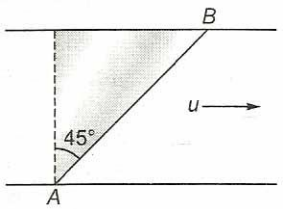
Meritstore

NEET

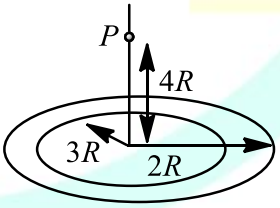
TEST ID: 25

Time : 03:00:00 **Marks** : 720

1. Which of the following cannot be regarded as an essential characteristic of a unit of measurement?
   a) Inaccessibility
   b) Indenstructibility
   c) Invariability
   d) Reproductibility
2. The unit of absolute permittivity is
   a) $Fm\ \ (farad - metre)$
   b) $Fm^{-1}\ (farad/metre)$
   c) $Fm^{-2}\ (farad/metre^2)$
   d) F (farad)
3. A man wants to reach point B on the opposite bank of a river flowing at a speed as shown in figure. What minimum speed relative to water should the man have so that he can reach point B? In which direction should be swim?



   a) $u\sqrt{2}$ b) $u/\sqrt{2}$ c) 2u d) $u/2$
4. A body crosses the topmost point of a vertical circle with critical speed. Its centripetal acceleration, when the string is horizontal will be
   a) 6 g b) 3 g c) 2 g d) g
5. A car is moving with speed 30 m/sec on a circular path of radius 500 m. Its speed is increasing at the rate of $2m/\sec^2$, What is the acceleration of the car
   a) $2m/\sec^2$ b) $2.7m/\sec^2$
   c) $1.8m/\sec^2$ d) $9.8m/\sec^2$
6. A block of mass M is pulled along a horizontal frictionless surface by a rope of mass m. Force P is applied at one end of the rope. The force which the rope exerts on the block is
   a) $\frac{P}{M(m+M)}$ b) $\frac{P}{M-m}$
   c) $\frac{Pm}{M-m}$ d) $\frac{PM}{m+M}$
7. A box is lying on an inclined plane what is the coefficient if static friction if the box starts sliding when an angle of inclination is 60°
   a) 1.173 b) 1.732 c) 2.732 d) 1.677
8. A body of mass 5 kg is placed at the origin, and can move only on the x-axis. A force of 10 N is acting on it in a direction making an angle of 60° with the x-axis and displaces it along the x-axis by 4 $metres$. The work done by the force is
   a) 2.5 J b) 7.25 J c) 40 J d) 20 J
9. The moment of inertia of a thin uniform rod of mass M and length L about an axis passing through its midpoint and perpendicular to its length is I_0. Its moment of inertia about an axis passing through one of its ends and perpendicular to its length is
   a) $I_0 + ML^2$ b) $I_0 + \frac{ML^2}{2}$
   c) $I_0 + \frac{ML^2}{4}$ d) $I_0 + 2ML^2$
10. A circular disc of mass 0.41 kg and radius 10 m rolls without slippling with a velocity of 2ms^{-1}. The total kinetic energy of disc is
    a) 0.41 J b) 1.23 J c) 0.82 J d) 2.45 J
11. A thin uniform annular disc (see figure) of mass M has outer radius $4R$ and inner radius $3R$. The work required to take a unit mass from point P on its axis to infinity is



    a) $\frac{2GM}{7R}(4\sqrt{2}-5)$ b) $-\frac{2GM}{7R}(4\sqrt{2}-5)$
    c) $\frac{GM}{4R}$ d) $\frac{2GM}{5R}(\sqrt{2}-1)$
12. The twisting couple per unit twist for a solid cylinder of radius 3 cm is 0.1 N-m. The twisting couple per unit twist, for a hollow cylinder of same material with outer and inner radius 5 cm and 4 cm respectively will be
    a) 0.1 N-m b) 0.455 N-m

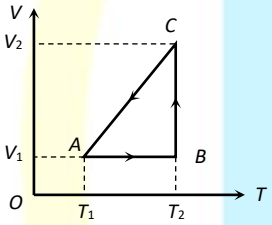
c) 0.91 N-m d) 1.82 N-m

13. A bird is sitting in a large closed cage which is placed on a spring balance. It records a weight of 5N. The bird of mass 0.5 kg files upward in the cage with an acceleration of 2 ms^{-2}. The spring balance will now record a weight of
a) 4 N b) 5 N c) 6 N d) 7 N

14. A water film is formed between two parallel wires of 10 cm length. The distance of 0.5 cm between the wires is increased by 1 mm. Which will be the work done?
(Surface tension of water $=72\ Nm^{-1}$)
a) 288 erg b) 144 erg c) 72 erg d) 36 erg

15. According to the experiment of Ingen Hausz the relation between the thermal conductivity of a metal rod is K and the length of the rod whenever the wax melts is
a) $K/l =$ constant b) $K^2/l =$ constant
c) $K/l^2 =$ constant d) $Kl =$ constant

16. A cyclic process for 1 mole of an ideal gas is shown in figure in the V-T, diagram. The work done in AB, BC and CA respectively



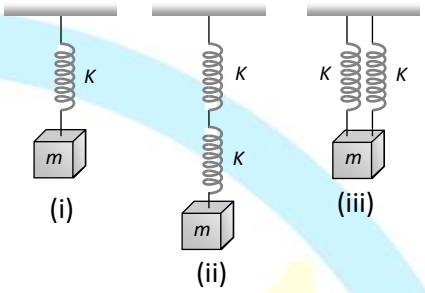
a) $0, RT_2 \ln\left(\frac{V_1}{V_2}\right), R(T_1 - T_2)$
b) $R(T_1 - T_2), 0, RT_1 \ln\frac{V_1}{V_2}$
c) $0, RT_2 \ln\left(\frac{V_2}{V_1}\right), R(T_1 - T_2)$
d) $0, RT_2 \ln\left(\frac{V_2}{V_1}\right), R(T_2 - T_1)$

17. Adiabatic modulus of elasticity of a gas is $2.1 \times 10^5 Nm^{-2}$. What will be its isothermal modulus of elasticity? $\left(\frac{C_p}{C_v} = 1.4\right)$
a) $1.2 \times 10^5\ Nm^{-2}$ b) $4 \times 10^5\ Nm^{-2}$
c) $1.5 \times 10^5\ Nm^{-2}$ d) $1.8 \times 10^5\ Nm^{-2}$

18. An air bubble of volume 1.0 cm^3 rises from the bottom of a lake 40m deep at a temperature of 12°C. The volume of the bubble when it reaches the surface, which is at a temperature of 35°C, will be
a) 5.4 cm^3 b) 4.9 cm^3 c) 2.0 cm^3 d) 10.0 cm^3

19. The displacement of tow particles executing SHM are represented equations$y_1 = 2\sin(10t + \theta), y_2 = 3\cos 10t$. The phase difference between the velocity of these particles is
a) θ
b) $-\theta$
c) $\theta + \pi/2$
d) $\theta - \pi/2$

20. Five identical springs are used in the following three configurations. The time periods of vertical oscillations in configurations (i), (ii) and (iii) are in the ratio



a) $1 : \sqrt{2} : \frac{1}{\sqrt{2}}$ b) $2 : \sqrt{2} : \frac{1}{\sqrt{2}}$
c) $\frac{1}{\sqrt{2}} : 2 : 1$ d) $2 : \frac{1}{\sqrt{2}} : 1$

21. In a resonance tube, using a tuning fork of frequency 325 Hz, two successive resonance length are observed as 25.4 cm and 77.4 cm respectively. The velocity of sound in air is
a) $338ms^{-1}$b) $328ms^{-1}$c) $330ms^{-1}$d) $320ms^{-1}$

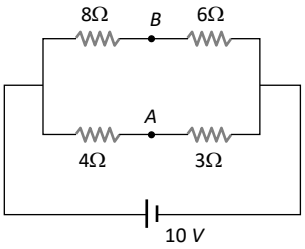
22. If n drops, each of capacitance C, coalesce to form a single big drop, then the ratio of the energy stored in the big drop to that in each small drop will be
a) $n : 1$ b) $n^{1/3} : 1$ c) $n^{5/3} : 1$ d) $n^2 : 1$

23. A spherical condenser has inner and outer spheres of radii a and b respectively. The space between the two is filled with air. The difference between the capacities of two condensers formed when outer sphere is earthed and when inner sphere is earthed will be
a) Zero b) $4\pi\varepsilon_0 a$
c) $4\pi\varepsilon_0 b$ d) $4\pi\varepsilon_0 a\left(\frac{b}{b-a}\right)$

24. 27 small drops each having charge q and radius r coalesce to form big drop. How many times charge and capacitance will become?
a) 3, 27 b) 27, 3 c) 27, 27 d) 3, 3

25. A battery of emf E and internal resistance r is connected to an external resistance R the condition for maximum power transfer is
a) r<R b) r>R c) r=1/R d) R=R

26. The potential difference between point A & B is



a) $\frac{20}{7}V$ b) $\frac{40}{7}V$ c) $\frac{10}{7}V$ d) 0

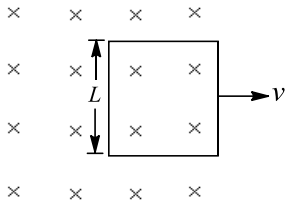
27. At neutral temperature, the thermoelectric power $\left(\frac{dE}{dT}\right)$ has the value
a) Zero
b) Maximum but negative
c) Maximum but positive
d) Minimum but positive

28. Two thin, long, parallel wires, separated by a distance d carry a current of i ampere in the same direction. They will
a) Attract each other with a force of $\frac{\mu_0 i^2}{(2\pi d)}$
b) Repel each other with a force of $\frac{\mu_0 i^2}{(2\pi d)}$
c) Attract each other with a force of $\frac{\mu_0 i^2}{(2\pi d^2)}$
d) Repel each other with a force of $\frac{\mu_0 i^2}{(2\pi d^2)}$

29. Direction of magnetic field at equatorial point is
a) Parallel to **M**
b) Perpendicular to **M**
c) Making an angle of angle 45° with **M**
d) Antiparallel to **M**

