (D) 40 N

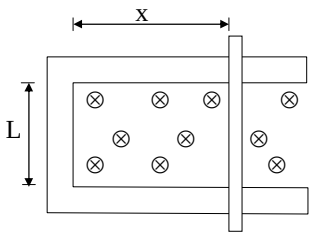


Space for rough work

5. A person cannot see the objects clearly placed at a distance more than 40 cm. He is advised to use lens of power
(A) – 2.5 D (B) +2.5 D (C) +1.5 D (D) – 6.25 D

6. A 1.6 kg ball is attached to the end of a 0.45 m string to form a pendulum. This pendulum is released from rest with the string horizontal. At the lowest point of its swing, when it is moving horizontally, the ball collides with a 0.80-kg block initially at rest on a horizontal frictionless surface. The speed of the block just after the collision is 3.0 m/s. What is the speed of the ball just after the collision?
(A) 1.7 m/s (B) 1.1 m/s (C) 1.5 m/s (D) 1.3 m/s

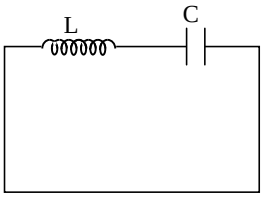
7. A rod with resistance R lies across frictionless conducting rails in a constant uniform magnetic field B, as shown in the figure given below.
Assume the rails have negligible resistance. The magnitude of the force that must be applied by a person to pull the rod to the right at constant speed v is
(A) 0 (B) BLv
(C) $\frac{BLv}{R}$ (D) $\frac{B^2L^2v}{R}$



8. Energy required for the electron excitation in Li^{++} from the first to the third Bohr orbit is
(A) 36.3 eV (B) 108.8 eV (C) 122.4 eV (D) 12.1 eV

9. Two point masses A of mass M and B of mass 4M are fixed at the ends of a rod of length *l* and of negligible mass. The rod is set rotating about an axis perpendicular to its length with a uniform angular speed ω. For the rod to have the minimum possible kinetic energy of rotation, the axis of rotation should be at a distance of
(A) $\frac{2}{5}l$ from centre (B) $\frac{3}{10}l$ from centre (C) $\frac{4}{5}l$ from centre (D) $\frac{l}{5}$ from centre

10. In an LC circuit the capacitor has maximum charge q_0. The value of $\left(\frac{dI}{dt}\right)_{max}$ is
(A) $\frac{q_0}{LC}$ (B) $\frac{q_0}{\sqrt{LC}}$
(C) $\frac{q_0}{2LC}$ (D) $\frac{2q_0}{LC}$



Space for rough work

11. Two sound waves of slightly different frequency have the amplitude ratio $\frac{11}{9}$. What is the difference of sound levels) in (dB) of maximum and minimum intensities heard at a point?
(A) 100 (B) 10 (C) 16 (D) 20

12. A spring of stiffness constant k and natural length ℓ is cut into two parts of length $3\ell/4$ and $\ell/4$, respectively, and they are connected in parallel. If the mass is slightly displaced, find the time period of oscillation.
(A) $\pi\sqrt{\frac{2m}{k}}$ (B) $\frac{\pi}{2}\sqrt{\frac{2m}{k}}$ (C) $\frac{\pi}{2}\sqrt{\frac{3m}{k}}$ (D) $\pi\sqrt{\frac{3m}{k}}$

13. In a Searle's experiment for determination of Young's Modulus, when a load of 50 kg is added to a 3 meter long wire micrometer screw having pitch 1 mm needs to be given a quarter turn in order to restore the horizontal position of spirit level. Young's modulus of the wire if its cross sectional area is 10^{-5} m^2 is
(A) $6\times10^{11}N/m^2$ (B) $1.5\times10^{11}N/m^2$ (C) $3\times10^{11}N/m^2$ (D) None

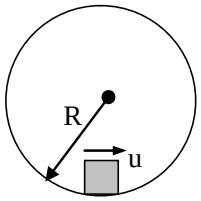
14. The moment of inertia of at the disc used in a torsional pendulum about the suspension wire is 0.2 kgm^2. It oscillates with a period of 2 s. Another disc is placed over the first one and the time period of the system becomes 2.5 s. Find the moment of inertia of the second disc about the wire.
(A) 0.32 kg m^2 (B) 0.45 kg m^2 (C) 0.28 kg m^2 (D) 0.11 kg m^2

15. A cubical block of wood of specific gravity 0.5 and chunk of concrete of specific gravity 2.5 are fastened together. The ratio of mass of wood to the mass of concrete which makes the combination to float with entire volume of the combination submerged in water is
(A) 1/5 (B) 1/3 (C) 3/5 (D) 2/5

16. A man is standing between source and cliff. When he start moving along line joining him and source, he hears 10 beats per second. Velocity of man is (Frequency of source = 60 Hz, Velocity of sound = 330 m/s)
(A) 18.5 m/s (B) 55 m/s (C) 15 m/s (D) 27.5 m/s

Space for rough work

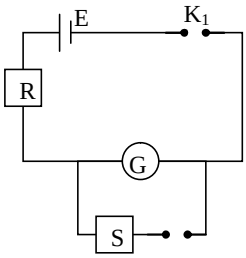
17. A particle is given an initial speed u inside a smooth spherical shell of radius R = 1 m that it is just able to complete the circle. Acceleration of the particle when its velocity is vertical is



(A) $g\sqrt{10}$ (B) g

(C) $g\sqrt{2}$ (D) 3g

18. In an experiment to determine the resistance of a galvanometer by half deflection method, the circuit shown is used. In one set of readings, if $R = 10\Omega$ and $S = 4\Omega$, then the resistance of the galvanometer is



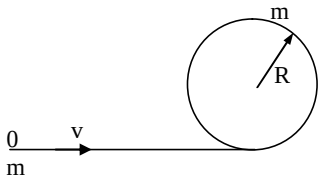
(A) $\frac{20}{3}\Omega$ (B) $\frac{40}{3}\Omega$

(C) $\frac{50}{3}\Omega$ (D) $\frac{70}{3}\Omega$

19. A charge *q* is moving with a velocity $\vec{v}_1 = 1\hat{i}$ m/s at a point in a magnetic field and experiences a force $\vec{F}_1 = q[-1\hat{j} + 1\hat{k}]N$. If the charge is moving with a velocity $\vec{v}_2 = 1\hat{j}\,m/s$ at the same point, it experiences a force $\vec{F}_2 = q[1\hat{i} - \hat{k}]N$. The magnetic induction $\vec{B}$ at that point is

(A) $(\hat{i} + \hat{j} + \hat{k})\ Wb/m^2$ (B) $(\hat{i} - \hat{j} + \hat{k})\ Wb/m^2$ (C) $(-\hat{i} + \hat{j} - \hat{k})\ Wb/m^2$ (D) $(\hat{i} + \hat{j} - \hat{k})\ Wb/m^2$

20. A circular hoop of mass m and radius R rests flat on a horizontal frictionless surface. A bullet, also of mass m and moving with a velocity v, strikes the hoop and gets embedded in it. The thickness of the hoop is much smaller than R. The angular velocity with which the system rotates after the bullet strikes the hoop is



(A) V/(4R) (B) V/(3R)

(C) 2V/(3R) (D) 3V/(4R)

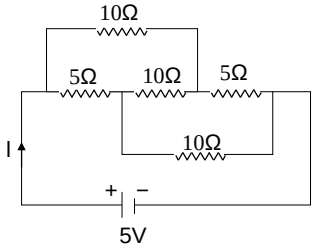
21. Unpolarized light travels through 2 linear polarizers. What (minimum) angle should the second polarizer be relative to the first polarizer (the difference between θ_1 and θ_2) so that the final intensity of light is $3/8^{th}$ of the original value?