30. The correct measure of magnetic hardness of a material is
a) Remanant magnetism
b) Hysterses loss
c) Coercivity
d) Curie temperature

31. A conducting square loop of side L and resistance R moves in its plane with a uniform velocity v perpendicular to one of its sides. A magnetic induction B constant in time and space, pointing perpendicular and into the plane of the loop exists everywhere with part of the loop outside the field, as shown in figure. The induced emf is



a) BvR
b) vBL/R
c) vBL
d) $BLv/2$

32. An inductive circuit contains a resistance of $10\ ohm$ and an inductance of $2.0\ henry$. If an ac voltage of $120\ volt$ and frequency of $60\ Hz$ is applied to this circuit, the current in the circuit would be nearly
a) 0.32 amp b) 0.16 amp c) 0.48 amp d) 0.80 amp

33. In a series $L-C-R$ circuit, resistance $R = 10\ \Omega$ and the impedance $Z = 10\ \Omega$. The phase difference between the current and the voltage is
a) 0° b) 30° c) 45° d) 60°

34. The refractive index and the permeability of a medium are respectively 1.5 and $5 \times 10^{-7}\mathrm{Hm}^{-1}$. The relative permittivity of the medium is nearly
a) 25 b) 15 c) 81 d) 6

35. The length of the tube of a microscope is $10\ cm$. The focal lengths of the objective and eye lenses are $0.5\ cm$ and $1.0\ cm$. The magnifying power of the microscope is about
a) 5 b) 23 c) 166 d) 500

36. A man of length h requires a mirror, to see his own complete image of length at least equal to
a) $h/4$ b) $h/3$ c) $h/2$ d) h

37. Which of the following has/have zero average value in a plane electromagnetic wave
a) Both magnetic and electric fields
b) Electric field only
c) Magnetic field only
d) Magnetic energy

38. If f_1, f_2 and f_3 are the frequencies of corresponding K_α, K_β and $L_\alpha X$-rays of an element, then
a) $f_1 = f_2 = f_3$ b) $f_1 - f_2 = f_3$
c) $f_2 = f_1 + f_3$ d) $f_2^2 = f_1 f_3$

39. While doing his experiment, Millikan one day observed the following charges on a single drop
(i) $6.563 \times 10^{-19}C$ (ii) $8.204 \times 10^{-19}C$
(iii) $11.50 \times 10^{-19}C$ (iv) $13.13 \times 10^{-19}C$

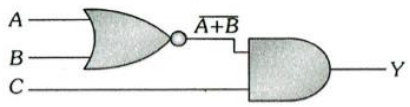
(v) $16.48 \times 10^{-19} C$ (vi) $18.09 \times 10^{-19} C$
From this data the value of the elementary charge (e) was found to be
a) $1.641 \times 10^{-19} C$ b) $1.630 \times 10^{-19} C$
c) $1.648 \times 10^{-19} C$ d) $1.602 \times 10^{-19} C$

40. The angular momentum (L) of an electron moving in a stable orbit around nucleus is
a) Half integral multiple of $\frac{h}{2\pi}$
b) integral multiple of h
c) integral multiple of $\frac{h}{2\pi}$
d) Half integral multiple of h

41. ${}_1H^1 + {}_1H^1 + {}_1H^2 \rightarrow X + {}_{+1}e^0$ +energy. The emitted particle is
a) Neutron b) Proton
c) α −particle d) Neutrino

42. Nuclear forces are
a) Short ranged attractive and charge independent
b) Short ranged attractive and charge dependent
c) Long ranged repulsive and charge independent
d) Long ranged repulsive and charge dependent

43. In the circuit given A, B and C are inputs and Y is the output



The output of Y is
a) High for all the high inputs
b) High for all the low inputs
c) High when $A = 1, B = 1, C = 0$
d) Low for all low inputs

44. A telephone link operating at a central frequency of 10 GHz is established. If 1% of this available then how many telephone channels can be simultaneously given when each telephone covering a band width of 5 kHz
a) 2×10^4 b) 2×10^6 c) 5×10^4 d) 5×10^6

45. The special theory of relativity is based on the frame of reference which has constant?
a) Acceleration b) Speed
c) Time interval d) Space interval

46. One gram of hydrogen is found to combine with 80 g of bromine. One gram of calcium (Valency =2) combines with 4 g of bromine. The equivalent weight of calcium is
a) 10 b) 20 c) 40 d) 80

47. How many gram of KCL would have to be dissolved in 60 g H_2O to give 40% by weight of solution?
a) 40 g b) 20 g c) 15 g d) 10 g

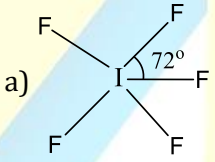
48. Suppose 10^{-17} J of light energy is needed by the interior of a human eye to see an object. Calculate the number of photons of green light ($\lambda = 550$ nm) needed to generate this minimum amount of energy
a) 26 b) 27 c) 28 d) 29

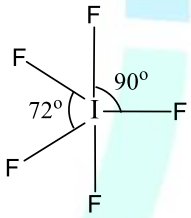
49. Angular momentum of an electron in the n th orbit of hydrogen atom is given by
a) $\frac{nh}{2\pi}$ b) nh c) $\frac{2\pi}{nh}$ d) $\frac{\pi}{2nh}$

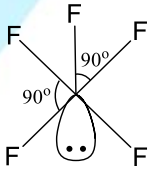
50. Metallic nature and basic nature of the oxides…… as we move along a period
a) Increases
b) Decreases
c) Remains constant
d) First increases then decreases

51. Which one of the following conversions involve change in both hybridisation and shape?
a) $CH_4 \longrightarrow C_2H_6$
b) $NH_3 \longrightarrow NH_4^+$
c) $BF_3 \longrightarrow BF_4^-$
d) $H_2O \longrightarrow H_3O^+$

52. The structure of IF_5 can be best described as

a) 

b) 

c) 

d) None of these

53. At lower temperatures, all gases except H_2 and He show
a) Negative deviation
b) Positive deviation
c) Positive and negative deviation
d) None of the above

54. In an isochoric process, the increase in internal energy is
a) Equal to the heat absorbed
b) Equal to the heat evolved
c) Equal to the work done
d) Equal to the sum of the heat adsorbed and work done

55. Molar heat capacity of aluminum is $25\ JK^{-1}\ mol^{-1}$. The heat necessary to raise

the temperature of 54 g of aluminum (Atomic mass 27 g mol^{-1}) from 30°C to 50°C is

a) 1.5 kJ b) 0.5 kJ c) 1.0 kJ d) 2.5 kJ

56. A vessel at 1000 K contains CO_2 with a pressure of 0.5 atm. Some of the CO_2 is converted into CO on the addition of graphite. If the total pressure at equilibrium is 0.8 atm, the value of K_p is

a) 1.8 atm b) 3 atm
c) 0.3 atm d) 0.18 atm

57. In which of the following reactions, chlorine acts as an oxidising agent?

(i)$CH_3CH_2OH + Cl_2CH_3CHO + HCl$
(ii)$CH_3CHO + Cl_2CCl_3CHO + HCl$
(iii)$CH_4 + Cl_2 \xrightarrow{h} CH_3Cl + HCl$

The correct answer is

a) (i) only b) (ii) only
c) (i) and (iii) d) (i),(ii) and (iii)

58. In which of the following compounds, the oxidation number of iodine is fractional?

a) IF_3 b) IF_5 c) I_3^- d) IF_7

59. Hydrogen does not combine with

a) Helium b) Bismuth
c) Antimony d) Sodium

60. Select the incorrect statement

a) Be can form complexes due to its very small size
b) Mg cannot form complexes
c) Mg burns in air releasing dazzling light rich in UV rays
d) $CaCl_2.6H_2O$ when mixed with ice gives freezing mixture

61. Quartz watches contain

a) Hands made of quartz
b) Silica coating on the numbers
c) A crystal of quartz as an essential component
d) A coating of quartz on the outer body

62. Lead pipes are not suitable for drinking water because

a) A layer of lead dioxide is deposited over pipes
b) Lead forms basic lead carbonate
c) Lead reacts with water containing air to form $Pb(OH)_2$
d) Lead reacts with air to form litharge

63. In this reaction,

$CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN \xrightarrow{H.OH} CH_3CH(OH)COOH$

an asymmetric centre is generated. The acid obtained would be

a) 50%D+50%L-isomer b) 20%D+80%L-isomer
c) D-isomer d) L-isomer

64. What are the products obtained upon the ozonolysis of pent-2-ene?

a) CH_3CH_2CHO b) CH_3CHO
c) CH_3COCH_3 d) Both (a) and (b)

65. A cyclic hydrocarbon molecule has all the carbon and hydrogen in a single plane. All the carbon-carbon bonds are of same length, less than 1.54Å, but more than 1.34Å. The C-c bond angle will be

a) 109°28′ b) 100° c) 180° d) 120°

66. Which of the following is not regarded as a pollutant?

a) NO_2 b) CO_2
c) O_3 d) Hydrocarbons

67. The ability of a given substance to assume two or more crystalline structure is called

a) Amorphism b) Isomorphism
c) Polymorphism d) Isomerism

68. Which set of characteristics of ZnS crystal is correct?

a) Coordination number (4 : 4):ccp;Zn^{2+} ion in the alternate tetrahedral voids
b) Coordination number (6 : 6); hcp;Zn^{2+} ion in all tetrahedral voids
c) Coordination number (6 : 4); hcp;Zn^{2+} ion in all octahedral voids
d) Coordination number (4 : 4); ccp;Zn^{2+} ion in all tetrahedral voids

69. An aqueous solution of 6.3 g oxalic acid dihydrate is made up to 250 mL. The volume of 0.1 N sodium hydroxide required to completely neutralise 10 mL of this solution is

a) 40 mL b) 20 mL c) 10 mL d) 4 mL

70. In a 0.2 molal aqueous solution of a weak acid H*X*, the degree of ionisation is 0.3 Taking k_f for water as 1.85, the freezing point of the solution will be nearest to

a) −0.480°C b) −0.360°C c) −0.260°C d) +0.480°C

71. The Edison storage cell is represented as :

$Fe(s) + FeO(s)|KOH(aq)|Ni_2O_3(s)|Ni_2O_3(s)|Ni(s)$

The half reactions are $Ni_2O_3(s) + H_2O(l) + 2e^- \rightarrow 2NiO(s) + 2OH^-$; $E° = +0.40$ V