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

Space for rough work

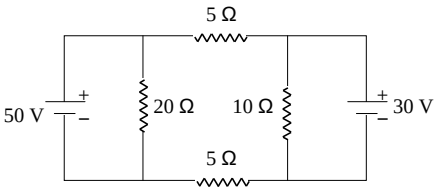
22. A beam of fast moving electrons having cross-sectional area A falls normally on a flat surface. The electrons are absorbed by the surface and the average pressure exerted by the electrons on this surface is found to be P. If the electrons are moving with a speed v, then the effective current through any cross-section of the electron beam is
(A) $APe/(mv)$ (B) $APe/(mv^2)$ (C) $APv/(me)$ (D) $APm/(eV)$

23. The current I drawn from the 5V source will be
(A) 0.17 A (B) 0.33 A
(C) 0.5 A (D) 0.67 A



24. The wavelength of characteristic X-ray K_α – line emitted by a hydrogen like atom is 0.32 Å. The wavelength of K_β line emitted by the same element is
(A) 0.18 Å (B) 0.48 Å (C) 0.27 Å (D) 0.38 Å

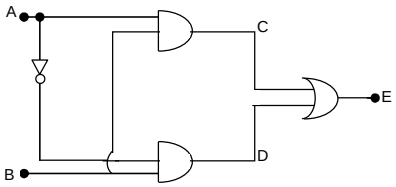
25. In the circuit shown, current (in A) through the 50 V and 30 V batteries are, respectively.
(A) 2.5 and 3 (B) 3,5 and 2
(C) 4.5 and 1 (D) 3 and 2.5



26. **Statement-1:** Phase change suffered by an electromagnetic wave travelling a distance Δx in a medium of refractive index μ is equal to phase change suffered in travelling $\mu\Delta x$ in vacuum.
Statement-2: Wave speed in vacuum is μ times wave speed in medium and frequency does not change due to change of medium.
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is false, statement-2 is true.
(D) Statement-1 is true, statement-2 is false.

Space for rough work

27. Truth table for the given circuit (Fig.) is



A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

(A)

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

(B)

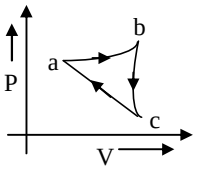
A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

(C)

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

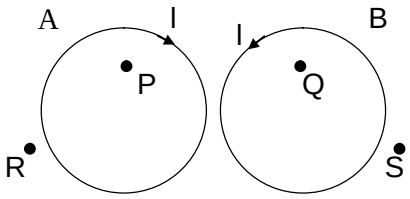
(D)

28. In the P-V diagram shown, the gas does 5 J of work in isothermal process ab and 4 J in adiabatic process bc. What will be the change in internal energy of the gas in straight path c to a?



(A) 9 J (B) 1 J
(C) 4 J (D) 5 J

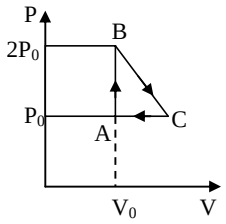
29. Two identical loops A and B lying in the same plane carry equal currents. Four points P, Q, R and S are in the plane of the loops. Choose the correct statement :



(A) The field at P must be out of the plane of the paper
(B) The field at Q must be into the plane of the paper
(C) The field at R must be out of the plane of the paper
(D) The field at S must be out of the plane of the paper

Space for rough work

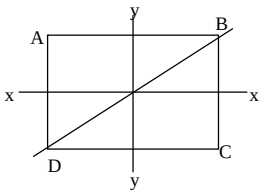
30. An ideal gas at pressure, volume and temperature P_0, V_0 and T_0 respectively is heated to point B, allowed to expand to point C, and then returned to the original; point A. Points B and C have the same temperatures. The internal energy decreases by $(3P_0 V_0/2)$ in going from point C to A. Heat transfer along the process CA is



(A) $(P_0V_0/2)$ (B) $(-5P_0V_0/2)$

(C) $(-3P_0V_0/2)$ (D) 0

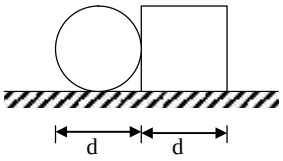
31. In a rectangle ABCD, AB = 2l and BC = l, Axes xx and yy pass through centre of the rectangle. The moment of inertia is least about :



(A) DB (B) BC

(C) xx (D) yy

32. A square plate of edge d and a circular disc of diameter d are placed touching each other at the midpoint of an edge of plate as shown. The centre of mass of the combination will be (assume same mass per unit area for the two plates) :



(A) $\frac{2d}{2+\pi}$ left to the centre of the disc

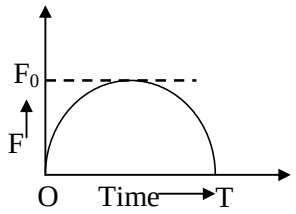
(B) $\frac{2d}{2+\pi}$ right to the centre of the disc

(C) $\frac{4d}{4+\pi}$ right to the centre of the disc

(D) $\frac{4d}{4+\pi}$ left to the centre of the disc

Space for rough work

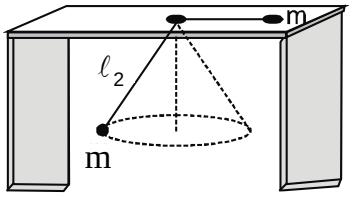
33. A particle of mass m, initially at rest, is acted upon by a variable force F for a brief interval of time T. It begins to move with a velocity u after the force stops acting. F is shown in the graph as a function of time. The curve is a semicircle, then :



(A) $u = \frac{\pi F_0^2}{2m}$ (B) $u = \frac{\pi T^2}{8m}$

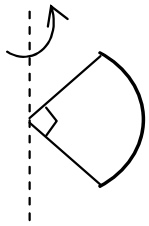
(C) $u = \frac{\pi F_0 T}{4m}$ (D) $u = \frac{F_0 T}{2m}$

34. Two identical particles are attached at the ends of a light string which passes through a hole at the centre of a table. One of the particles is made to move in a circle on the table with angular velocity ω_1 and the other is made to move in a horizontal circle as a conical pendulum with angular velocity ω_2. If ℓ_1 and ℓ_2 are the length of the string over and under the table, then in order that particle under the table neither moves down nor moves up the ratio $\frac{\ell_1}{\ell_2}$ is :



(A) $\frac{\omega_1}{\omega_2}$ (B) $\frac{\omega_2}{\omega_1}$ (C) $\frac{\omega_1^2}{\omega_2^2}$ (D) $\frac{\omega_2^2}{\omega_1^2}$

35. One quarter section is cut from a uniform circular disc of radius R. This section has mass M. it is made to rotate about a line perpendicular to its plane and passing through the centre of the original disc. Its moment of inertia about the axis of rotation is

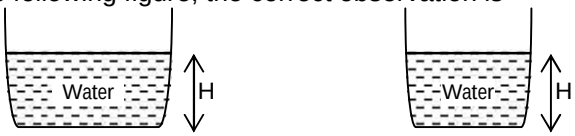


(A) $\frac{1}{2}MR^2$ (B) $\frac{1}{4}MR^2$

(C) $\frac{1}{8}MR^2$ (D) $\sqrt{2}\ MR^2$

Space for rough work

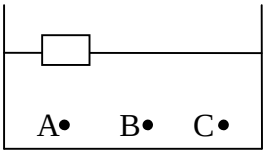
36. From the following figure, the correct observation is



(I) (II)

(A) the pressure on the bottom of tank (I) is greater than at the bottom (II)
(B) the pressure on the bottom of tank (I) is smaller than at the bottom of (II)
(C) the pressure depends on the shape of the container
(D) the pressure on the bottom of (I) and (II) is the same

37. A wooden object floats in water kept in a beaker. The object is near a side of beaker (figure). Let ρ_1, ρ_2, ρ_3 be the pressures at three points A, B and C of the bottom as shown in the figure.