$FeO(s) + H_2O(l) + 2e^- \rightarrow Fe(s) + 2OH^-;\ E^\circ = -0.87\ V$

Choose the incorrect statement

a) E_{anode} increases with increase in concentration of OH^-

b) $E_{cathode}$ decreases with increase in concentration of OH^-

c) $E^\circ_{cell} = 1.27\ V$

d) E_{cell} increases with increase in concentration of FeO

72. For the reaction, $2A + B \rightarrow$ products, the active mass of B is kept constant, and that of A is doubled. The rate of reaction will be then

a) Decrease 4 times b) Decrease 2 times

c) Increase 4 times d) Increase 2 times

73. The ratio of the times for 99.9% of the reaction to complete and half of the reaction to complete is

a) 2 b) 4 c) 8 d) 10

74. Colloidal gold is given by injection to act as

a) Disinfectant

b) Anticancer agent

c) Germ killer

d) Tonic to raise vitality of human systems

75. Which of the following mineral does not contain Al?

a) Fluorspar b) Cryolite

c) Mica d) Feldspar

76. Mond's process is used for the purification of

a) Ni b) Ti c) Zr d) Hg

77. S—S bond is not present in

a) $H_2S_2O_4$ b) $H_2S_2O_6$

c) $H_2S_2O_8$ d) None of these

78. One of the product formed when $K_2Cr_2O_7$ reacts with conc H_2SO_4 in cold is

a) CrO_3 b) $Cr_2(SO_4)$c) Cr_2O_3 d) CrO_4Cl_2

79. Which among the following metals does not dissolve in aqua regia?

a) Pt b) Pd c) Au d) Ir

80. False statement is

a) Aprotic solvents increase the enol content in tautomerism

b) Any deviation from the normal bond angles introduces angle strain in molecule

c) Diastereomers have identical physical properties

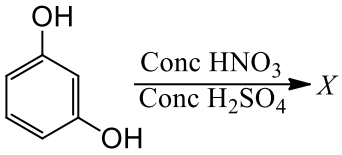
d) Chain isomers can also be position isomers

81. 9.65 C of electric current is passed through fused anhydrous magnesium chloride. The magnesium metal thus, obtained is completely converted into a Grignard reagent. The number of moles of the Grignard reagent obtained is

a) 5×10^{-4} b) 1×10^{-4}

c) 5×10^{-5} d) 1×10^{-5}

82. Consider the following reaction,



product X is

a) Picric acid b) Styphnic acid

c) Salicylic acid d) Benzoic acid

83. Tertiary alcohols (3°) having at least four carbon atoms upon drastic oxidation yield carboxylic acid with

a) One carbon atom less

b) Two carbon atoms less

c) Three carbon atoms less

d) All the above three options are correct

84. A keto ester (A) with molecular formula $C_6H_{10}O_3$ on treatment with $NaOH + I_2$ does not give iodoform but on boiling with dilute KOH gives a compound (B) with molecular formula$C_4H_5O_3K$ which upon acidification followed by heating undergoes decarboxylation to give acetone. The keto ester (A) is

a) $CH_3COCH_2CH_2COOCH_3$

b) $CH_3COCH_2COOC_2H_5$

c) $CH_3CH_2OCH_2COOCH_3$

d) $CH_3 - COCH(CH_3)COOCH_3$

85. Which one of the following is not the correct reaction of aryl diazoniumsalts ?

a) $C_6H_5N_2^+Cl^- + Cu_2Cl_2 \rightarrow C_6H_5Cl$

b) $C_6H_5N_2^+Cl^- + HBF_4 \xrightarrow{Heat} C_6H_5F$

c) $C_6H_5N_2^+Cl^- + H_3PO_2 \rightarrow C_6H_5PO_4$

d) $C_6H_5N_2^+Cl^- + SnCl_2/HCl \rightarrow C_6H_5NHNH_2$

86. Which of the following reactions can be used to prepare ethyl isocyanide?

a) $CH_3CH_2I + NaCN \xrightarrow{C_2H_5OH/H_2O}$

b) $CH_3CH_2I + KCN \xrightarrow[\Delta]{Alcohol}$

c) $CH_3CH_2NH_2 + CHCl_3 + KOH \xrightarrow[\Delta]{Alcohol}$

d) None of the above

87. Diabetes is detected, using ……. for testing urine of patients.

a) Fehling 's solution b) Tollen's regent

c) Benedict's solution d) Baeyer's reagent

88. Dacron is an example of

a) Elastomer
b) Fibre
c) Thermoplastic
d) Thermosetting polymer

89. Which of the following is used for making artificial silk?
a) Adipic acid b) Starch
c) Cellulose d) Terephthalic acid

90. Chemically aspirin is known as
a) Salicylic acid
b) Salicylaldehyde
c) 2-acetoxybenzoic acid
d) Phenyl salicylate

91. What size of herbarium sheet and label is recommended generally?
a) 30 × 40 cm, 6 × 12 cm b) 29 × 41 cm, 7 × 14 cm
c) 30 × 45 cm, 7 × 12 cm d) 20 × 30 cm, 5 × 10 cm

92. Phenetic classification of organism is based on
a) Observable characteristics of existing organisms
b) The ancestral lineage of existing organism
c) Dendrogram based on DNA characteristics
d) Sexual characteristics

93. Scientific study of diversity of organisms and their evolutionary relationship is
a) Morphology b) Anatomy
c) Taxonomy d) Systematics

94. Slimy mass of protoplasm with many nuclei and an *Amoeba* –like thalloid body is a characteristic feature of
a) Ascomycetes b) Actinomycetes
c) Phycomycetes d) Basidiomycetes

95. A kingdom common to unicellular animals and plants is
a) Monera b) Plantae c) Fungi d) Protista

96. During development of embryo in archegonium of Bryophyta, its posterior part form protective embryo cover, which is called
a) Calyptra b) Paraphysis
c) Apophysis d) Hypophysis

97. Classification on the basis of all observed characters is known as
a) Number and codes taxonomy
b) Numerical taxonomy
c) Countable taxonomy
d) Numerical information taxonomy

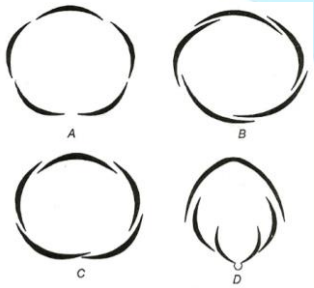
98. Which is not correctly matched?
a) Annelida –Enterocoelomate
b) Platyhelminthes –Acoelomate
c) Arthropoda – Schizocoelomate
d) Nemathelminthes –Pseudocoelomate

99. Fertilized eggs of *Periplanata Americana* are encased in
a) Ootheca b) Cocoon
c) Genital chamber d) Phallomere

100. Phylum of *Taeniasolium* is
a) Aschelminthes b) Annelida
c) Platyhelminthes d) Mollusca

101. At the two ends of the embryonical axis
a) Radicle is present b) Plumule is present
c) Both (a) and (b) d) None of these

102. Identify the type of aestivation in the given diagram (*A* to *D*)



a) A-Twisted, B-Valvate, C-Vexillary, D-Imbricate
b) A-Valvate, B-Twisted, C-Imbricate, D-Vexillary
c) A-Valvate, B-Twisted, D-Vexillary, D-Imbricate
d) A-Valvate, B-Vexillary, C-Twisted, D-Imbricate

103. Study of fruits is called
a) Palynology b) Pomology
c) Embryology d) Morphology

104. Which one of the following is wrongly matched?

Column I	Column II

a) CaesalpiniaceaeCatechu
b) Palmae Date palm
c) Euphorbiaceae*Coccinia*
d) Musaceae Banana

105. In monocot roots, which type of vascular bundles are found?
a) Collateral, conjoint and closed
b) Radial with exarch xylem
c) Bicollateral, conjoint and closed
d) Radial with endarch xylem

106. Conjoint collateral closed vascular bundle is found in
a) Monocot stem b) Monocot root
c) Dicot stem d) Dicot root

107. The cell junctions called tight, adhering and

gap junctions are found in
a) Muscular tissue b) Connective tissue
c) Epithelial tissue d) Neural tissue

108. During respiration in frog, the hyoid and floor of the buccal cavity are raised with the help of
a) Sternohyal muscles b) Petrohyal muscles
c) Ligaments d) Intercoastal muscles

109. Read the following statements and select correct options for prokaryotic cells
I. They are generally smaller than eukaryotic cells
II. They multiply more rapidly than the eukaryotic cells
III. They are presented by bacteria, BGA mycoplasma and PPLO (Pleura Pneumonia Like Organism)
a) II and I b) II and III
c) I and III d) I, II and III

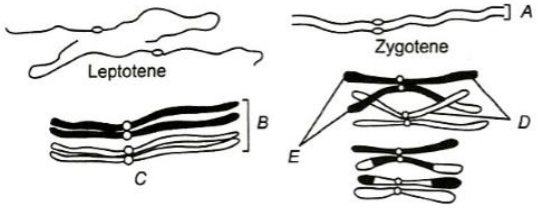
110. Pits present in the wall of plant cells helps to produce a protoplasmic continum, called…… amongst cells
a) Apoplast b) Symplast
c) Osmosis d) None of these

111. Each active sites in enzyme is bounded by how many amino acids?
a) 20 b) Infinite
c) 3 d) None of these

112. Feedback inhibition of enzymes is affected by which of the following?
a) Enzyme
b) Substrate
c) End products
d) Intermediate end products

113. Chiasmata are formed due to
a) Crossing over of same part between homologous chromosomes
b) Crossing over of same part between non-homologous chromosomes
c) Duplication of homologous and non-homologous chromosomes
d) Loss of some part of chromosomes