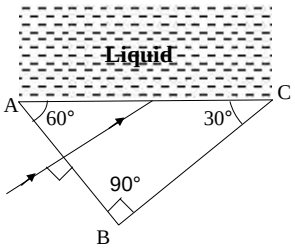


(A) $\rho_1 \neq \rho_2 = \rho_3$ (B) $\rho_1 > \rho_2 > \rho_3$
(C) $\rho_1 = \rho_2 = \rho_3$ (D) None of these

38. The height of mercury column in a simple barometer is h. As the tube is inclined with the vertical at an angle α, the length of mercury column along the length of the tube will become

(A) $h\cos\alpha$ (B) $\frac{h}{\cos\alpha}$ (C) $h\sin\alpha$ (D) $\frac{h}{\sin\alpha}$

39. Light is incident normally on face AB of a prism as shown in figure. A liquid of refractive index μ is placed on face AC of the prism. The prism is made of glass of refractive index $\frac{3}{2}$. The limits of μ for which total internal reflection takes place on face AC is:



(A) $\mu > \frac{\sqrt{3}}{2}$ (B) $\mu < \frac{3\sqrt{3}}{4}$ (C) $\mu > \sqrt{3}$ (D) $\mu < \frac{\sqrt{3}}{2}$

Space for rough work

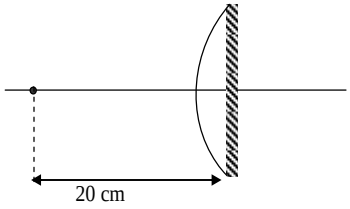
40. Two beams of light having intensities 'I' and '4I' interfere to produce a fringe pattern on a screen. The phase difference between the beams is $\pi/2$ at point A and π at point B. Then the difference between the resultant intensities at A and B is
(A) 3I (B) 5I (C) 8I (D) 4I

41. When an unpolarized light of intensity 'I_0' is incident on a polarizing sheet, the intensity of the light which does not get transmitted is
(A) I_0 (B) zero (C) $I_0/2$ (D) $I_0/4$

42. The critical angle for a prism and its surrounding interface is 36°. The maximum angle of prism for which any emergent ray is possible is
(A) 18° (B) 36° (C) 72° (D) 144°

43. Critical angle of glass is θ_1 and that of water is θ_2. The critical angle for water and glass surface would be $(\mu_g = 3/2, \mu_w = 4/3)$
(A) less than θ_2 (B) between θ_1 and θ_2 (C) greater than θ_2 (D) less than θ_1

44. A point object is placed at distance of 20 cm from a thin plano convex lens of focal length 15 cm. The plane surface of the lens is now silvered. The image created by the system is at:
(A) 60 cm to the left of the system (B) 60 cm to the right of the system
(C) 12 cm to the left of the system (D) 12 cm to the right of the system



45. A copper wire having a cross-sectional area of 0.5 mm^2 and a length of 0.1 m is initially at 25°C and is thermally insulated from the surroundings. If a current of 10 A is set up in this wire, find the time in which the wire starts melting. The change of resistance of the wire with temperature may be neglected.
Density of Cu $= 9\times10^3 kg/m^3$; specific heat of Cu is 9×10^{-2} Cal $Kg^{-1}{}^{\circ}C^{-1}$; Melting point of copper is 1075 °C; specific resistance is $1.6\times10^{-8}\,\Omega m$.
(A) 321 s (B) 540 s (C) 558 s (D) 247 s

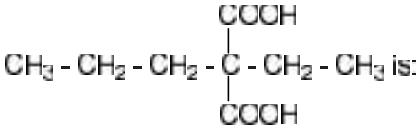
Space for rough work

Chemistry Section - III

Straight Objective Type

Chemistry contains 45 multiple choice questions numbered 1 to 45. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. The IUPAC name of the compound