114. Study the diagram showing meiosis carefully and choose the correct options for $A-E$



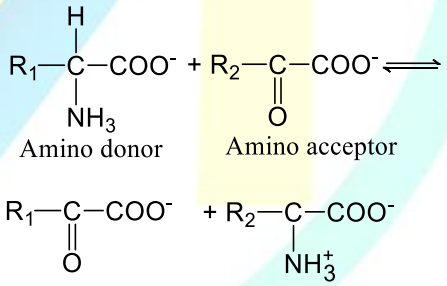
A –Tetrad, B –Bivalent, C –Zygotene stage,
a) D –Sister chromatids, E –Non-sister chromatids
A –Bivalent, B –Tetrad, C –Pachytene
b) stage, D –Crossing over, E –Non-sister chromatids
A –Bivalent, B –Tetrad, C –Pachytene
c) stage, D-Non-Sister chromatids, E-Sister chromatids
A –Bivalent, B –Tetrad, C –Pachytene
d) stage, D –Sister chromatids, E –Non-Sister chromatids

115. The transport of organic and inorganic substances in plants over longer distance occurs through vascular tissue by the means of
a) Diffusion
b) Facilitated diffusion
c) Active transport
d) Mass flow

116. Which part of root absorbs both water and minerals?
a) Zone of cell differentiation
b) Zone of cell formation
c) Zone of cell elongation
d) Terminal portion of root

117. Movement of water through cell wall, is
a) Apoplast b) Symplast
c) Tonoplast d) None of these

118. What does the given reaction shows?



Choose the correct option
a) Oxidative deamination
b) Reductive amination
c) Transamination
d) Deamination

119. What effect can be seen on the plant growth and reproduction in the absence of essential mineral element?
a) Plants will complete their life cycle
b) Plants will complete their life cycle
c) There will be no effect on the normal
d) Only growth will get effected not the

normally	growth but reproduction in plants will suffer	reproduction

120. Identify the 5-C compound from the given option
a) RuBP b) OAA c) 3PGA d) $NADPH_2$

121. Synthesis of one molecule of glucose requires
a) $6CO_2$, 18 ATP and 12 NADPH
b) $6CO_2$, 12 ATP and 18 NADPH
c) $6CO_2$, 30 ATP and 12 NADPH
d) $6CO_2$, 38 ATP and 12 NADPH

122. Preparatory phase before fermentation is
a) Upstream process b) Downstream process
c) Inoculation d) Filtration

123. Steps of respiration are controlled by
a) Substrates b) Enzymes
c) Hormone d) Bile juice

124. Growth of the plant is open because of
a) Differentiation b) Dedifferentiation
c) Redifferentiation d) All of the above

125. SDP also called
a) Short night plant
b) Long night plant
c) Intermediate night plant
d) None of these

126. Effect of photoperiod on growth and development of plants especially on flowering is called
a) Vernalisation b) Photoperiodism
c) Both (a) and (b) d) Phototaxis

127. The major site of protein breakdown to form free amino acids is in the environment of
a) Kidney b) Spleen
c) Liver d) Bone-marrow

128. Hydrolysis of milk sugar gives rise to
a) Two molecules of lactose
b) Two molecules of glucose
c) One molecule of glucose and one molecule of fructose
d) One molecule of glucose and one molecule of galactose

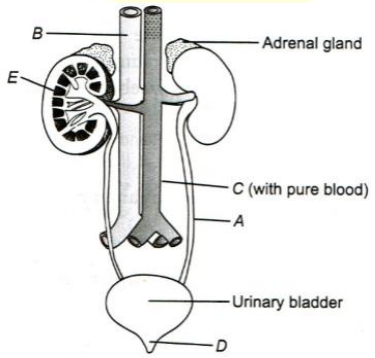
129. Severe Acute Respiratory Syndrome (SARS)
a) Is caused by a variant of *Pneumococcus pneumoniae*
b) Is caused by a variant of the common cold virus (corona virus)
c) Is an acute form of asthma
d) Affects non-vegetarians much faster than vegetarians

130. Why breathing is accelerated when the person opens his nose after holding the breathe by closing his nose?
a) CO_2 build up in the body
b) CO build up in the body
c) H^+ decreases in the body
d) CO_2 decrease in body

131. A doctor suggested not to have more than one child to a couple because
a) Male is Rh^+ and female is Rh^-
b) Male is Rh^- and female is Rh^+
c) Male is Rh^- and female is Rh^-
d) Male is Rh^+ and female is Rh^-

132. 72 beats per minute heart beat rate of man is controlled by
a) SA-node b) Ventricles
c) Purkinje fibres d) AV-node

133. Identify A to E in the given structure and choose the correct option accordingly



Human urinary system

a) A-Ureter, B-Inferior vana cava, C-Dorsal aorta, D-Urethra, E-Medulla
b) A-Ureter, B-Inferior vana cava, C-Dorsal aorta, D-Pelvis, E-Urethra
c) A-Ureter, B-Inferior vana cava, C-Dorsal aorta, D-Urethra, E-Pelvis
d) A-Ureter, B-Inferior vana cava, E-Pelvis, D-Dorsal aorta, E-Urethra

134. Urine is yellow in colour, due to
a) Prochrome b) Haemoglobin
c) Urochrome d) Creative

135. Renin is released by
a) Hypothalamus
b) Posterior lobe of pituitary
c) Anterior lobe of pituitary
d) J G cells

136. In rabbit, end of a long bone is connected to another by
a) Tendon b) ligaments

c) Muscle d) Cartilage

137. Largest muscle in the human body is
a) Sartorius b) Gluteus
c) Stapedius d) Masseter

138. Neural canal is
a) Solid portion of vertebrae through which the neural canal passes
b) Hollow portion of vertebrae through which the neural canal passes
c) Both (a) and (b)
d) None of the above

139. Pneumotaxic centre which can moderate the functions of the respiratory rhythm centre is present at
a) Pons region of brain
b) Thalamus
c) Spinal cord
d) Right cerebral hemisphere

140. Unidirectional transmission of a nerve impulse through nerve fibre is due to the fact that
a) Nerve fibre is insulated by a medullary sheath
b) Sodium pump starts operating only at the cyton and then continues into the nerve fibre
c) Neurotransmitters are released by dendrites and not by axon endings
d) Neurotransmitters are released by the axon endings and not by dendrites

141. Pineal gland is located on the
a) Ventral side of forebrain
b) Lateral side of forebrain
c) Dorsal side of forebrain
d) Back side of forebrain

142. 'Myasthenia gravis' is related to which hormone?
a) Thyroid hormone b) Calcitonin hormone
c) Thymosine hormone d) Vitamin-D

143. The part where fertilization of ovum takes place in rabbit, humans and other placental mammals is:
a) Ovary b) Uterus
c) Vagina d) Fallopian tube

144. The living organisms can be unexceptionally distinguished from the non-living things on the basis of their ability for:
a) Interaction with environment and progressive evolution
b) Reproduction
c) Growth and movement
d) Responsive to touch

145. Pollens outer layer is called …A… . This is made up of …B… . This is absent on the …C… . Fill in the blanks A, B and C
a) A-Intine, B-organic compound, C-micropyle
b) A-exine, B-sporopollenin, C-germ pore
c) A-exine, B-intine, C-micropyle
d) A-micropyle, B-intine, C-exine

146. If there are four cells in a anther, what will be the number of pollen grains?
a) 4 b) 9 c) 12 d) 16

147. Triple fusion in angiosperm is the fusion of second sperm with
a) Antipodal cell and one synergid cell
b) Two antipodal cells
c) Two synergid cells
d) Two polar nuclei

148. The correct sequence of male reproductive structures of rabbit through which sperms pass out is
1. Rete testes
2. Vasa efferentia
3. Epididymis
4. Vasa deferentia
a) I, II, III, IV b) II, III, IV, I
c) II, III, I, IV d) I, III, II, IV

149. Identify the odd one
a) Labia minora
b) Fimbriae
c) Infundibulum
d) Isthmus

150. Most of the organs are formed during ….. of development
a) 1st month
b) 2nd month
c) 3rd month
d) 4th month

151. Women who consumed the drug thalidomide for relief from vomiting during early months of pregnancy gave birth to children with
a) No spleen
b) Hare-lip
c) Extra fingers and toes
d) Under developed limbs

152. In contraception, sperm motility decreases due to
a) Cu ion b) Fe ion
c) Zn ion d) Se ion

153. NSEP stands for

a) National Smallpox Eradication Programme
b) National Sickness Eradication Programme
c) National Syphilis Eradication Programme
d) None of the above

154. Heredity is
a) Transmission of characters
b) Mixing of characters
c) Blending of inheritance
d) Deleting of characters

155. Three children in a family have blood types O, AB and B respectively. What are the genotypes of their parents?
a) I^Ai and I^Bi b) I^AI^B and i i
c) I^BI^B and I^AI^A d) I^AI^A and I^B i

156. The total number of progeny obtained through dihybrid cross of Mendel is 1280 in F_2-generation. How many are recombinants?
a) 240 b) 360 c) 480 d) 720

157. Which mutations of the genetic bases gives the proof that codon is triplet and reads in a contagious manner?
a) Frameshift mutation b) Point mutation
c) Both (a) and (b) d) Inversion mutation

158. Before the genetic code was postulated, the *t*RNA was called
a) *r*RNA (ribosomal RNA)
b) *m*RNA (messenger RNA)
c) *s*RNA (soluble RNA)
d) *s*-RNA (sedimentary RNA)

159. Biological concept of species was given by
a) E Mayer
b) Darwin
c) De Vries
d) Mendel

160. Which of the following is not a concept of Lamarck?
a) Environmental pressure causes variation
b) Rate and survival of organism is different due to variation
c) Inheritance of acquried characters
d) If an organ is used constantly it will continuously increase its size

161. Tobacco contains
a) Nicotine b) Amphitamins
c) Carbon monoxide d) Both (a) and (c)

162. Tuberculosis is caused by
a) *Mycobacterium* sp.
b) *Aspergillus* sp.
c) *Clostridium sp.*
d) *Vibrio* sp.

163. Smokeless tobacco causes
a) Oral cancer
b) Lung cancer
c) Bronchitis
d) Heart disease

164. Choose the scientific name of a microorganism which produces high quality of protein
a) *Spirulina* b) *Chara*
c) Agar-agar d) *Ephedra*

165. Potato and tomato are native of:
a) Canada b) North America
c) South America d) China

166. Breeding of crops with high levels of minerals, vitamins and proteins is called
a) Somatic hybridization
b) Biofortification
c) Biomagnifications
d) Micropropagation

167. Which of the following belongs to free living nitrogen fixing bacteria?
I. *Rhizobium* II. *Azospirillum* III. *Azotobacter*
Choose the correct option
a) I and II b) I and III
c) II and III d) I, II and III

168. Which of the following steps are involved in the process of recombinant biotechnology? Arrange in correct order
I. Extraction of the desired gene product
II. Amplification of the gene of interest
III. Isolation of a desired DNA fragment
IV. Ligation of the DNA fragment into a vector
V. Insertion of recombinant DNA into the host
Correct order is
a) I, II, III, IV and V b) III, II, IV, V and I
c) II, IV, V, III and I d) I, IV, V, III and II

169. Who among the following discovered the enzyme restriction endonuclease?
a) Hamilton Othanel Smith
b) Sir Godfrey Hounsfield
c) F. Jacob
d) Andre Lwoff

170. Blindness can be prevented by use of which crop in poor contries?
a) Golden rice b) Wheat
c) Gram d) Pea

171. Which of the following is not a restriction endonuclease?
a) *Eco* RI b) *Hind* III c) *Pst* I d) DNAse I

172. Which gene was introduced in the first

transgenic cow?

a) Human α-lactalbumin b) α-1-antitrypsin

c) β-1-antitrypsin d) *cry*-IAc

173. The organism which tolerate wide range of salinity called …A…

II. The organism which tolerate narrow range of salinity called …B…

Choose the correct option for A and B

a) A–stenohaline; B–euryhaline

b) A–euryhaline; B–stenohaline

c) A–isohaline; B–euryhaline

d) A–heterohaline; B–isohaline

174. When the value of '*r*' is significantly low as compared to other. It is better known by

a) Competition exclusion

b) Resource partition

c) Interference competition

d) Competition release

175. In plant succession, when climax community is reached, the net productivity

a) Continues to increase b) Becomes zero

c) Becomes reduced d) Becomes stable

176. Stratification occurs in

a) Desert b) Tropical forest

c) Deciduous forest d) Tundra

177. Biosphere reserves differ from national parks and wild life sanctuaries because in the former

a) Human beings are not allowed to enter

b) People are an integral part of the system

c) Plants are paid greater attention than the animals

d) Living organisms are brought from all over the world and preserved for posterity

178. Manas sanctuary is located at

a) Rajasthan b) Asom c) Bihar d) Gujarat

179. Ozone depletion in stratosphere shall result in

a) Forest fires

b) Green house effect

c) Global warming

d) Increased incidence of skin cancer

180. Biomagnification is highest in

a) Producers

b) Primary consumers

c) Secondary consumers

d) Decomposers

Meritstore

NEET

TEST ID: 4

Time : 03:00:00 **Marks :** 720

: ANSWER KEY :

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

Mukesh Sir's Group Tuitions

Date :14/05/2016 NEET – 2016 **TEST ID: 04**

Time : 03:00:00 **PCB** **Marks** : 720

: HINTS AND SOLUTIONS :

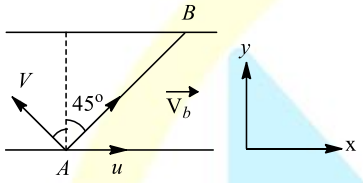
Single Correct Answer Type

1 **(a)**

Indestructibility, invariability and reproductibility are essential characteristics of a unit of measurement.

3 **(b)**

Let v be the speed of boatman is still water.



Resultant of v and u should be along AB.

Components of $\vec{v}_b$ (absolute velocity of boatman)along x and y direction are,

$v_x = u - v\sin\theta$

Further, $\tan 45° = \frac{v_y}{v_x}$

or $1 = \frac{v\cos\theta}{u - v\sin\theta}$

$$v = \frac{u}{\sin\theta + \cos\theta} = \frac{u}{\sqrt{2}\sin(\theta + 45°)}$$

v is minimum at,

$\theta + 45° = 90°$ or $\theta = 45°$

and $v_{\min} = \frac{u}{\sqrt{2}}$

4 **(b)**

$v = \sqrt{3gr}$ and $a = \frac{v^2}{r} = \frac{3gr}{r} = 3g$

5 **(b)**

Net acceleration in nonuniform circular motion,

$$a = \sqrt{a_t^2 + a_c^2} = \sqrt{(2)^2 + \left(\frac{900}{500}\right)^2} = 2.7\ m/s^2$$

a_t = tangential acceleration

a_c = centripetal acceleration $= \frac{v^2}{r}$

6 **(d)**

Acceleration $= \frac{P}{M+m}$

Force on the block = Mass of block × acceleration

$= \frac{MP}{M+m}$

7 **(b)**

μ = tan(Angle of repose) $= \tan 60° = 1.732$

8 **(d)**

$W = FS\cos\theta = 10 \times 4 \times \cos 60° = 20\ Joule$

9 **(c)**

$I = I_{CM} + Mh^2$ (Parallel axis theorem)

10 **(b)**

$$K = \frac{1}{2}mv^2\left(1 + \frac{k^2}{R^2}\right)$$

$$= \frac{1}{2} \times 0.41 \times (2)^2 \times \left(\frac{3}{2}\right)$$

$= 1.23$ J

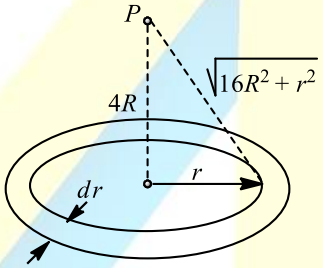
11 **(a)**

$W = \Delta U = U_f - U_i = U_\infty - U_P$

$= -U_P = -mV_P$

$= -V_P$ (as $m = 1$)

Potential at point P will be obtained by in integration as given below. Let dM be the mass of small rings as shown



$$dM = \frac{M}{\pi(4R)^2 - \pi(3R)^2}(2\pi r)dr$$

$$= \frac{2Mr\,dr}{7R^2}$$

$$dV_P = -\frac{G.dM}{\sqrt{16R^2 + r^2}}$$

$$= -\frac{2GM}{7R^2}\int_{3R}^{4R}\frac{r}{\sqrt{16R^2 + r^2}} \cdot dr$$

$$= -\frac{2GM}{7R}\left(4\sqrt{2} - 5\right)$$

$$\therefore \quad W = +\frac{2GM}{7R}(4\sqrt{2} - 5)$$

12 **(b)**

Twisting coupler per unit twist for solid cylinder,

for hollow cylinder, $C_1 = \frac{\pi\eta r^4}{2l}$

$$\therefore\ C_2 = C_1\frac{r_2^4 - r_1^4}{r^4} = \frac{0.1 \times (5^4 - 4^4)}{\partial^4} = \frac{36.9}{81}$$

$= 0.455$ Nm

13 **(c)**

The effective weight = weight of bird + reactional force due to acceleration of bird

$= 5 + ma = 5 + 0.5 \times 2 = 6$ N

14 **(b)**

$W = 2 \times T \times \Delta A$

$= 2 \times 72 \times (0.6 - 0.5) \times 10 = 144$ erg

16 **(c)**

Process AB is isochoric, $\therefore W_{AB} = P\,\Delta V = 0$

Process BC is isothermal $\therefore W_{BC} = RT_2.\ln\left(\frac{V_2}{V_1}\right)$

Process CA is isobaric

$\therefore W_{CA} = P\Delta V = R\Delta T = R(T_1 - T_2)$

[Negative sign is taken because of compression]

17 **(c)**

$$\frac{E_s}{E_T} = \gamma = \frac{C_P}{C_V} = 1.4$$

$$\frac{2.1 \times 10^5}{E_T} = 1.4$$

$$\text{or } E_T = \frac{2.1 \times 10^5}{1.4}$$

$$= 1.5 \times 10^5 \text{Nm}^{-2}$$

18 **(a)**

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$\frac{(P + h\rho g)1.0}{273 + 12} = \frac{P.V_2}{273 + 35}$$

$V_2 = 5.4cm^3$

19 **(d)**

$v_1 = \frac{dy_1}{dt} = 2 \times 10\cos(10t + \theta)$;

$v_2 = -3 \times 10\sin 10t = 30\cos(10 + \pi/2)$

$\therefore$ Phase difference$= (10t + \theta) - (10t + \pi/2)$

20 **(a)**

$$T \propto \frac{1}{\sqrt{k}} \Rightarrow T_1 : T_2 : T_3 = \frac{1}{\sqrt{k}} : \frac{1}{\sqrt{k/2}} : \frac{1}{\sqrt{2k}} = 1 : \sqrt{2} : \frac{1}{\sqrt{2}}$$

21 **(a)**

$v = 2n(l_2 - l_1) = 2 \times 325(77.4 - 25.4)\text{cms}^{-1}$

$$= \frac{650 \times 52}{100}\text{ms}^{-1} = 338\ \text{ms}^{-1}$$

22 **(c)**

$U_{Big} = n^{5/3}u_{small}$

23 **(c)**

Capacity when outer sphere is earthed

$$C_1 = 4\pi\varepsilon_0 \frac{ab}{b - a}$$

Capacity when inner sphere is earthed

$$C_2 = 4\pi\varepsilon_0 b + \frac{4\pi\varepsilon_0 ab}{b - a} = 4\pi\varepsilon_0\left(\frac{b^2}{b - a}\right)$$

Difference in capacity $= C_2 - C_1 = 4\pi\varepsilon_0 b$

24 **(b)**

Let R and r be the radii of bigger and each smaller drop. Charge remains conserved.

Hence, charge on bigger drop

$= 27 \times$charge on smaller drop

$ie, q' = 27q$

Now, before and after coaleseing, volume remains same.