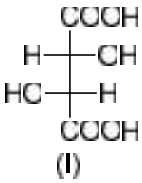


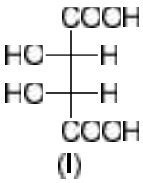
(A) 2-propyl-2-ethylpropane -1, 3-dioic acid
(B) 2-ethyl-2-propylpropane -1, 3-dioic acid
(C) 2-ethyl-2-carboxypentanoic acid
(D) 2-carboxy-2-ethylpentanoic acid

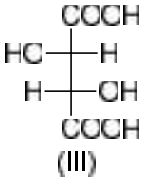
2. A nucleophile is:
(A) Electron – rich species
(B) Electron – deficient species
(C) A lewis acid
(D) Positively charged species

3. The pair of electrons in the given carbanion $CH_3 - C \equiv C^-$, is present in which of the following orbitals?
(A) sp^3 (B) sp^2 (C) 2p (D) sp

4. Pair of enantiomers form the following compounds are,


(I)


(I)


(III)

(A) I and II
(B) II and III
(C) I, II and III
(D) I and III

5. Elevation in b.pt, of an aqueous glucose solution is $0.6K_b$ for water is 0.52K $molality^{-1}$. The mole fraction of glucose in the solution is:
(A) 0.02 (B) 0.03 (C) 0.01 (D) 0.04

Space for rough work

6. Resonance is due to:
   (A) Delocalisation of sigma – electrons
   (B) Delocalisation of pi-electrons
   (C) Migration of H-atoms
   (D) Migration of protons

7. Maximum number of σ bonds that may be present in an isomer of C_4H_8 are:
   (A) 10 (B) 11 (C) 12 (D) 13

8. The hydrogen bond is strongest in which one of the following?
   (A) F – H - - - F (B) O – H - - - O (C) S – H - - - F (D) F – H - - - O

9. The ratio of vapour pressures of two liquids A and B in pure state are 1:2. If the two liquids are mixed and the ratio of their mole fraction in vapour phase are 2:1, the liquids A and B were mixed in the ratio of their mole:
   (A) 1 : 2 (B) 2 : 1 (C) 4 : 1 (D) 1 : 4

10. Which one of the following is the weakest base in aqueous medium?
   (A) NH_3 (B) $(C_2H_5)_2NH$ (C) $C_2H_5NH_2$ (D) $(C_2H_5)_3N$

11. Which one of the following compounds is most acidic?
   (A) Phenol
   (B) Trichloroacetaldehyde
   (C) Trichloroacetic acid
   (D) Benzoic acid

12. Which statements is not correct?
   (A) Colloidal state is a particular state and not a class of compounds.
   (B) The dispersed phase may consists of a single macro molecule or an aggregate of atoms or ions.
   (C) The sol particles can be seen under microscope.
   (D) Colloidal state is an intermediate (but heterogeneous) state between true solution and suspension state.

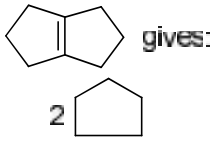
13. Which of the following yields both alkane and alkene?
   (A) Kolbe's reaction
   (B) Williamson's synthesis
   (C) Wurtz reaction
   (D) Sandmeyer's reaction

14. Anti-Markownikoff addition of HBr is not observed in:
   (A) Propene (B) 1-butene (C) 2-butene (D) 2-pentene

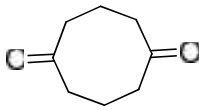
Space for rough work

15. For a given reaction the concentration of the reactant plotted against time gave a straight line with negative slope. The order of the reaction is-
(A) 3 (B) 2 (C) 1 (D) 0

16. Ozonolysis of the following compound



(A)



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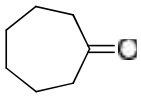
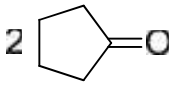


(C)



(D)