That is,

$$\frac{4}{3}\pi R^3 = 27 \times \frac{4}{3}\pi r^3$$

$\therefore\ R = 3r$

Hence, capacitance of bigger drop

$C' = 4\pi\varepsilon_0 R = 4\pi\varepsilon_0(3r)$

$= 3(4\pi\varepsilon_0 r) = 3C$

25 **(d)**

We know that the current in the circuit

$$I = \frac{E}{R + r}$$

and power delivered to the resistance R is

$$P = I^2R = \frac{E^2R}{(R + r)^2}$$

It is maximum when $\frac{dP}{dR} = 0$

$$\frac{dP}{dR} = E^2\left[\frac{(r + R)^2 - 2R(r + R)}{(r + R)^4}\right] = 0$$

Or $(r + R)^2 = 2R(r + R)$

Or $R = r$

26 **(d)**

The given circuit is a balanced wheatstone bridge circuit. Hence potential difference between A and B is zero

27 **(a)**

At neutral temperature, $\frac{dE}{dT} = 0$

28 **(a)**

The force per unit length between the two wires is

$$\frac{F}{l} = \frac{\mu_0}{4\pi} \cdot \frac{2i^2}{d} = \frac{\mu_0 i^2}{2\pi d}$$

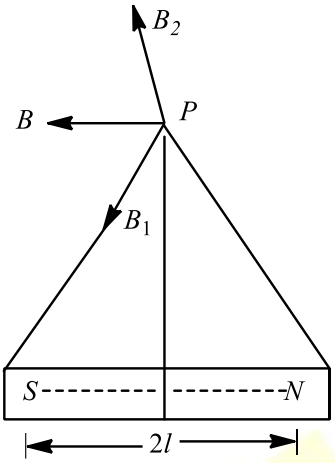
The force will be attractive as current directions in both are same.

29 **(d)**

Magnetic field due to a magnet at any point or equatorial line is given by

$$B = \frac{\mu_0}{4\pi}\frac{M}{d^3}$$

Direction of B is shown in figure.



Hence, in equatorial position, the direction of magnetic field is parallel to magnetic axis in direction from north pole to south pole *ie,* anti-parallel to **M.**

30 **(c)**

The correct measure of hardness of a material is its coercivity, *ie*, the field strength required to be applied in opposite direction to reduce the residual magnetism of the specimen to zero.

31 **(c)**

As magnetic flux linked with the loop is changing, emf induced in the loop is $e = BLv$.

32 **(b)**

$$Z = \sqrt{R^2 + X_L^2} = \sqrt{10^2 + (2\pi \times 60 \times 2)^2} = 753.7$$

$$\therefore i = \frac{120}{753.7} = 0.159\ A$$

33 **(a)**

Impedance,

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$\therefore \quad 10 = \sqrt{(10^2 + (X_L - X_C)^2}$$

$$\Rightarrow \quad 100 = 100 + (X_L - X_C)^2$$

$$\Rightarrow \quad X_L - X_C = 0$$

...(i)

Let ϕ is the phase difference between current and voltage

$$\tan\phi = \frac{X_L - X_C}{R}$$

$$\therefore \quad \tan\phi = \frac{0}{R}$$

$$\Rightarrow \quad \phi = 0 \qquad \text{[From Eq.(i)]}$$

34 **(d)**

Given refractive index

$n = 1.5$

Permeability $\mu_0 = 5 \times 10^{-7}$

$n = \sqrt{\mu_r \varepsilon_r}$

$$\varepsilon_r = \frac{n^2}{\mu_r}$$

or $\quad \rho = \frac{n^2\mu_0}{\mu}\left(\because \mu_r = \frac{\mu}{\mu_0}\right)$

or $\quad \varepsilon_r = \frac{(1.5)^2 \times 4\pi \times 10^{-7}}{5 \times 10^{-7}}$

or $\quad \varepsilon_r = 6$

35 **(d)**

$$m \simeq \frac{LD}{f_o f_e} \Rightarrow m = \frac{10 \times 25}{0.5 \times 1} = 500$$

37 **(a)**

Both magnetic and electric fields have zero average value in a plane *e*.m. wave

38 **(c)**

For k_α emission

transition L shell to $k-$ shell

For k_β emission

transition M shell to $k-$ shell

For L_α emission

transition M shell to $L-$ shell

$E_M - E_K = (E_M - E_L) + (E_L - E_K)$

$\Rightarrow hf_2 = hf_3 + hf_1 \Rightarrow f_2 = f_1 + f_3$

39 **(a)**

Any charge in the universe is given by

$q = ne \Rightarrow e = \frac{q}{n}$ (where$n$ is an integer)

$q_1 : q_2 : q_3 : q_4 : q_5 : q_6 :: n_1 : n_2 : n_3 : n_4 : n_5 : n_6$

$6.563 : 8.204 : 11.5 : 13.13 : 16.48 : 18.09$

$:: n_1 : n_2 : n_3 : n_4 : n_5 : n_6$

Divide by 6.563

$1 : 1.25 : 1.75 : 2.0 : 2.5 : 2.75$

$:: n_1 : n_2 : n_3 : n_4 : n_5 : n_6$

Multiplied by 4

$4 : 5 : 7 : 8 : 10 : 11 :: n_1 : n_2 : n_3 : n_4 : n_5 : n_6$

$$e = \frac{q_1 + q_2 + q_3 + q_4 + q_5 + q_6}{n_1 + n_2 + n_3 + n_4 + n_5 + n_6}$$

$$= \frac{73.967 \times 10^{-19}}{45}$$

$$= 1.641 \times 10^{-19} C$$

[**Note** : If you take 45.0743 in place of 45, you will get the exact value]

40 **(c)**

For an electron to remain orbiting around the nucleous, the angular momentum (L) should be an integral multiple of $h/2\pi$.

ie, $mvr = \frac{nh}{2\pi}$

where n = principle quantum number of electron, and h= Planck's constant

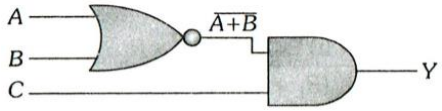
41 **(c)**

$_1H^1 + \ _1H^1 + \ _1H^2 \rightarrow \ _2He^4 + \ _{+1}e^0 +$ energy

42 **(a)**

Nuclear force is charge independent, it also acts between two neutrons

43 **(d)**



The output Y is

$Y = \overline{(A+B)} \cdot C$

The truth table of the given circuit is as shown in the table

A	B	C	$\overline{A+B}$	$Y = \overline{(A+B)}.C$
0	0	0	1	0
0	0	1	1	1
0	1	0	0	0
0	1	1	0	0
1	0	0	0	0
1	0	1	0	0
1	1	0	0	0
1	1	1	0	0

44 **(a)**

1% of $10\ GHz = 10 \times 10^9 \times \frac{1}{100} = 10^8 Hz$

Number of channels $= \frac{10^8}{5\times10^3} = 2 \times 10^4$

45 **(b)**

The special theory of relativity is based on the frame of reference which moves with constant speed.

46 **(b)**

Since, 1 g hydrogen combines with 80 g bromine, the eq. wt. of bromine $= 80$

$\because$ 4 g bromine combines with Ca $= 1$g

$\therefore$ 80 g bromine will combine with Ca $= \frac{1\times80}{4} =$ 20g

$\therefore$ Eq. wt. of Ca is 20 g.

47 **(a)**

$\%$ by weight $= \frac{\text{weight of solute}}{\text{weight of soultion}} \times 100$

Or $\quad 40 = \frac{w}{(w+60)} \times 100$

$w = 40$ g

48 **(c)**

Energy of one photon, $E = \frac{hc}{\lambda}$

$= \frac{6.626 \times 10^{-34} \times 3 \times 10^8}{550 \times 10^{-9}\text{m}}$

$\therefore$ Number of photons $= \frac{\text{energy required}}{\text{energy of one photon}}$

$= \frac{10^{-17}}{3.61 \times 10^{-19}} = 27.67 = 28$

49 **(a)**

According to Bohr, an electron can move only in those orbits in which its angular momentum is a simple multiple of $\frac{h}{2\pi}$.

$i.e.$, equal to $\frac{nh}{2\pi}$(where, n is an integer)

51 **(c)**

(a) $CH_4 \quad \longrightarrow \quad CH_3 - CH_3$

$4bp + 0lp \qquad 4bp\,4bp$

Hybridisations $sp^3\ sp^3\ sp^3$

Structure tetrahedral tetrahedral

(b) $NH_3 \quad \longrightarrow \quad NH_4^+$

$3bp + 1lp \qquad 4bp$

Hybridisations $sp^3\ sp^3$

Structure pyramidal tetrahedral

(c) $BF_3 \quad \longrightarrow \quad BF_4^-$

$3bp \qquad 4bp$

Hybridisations $sp^2\ sp^3$

Structure trigonal tetrahedral planar

(d) $H_2O \quad \longrightarrow \quad H_3O^+$

$2bp + 2lp \qquad 3bp + 1lp$

Hybridisations $sp^3\ sp^3$

Structure angularpyramidal

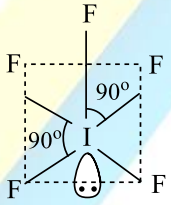
Thus conversion of BF_3 into BF_4^- involves change in both hybridisation and shape.

52 **(c)**

Number of hybrid orbitals $=$ no. of bp $+$ no. of lp

$= 5 + 1 = 6$

Thus, hybridization is sp^3d^2 but geometry, due to the presence of one pair, is square pyramidal, ie



54 **(a)**

For isochoric process, $\Delta V = 0$ so, $q_v = \Delta E$ ie, heat given to a system under constant volume is used up in increasing ΔE

55 **(a)**

Molar heat capacity of aluminum is 25 $JK^{-1}\ mol^{-1}$. The heat necessary to raise the temperature of 54 g of aluminum (Atomic mass 27 g mol^{-1}) from 30°C to 50°C is

56 **(a)**

$CO_2(g) + C(s) \rightleftharpoons 2CO(g)$

Initial:0.5 atm

At equili:$(0.5 - p)2p$ atm

This is a case of heterogeneous equilibrium.

$C(s)$ being solid is not considered

Total pressure of CO_2 and CO gases.