17. A certain current liberates 0.504 g of hydrogen in 2 hours. How many gram of copper can be liberated by the same current flowing for the same time in aqueous $CuSO_4$ solution :
(A) 12.7 (B) 16 (C) 31.8 (D) 63.5

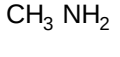
18. The strongest ortho-para and strongest meta-directing groups respectively are:
(A) $-NO_2$ and $-NH_2$ (B) $-NH_2$ and $-NO_2$ (C) $-NH_2$ and $-CONH_2$ (D) $-X$ and $-CONH_2$

19. Carboxylic acid group can be detected by which test?
(A) Sodium bisulphate test (B) Fehling's solution test
(C) Tollen's reagent (D) With $NaHCO_3$

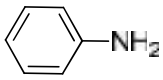
20. Which of the following ion has exceptionally higher values of $\wedge_\infty$
(A) H^+ (B) K^+ (C) NH_2^- (D) NH_2^+

21. Carbylamine test is performed in alcoholic KOH by heating a mixture of:
(A) Chloroform and silver powder (B) Trihalogenated methane and a primary amine
(C) An alkyl halide and a primary amine (D) An alkyl cyanide and a primary amine

22. Which of the following amines from N-nitroso derivative when treated with $NaNO_2$ and HCl ?



(A)



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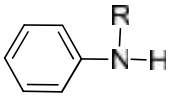

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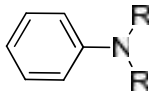


(D)

Space for rough work

23. Continuous bleeding from an injured part of body is due to deficiency of:
(A) vitamin A (B) vitamin E (C) vitamin B (D) vitamin K

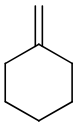
24. The successive nucleotides of DNA are covalently linked through:
(A) Peptide bonds (B) Hydrogen bonds
(C) Glycosidic bonds (D) Phosphodiester bonds

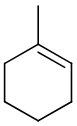
25. pK_b of NH_4OH is 5. The pH of a mixture containing 10mL of 0.3M NH_4OH and 200mL of 0.1M $(NH_4)_3PO_4$ is:
(A) 5 (B) 5.3010 (C) 6.3010 (D) 7.6987

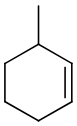
26. In S_{N^1} reaction, the first step involves the formation of:
(A) Free radical (B) carbanion (C) carbocation (D)final product

27. An alkyl halide may be converted into an alcohol by:
(A) Addition (B) Substitution
(C) dehydrohalogenation (D) elimination

28. A $\xrightarrow{\text{Dil. } H_2SO_4 / Hg^{2+}}$ 1-Methylcyclohexanol. Here A is:


(A)


(B)


(C)

(a) or (b)
(D)

29. A solid PQ have rock salt type structure in which Q atoms are at the corners of the unit cell. If the body centred atoms in all the unit cells are missing, the resulting stoichiometry will be -
(A) PQ (B) PQ_2 (C) P_3Q_4 (D) P_4Q_3

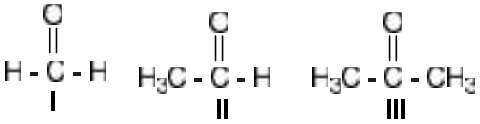
30. For the reaction: $AB_{2(g)} \rightleftharpoons AB_{(g)} + B_{(g)}$, the degree of dissociation of AB_2 is negligible compared to unity, then which one is not correct?
(A) $K_{eq.} = \frac{C\alpha^2}{4}$ (B) $\alpha = \sqrt{\frac{K_{eq.}}{C}}$ (C) $\alpha = \sqrt{\frac{K_p}{P}}$ (D) $K_{eq.} = \frac{\alpha^2 \times P}{(1+\alpha)}$

Space for rough work

31. Cannizzaro reaction is example of:
(A) Redox reaction (B) Disproportionation (C) Both (A) and (B) (D) Only oxidation

32. Which will give silver mirror test with Tollen's reagent?
(A) C_6H_5CHO (B) CH_3-CHO (C) HCOOH (D) All of these

33. Mark out the correct order of dipole moment for the following compounds:



(A) I > II > III (B) II > III > I (C) III > II > I (D) III > I > II

34. Which of the following does not give oxygen on heating?
(A) $KClO_3$ (B) $Zn(ClO_3)_2$ (C) $K_2Cr_2O_7$ (D) $(NH_4)_2Cr_2O_7$

35. According to the equation
$C_6H_{6(l)}+\frac{15}{2}O_{2(g)}\rightarrow 3H_2O_{(l)}+6CO_{2(g)}\Delta H=-3264.4\ kJ/mol$,
the energy evolved when 7.8 gm of C_6H_6 is burnt in air will be
(A) 162.22 kJ/mol (B) 326.4kJ/mol (C) 32.64kJ/mol (D) 3.264 kJ/mol

36. Given the bond energies of $N\equiv N, H-H$ and N – H bonds are 945, 436 and 391kJ mol respectively, the enthalpy of the reaction $N_{2(g)}+3H_{2(g)}\rightarrow 2NH_{3(g)}$ is
(A) -93 kJ (B) 102kJ (C) 90kJ (D) 105kJ

37. The vapour pressure of water at 300 K in a closed container is 0.4 atm. If the volume of the container is doubled, its vapour pressure at 300 K will be
(A) 0.8 atm (B) 0.2 atm (C) 0.4 atm (D) 0.6 atm

Space for rough work

38. Equal masses of SO_2, CH_4 and O_2 are mixed in empty container at 298K, when total pressure is 2.1 atm. The partial pressure of CH_4 in the mixture is
(A) 0.5 atm (B) 0.75atm (C) 1.2atm (D) 0.6atm

39. Which of the following pairs of substances on reaction will not evolve H_2 gas?
(A) Fe and H_2SO_4 (aqueous) (B) Copper and HCI (aqueous)
(C) Sodium and ethyl alcohol (D) Iron and steam

40. The sum of angular node and angular momentum for ψ 4,3,2 is
(A) $\frac{\sqrt{6}h+3\pi}{2\pi}$ (B) $\frac{\sqrt{3}h+3\pi}{\pi}$ (C) $\frac{\sqrt{3}h+\pi}{2\pi}$ (D) $\frac{\sqrt{3}h+3\pi}{3\pi}$

41. Amongst the following elements whose electronic configurations are given below, the one having the highest ionization enthalpy is:
(A) $[Ne]\,3s^2\,3p^1$ (B) $[Ne]\,3s^2\,3p^3$ (C) $[Ne]3s^2 3p^2$ (D) $[Ar]\,3d^{10}\,4s^2\,4p^3$

42. In van der Waal's equation of state for a non – ideal gas the term that accounts for intermolecular force is:
(A) $\left(P+\frac{a}{V^2}\right)$ (B) (V - b) (C) RT (D) $\frac{1}{RT}$

43. The equilibrium constant for the reaction,
$CaCO_3(s) \rightleftharpoons CaO(s)+CO_2(g)$ is:
(A) $K_c=\frac{1}{[CO_2]}$ (B) $K_c=[CO_2]$ (C) $K_c=\frac{[CaO][CO_2]}{[CaCO_3]}$ (D) $K_c=\frac{[CaCO_3]}{[CaO][CO_2]}$

44. $C(s)+H_2O(g) \rightleftharpoons CO(g)+H_2(g)$
The above equilibrium when subjected to pressure:
(A) Remains unaffected (B) Proceeds in the backward direction
(C) Proceeds in the forward direction (D) None of the above

45. In a chemical reaction $A+B \rightleftharpoons C+D$ The concentration A, B, C and D are 0.5, 0.8, 0.4 and 1.0 at equilibrium respectively. The equilibrium constant is:
(A) 0.1 (B) 1.0 (C) 10 (D) ∞

Space for rough work