$p_{CO_2} + p_{CO} = p_{\text{total}}$

$0.5 - p + 2p = 0.8$

$p = 0.3$ atm

$\therefore \quad p_{CO_2} = 0.5 - 0.3 = 0.2$ atm

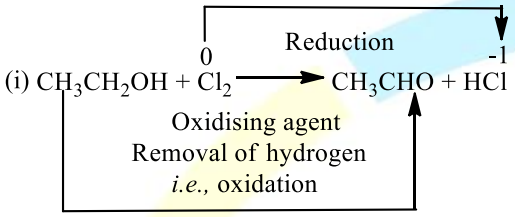
$p_{CO} = 2p = 0.6$ atm

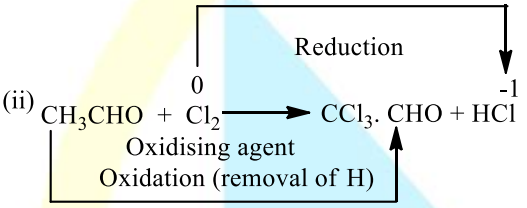
$$K_p = \frac{p_{CO}^2}{p_{CO_2}} = \frac{0.6 \times 0.6}{0.2}$$

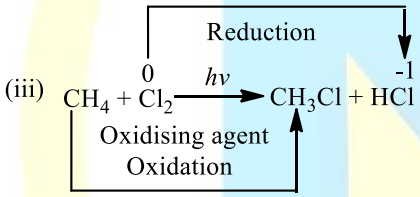
$= 1.8$ atm

57 **(d)**

In a reaction, the reagent, which is reduced or remove hydrogen from the other reactant (reagent), is termed as oxidising agent.







Hence, in all of the above reactions, chlorine acts as an oxidising agent.

58 **(c)**

Oxidation number of iodine in given species is as follows

O.N. of iodine in IF_3=+3

O.N. of iodine in $I_3^- = -\frac{1}{3}$

O.N. of iodine in IF_5=+5

O.N. of iodine in $IF_7 = +7$

59 **(a)**

Helium is a noble gas and does not combine with hydrogen

60 **(b)**

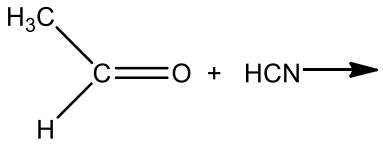
Ti and Cu transition metals show variable valency. Pb so variable valency due to inert pair effect, while barium shows fixed valency

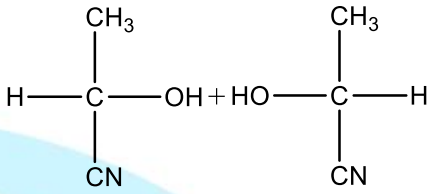
62 **(c)**

Lead react with water to form lead hydroxide $Pb(OH)_2$ hence, lead pipes are not suitable for drinking purpose

63 **(a)**

Lactic acid obtained in the given reaction is an optically active compound due to the presence of chiral C-atom. It exists as *d* and *l* forms whose ratio 1:1.





50% L-isomer 50% D-isomer

65 **(d)**

Cyclic hydrocarbon, with carbon-carbon bond length between1.34Å and 1.54Å, is benzene in which due to resonance, C − C, bond length is 1.39Å (*ie*.,between 1.34Å − 1.54Å). Benzene is a hexagonal molecule with bond-angle equal to120°.

66 **(b)**

Carbon dioxide, being limiting factor, when present in small amount (*ie*, 0.033%), has no adverse effect but when its concentration is slightly higher than 0.033%, it has an adverse effect on our climate. Thus, in normal conditions, CO_2 is not regarded as a pollutant

67 **(c)**

The phenomenon by which a certain crystalline compound exists in two or more different crystalline forms, is called polymorphism *e.g.,* $CaCO_3$occurs in two polymorphic forms, *i.e.*,calcite (rhombohedral) and aragonite (orthorhombic).

68 **(a)**

ZnShas zinc blende type structure (*i.e.*,ccp structure). The S^{2-} ions are present at the corners of the cube and at the centre of each face. Zinc ions occupy half of the tetrahedral sites. Each zinc ion is surrounded by four sulphide ions which are disposed towards the corner of regular tetrahedron. Similarly, S^{2-} ion is surrounded by four Zn^{2+} ions.

69 **(a)**

$$W = \frac{NE\,V}{1000}$$

$$N = \frac{W \times 1000}{E \times V}$$

$=\frac{6.3\times1000}{63\times250}=0.4$N

$N_1V_1 = N_2V_2$

$0.1 \times V_1 = 0.4 \times 10$

$V_1 = \dfrac{0.4 \times 10}{0.1}$

$V_1 = 40$ mL

70 **(a)**

Given, m=0.2

$k_f = 1.85$

$\alpha = 0.3$

$\therefore$ i=1+α=1.3

$\Delta T_f = molality \times k_f \times i$

=0.2× 1.85 × 1.3

=0.481°

$\therefore$ freezing point =-0.481°C

71 **(d)**

$E^{\circ}_{cell} = 0.87 + 0.40 = 1.27$ V

Cell reaction : $Fe + Ni_2O_3 \rightarrow FeO + 2NiO$

72 **(c)**

$2A + B \rightarrow$ products

Rate of reaction, $r_1 = k[A]^2[B]$

If the concentration of A become double then the rate will be

$r_2 = k[2A]^2[B]$

$r_2 = 4k[A]^2[B]$

$r_2 = 4r_1$

73 **(d)**

$t_{99.9\%} = \dfrac{2.303}{k}\log\dfrac{a}{a-99.9a}$

$t_{50\%} = \dfrac{0.693}{k}$

(b) $k = \frac{1}{t}\ln\frac{100}{100-99.9} = \frac{1}{t}\ln\frac{100}{0.1}$

Or $\frac{\ln 2}{t_{1/2}} = \frac{1}{t}\ln 10^3$

Or $\frac{\log 2}{t_{1/2}} = \frac{1}{t}\log 10^3 = 3/t$

$t_{1/2} = \dfrac{\log 2}{3} \times t$

$\therefore t = 10t_{1/2}$

74 **(d)**

In medical field, colloidal gold is used as tonic to raise vitality of human systems

75 **(a)**

Fluorspar (CaF_2),

Cryolite(na_3AlF_6)

Feldspar ($KAlSi_3O_3$),

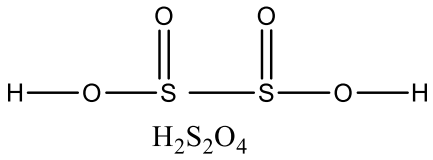
Mica ($K_2O.3Al_2O_3.6SiO_2.2H_2O$)

76 **(a)**

Mond's process is used for the purification of Ni

$Ni + 4CO \xrightarrow{Heat} [Ni(CO)_4] \xrightarrow{Decompose} Ni + 4CO$

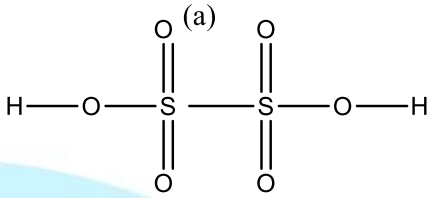
77 **(c)**



$H_2S_2O_4$

hyposulphurous acid

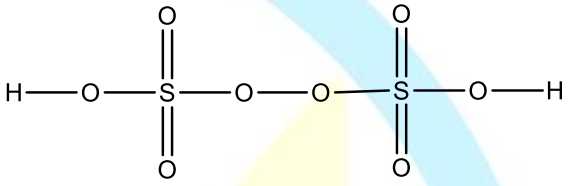
(a)



$H_2S_2O_6$

(b)

dithionic acid



$H_2S_2O_8$

(c)

Marshall's acid

.. Marshall's acid does not have s-s bond

78 **(a)**

$K_2Cr_2O_7 + 2H_2SO_4 \xrightarrow{Cold} 2CrO_3 + 2KHSO_4 +$ H_2OCrO_3 is highly acidic and oxidising and is called chromic acid

79 **(d)**

Ir does not dissolve in aqua regia as it is much more noble than Au and Pt

80 **(c)**

Diasteromers have different physical properties such as m. pt, b. pt solubilities

81 **(c)**

$MgCl_2 \rightarrow Mg^{2+} + 2Cl^-$

$Mg^{2+} + 2e^- \rightarrow Mg$ (at cathode)

2F 1 mol

$\because$ 2F(2 × 96500 C)deposits Mg = 1 mol

$\therefore$ 9.65 C charge will deposit Mg $= \dfrac{1 \times 9.65}{2 \times 96500}$

$= 5 \times 10^{-5}$ mol

RBr + Mg $\xrightarrow{\text{Dry ether}}$ RMgBr

Grignard reagent

In order to prepare Grignard reagent, one mole of Mg is used per mole of reagent obtained. Thus, by 5×10^{-5} mol mg ,5×10^{-5}mole of Grignard reagent is obtained.

83 **(b)**

3°alcohols are resistant to oxidation under drastic

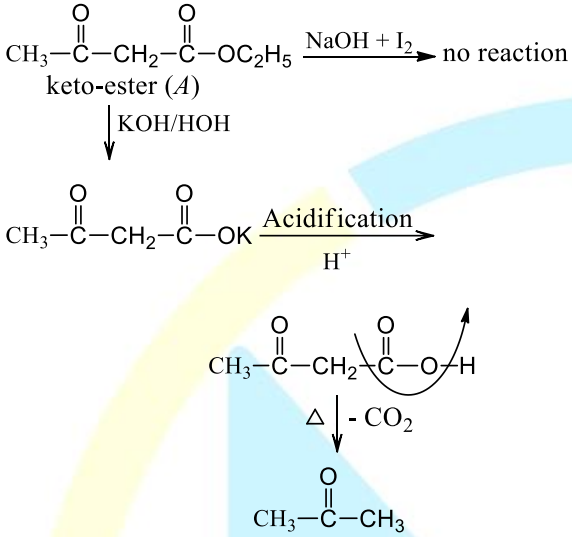
condition. They first form ketone and then acid by loosing one carbon at each step.

$$3^\circ \text{ alcohol} \xrightarrow[[O]]{\text{Drastic condition}} \text{ketone} \xrightarrow{[O]} \text{acid}$$

(4C) (3C) (2C)

∴Acid having 2C is formed when 3° alcohol is oxidised under drastic conditions.

84 **(b)**



The keto-ester (A) does not give haloform reaction inspite of the presence of CH_3CO- group in it. The reason is the presence of active methylene group ($ie, -CH_2-$), which prevents the conversion of CH_3CO- to CX_3CO-

86 **(c)**

Carbylamine reaction is used to prepare *iso*cyanides.

87 **(c)**

Benedict's solution contains $CuSO_4$, Na_2CO_3 and sodium citrate. This permits formation of a complex, which lowers the concentration of Cu (II) ions to such an extent that it doesn't permit the precipitation of insoluble $Cu(OH)_2$. Benedict's solution is more stable than Fehling's solution is not affected by substance like uric acid present in urine. Hence, it is preferred to detect the presence of glucose in urine.

91 **(c)**

Generally size of a herbarium sheet is 30 × 45 cm. Which is slightly small than the size of American herbarium (29 × 41 cm) and label size is 7 × 12

92 **(a)**

Phenetics (Gr. *Phainein*= to appear; the term phenotypes is derived from this same root) dedicates taxonomic affinities entirely on the basis of measurable similarities and differences.

93 **(d)**

The discipline of biology which deals with the kind and diversity of all organisms and the existing relationship amongest them is called systematics. The word 'systematics' is derived from Latin word *systema* which means systematic arrangement of organisms. It was first used by **Carolus Linnaeus.** He used **SystemaNaturae** as the title of his publication. The scope of systematics was later enlarged to include identification, nomenclature and classification. Systematic takes into account evolutionary relationships between organisms.

94 **(d)**

The members of fungal class-Myxomycetes are called slime moulds. In the vegetative phase of their cycle, these are devoid of cell wall and are either a free living, multinucleate, amoeboid, slimy mass of protoplasm (*ie*, Plasmodium) or an aggregation of *Amoeba* (Pseudoplasmodium).

95 **(d)**

R H Whittakerdivided living organisms into five kingdoms *viz*, monera, Protista, Fungi, Plantae and Animalia. Kingdom-Protista includes eukaryotic, unicellular, autotrophic or heterotrophic organisms (both plants and animals) like flagellates, diatoms, dinoflagellates, slime moulds, sarcodina, etc. Themajor groups of Protista are photosynthetic protists (algae), consumer-decomposer protists (slime moulds) and protozoan protists.

96 **(a)**

The archegonial venter forms a protective covering around the embryo called **calyptra.**

97 **(b)**

Numerical taxonomy which is now easily carried out using computers is based on all observable characteristics. Number and codes are assigned to all the characters and the data is then processed. In this way each character is given equal importance and at the same time hundreds of characters can be considered

99 **(a)**

Genital pouch of *Periplanetaamericana* is divisible into genital chamber and oothecal chamber. Ootheca of cockroach is formed of a protein secreted by collateral glands.

100 **(c)**

Taeniasolium(tapeworm) belongs to phylum-Platyhelminthes.

101 **(c)**
The embryo consists of an axis to which are attached one cotyledon (monocotyledonous seed) or two (dicotyledonous seeds) seed leaves or cotyledons. The place of attachment of cotyledons on the embryo axis bears radicle or embryonic root. The other end contains plumule or embryonic bud

102 **(b)**
Aestivation
A – Valvate, *e*. *g*.,*Calotropisprocera*
B – Twisted, *e*. *g*., lady's finger and cotton
C – Imbricate, *e*. *g*., *Cassia* and gulmohar
D – Vexillary, *e*. *g*., bean and pea

103 **(b)**
Pomology deals with the study of fruits.

104 **(a)**
catechu belongs to family-Araceae

105 **(b)**
When xylem and phloem groups are located on different radii, the bundles are said to be radial, *e.g.,* root. The protoxylem element lie at the periphery and metaxylem in the centre, this condition is called exarch, *e.g.,* root

106 **(a)**
In monocot stem, vascular bundles are conjoint, collateral and closed.

107 **(c)**
In epithelial tissue, the adjacent cells form ion-rich gap or cell junctions for intercellular communication and chemical exchange. These junctions probably do not provide physical support.

108 **(a)**
Petrohyal muscles raise the hyoid and floor of buccal cavity of frog during respiration.

109 **(d)**
The prokaryotic cells are represented by bacteria, blue-green algae, mycoplasma and PPLO. Prokaryotic cells are generally smaller and multiply more rapidly than the eukaryotic cells

110 **(b)**
Pits present in the wall to plant cell helps to produce a protoplasmic continum, called symplast

111 **(a)**
On the surface of enzyme, there are several sites for binding substrate molecules called active sites. It is lined by approximately 20 amino acids.

112 **(c)**
Feedback inhibition is an enzyme regulatory mechanism, where the end product functions as an allosteric inhibitor, if its concentration crosses a threshold value.

113 **(a)**
During diplotenesubstage of meiotic division, the force of attraction between homologous chromosomes reduced and later on they move apart.

114 **(a)**
Bivalent A pair of homologous chromosomes lying together is called a bivalent.
(i) **Tetrad** In pachytene stage, the chromatids of each synapsed chromosome slightly separate and become visible. The two visible chromatids of a chromosome are referred to as dyad
(ii) A group of four homologous chromatids (two dyads) is called a tetrad
(iii) **Pachytene Stage** Crossing over occurs during pachytene stage
(iv) **Non-sister Chromatids** The two chromatids of two homologous chromosomes (bivalent) are termed non-sister chromatids
(v) **Sister Chromatids** The two chromatids of the same chromosome are called sister chromatids

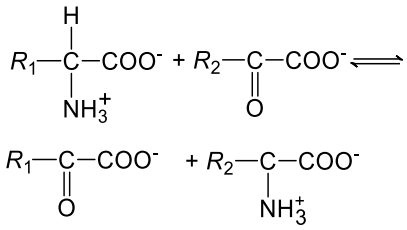
115 **(d)**
Transport of organic and inorganic substances in plants over longer distance proceeds through the vascular tissue system, *i.e.*, xylem and phloem and it is called translocation. It occurs through mass flow

116 **(a)**
In plants, water and minerals both are absorbed by the root hairs. Root hair zone is also known as zone of maturation or differentiation as the cells of this zone undergo maturation and differentiation into different types of primary tissues of the root.

117 **(a)**
Movement of water through cell wall is **apoplastic**.

118 **(c)**
Once the glutamic acid is synthesised by reductive amination, other amino acids are synthesised by the transfer of its amino group to other carbon skeletons. Therefore, glutamic acid is used as a starting material for the synthesis of other amino acids.

Such a transfer of amino group ($-NH_2$) from an amino donor compound to the carbonyl position ($= CO$) of an amino acceptor compound is called transamination



119 **(b)**
In the absence of essential mineral elements, plants do not complete their life cycle or set the seeds

120 **(a)**
RuBP (Ribulose, 1-5 diphosphate) is the 5 carbon compound in which the ribose sugar is present

121 **(a)**
In Calvin cycle for every carbon dioxide molecule, 3 molecules of ATP and 2 NADPH are required. To make one molecule of glucose 6 turns of the cycle are required. Thus, 18 ATP and 12 NADPH molecules will be required to make one molecule of glucose through Calvin cycle.

122 **(a)**
Preparatory phase before fermentation is called **upstream processing** while downstream processing is the name given to the stage after fermentation, when the desired product is recovered and purified.

123 **(b)**
A variety of enzymes control different steps of cellular respiration.

124 **(d)**
Due to differentiation, dedifferentiation, and redifferentiation, plants growth is open

125 **(b)**
Short day plants are also called long night plants because they requires continuous or critical dark period for flowering

126 **(b)**
The effect of photoperiod on plants is called photoperiodism. The photoperiod was first studied by Garner and Allard (1920)

127 **(c)**
The major site of protein breakdown to form free amino acids is in the small intestine in presence of bile.

128 **(d)**
Enzyme lactose hydrolyses milk sugar (lactose) into glucose and galactose

$$\text{Lactose} \xrightarrow{\text{Lactase}} \text{Glucose} + \text{Galactose}$$

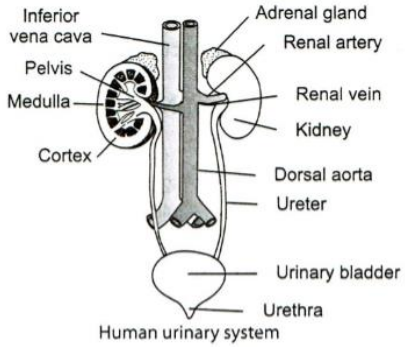
129 **(b)**
SARS (Severe Acute Respiratory Syndrome) spread recently in China, Hong Kong and Singapore. It is a viral disease caused by Paramyxo virus. Paramyxo virus of SARS is related to corona virus family (corona virus causes common cold).

130 **(a)**
Breathing gets accelerated when the person opens his nose after holding the breath by closing his nose due to increase CO_2 in arterial blood

131 **(a)**
Male is Rh^+ and female is Rh^-.
A special case of Rh incompatibility has been observed between Rh −veblood of pregnant mother with Rh +ve blood of foetus. During the delivery of the first child there is a possibility of exposure of the maternal blood to small amount of Rh +ve blood from foetus.
In such cases, the mother starts preparing antibodies against Rh antigen in her blood. In the case of her subsequent pregnancies, the Rh antibody from the mother can leak to blood of foetus and destroy foetal RBC. This could be fatal to foetus or could cause severe anaemia and jaundice to the foetus. This condition in called erythroblastosis foetalis

132 **(a)**
SA-node controls the rate of heart beat.

133 **(c)**
A – ureter
B – Inferior vana cava
C – Dorsal aorta
D – Urethra
E – Medulla

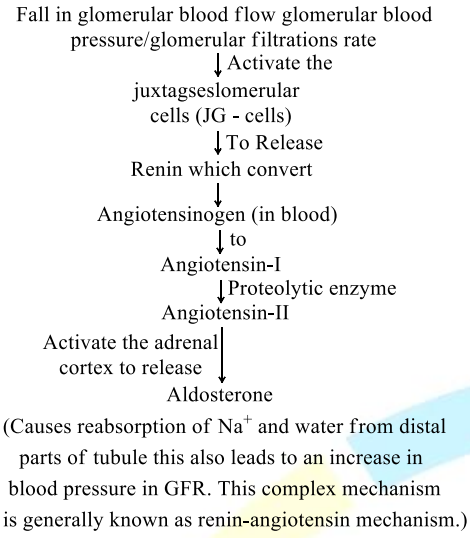


Human urinary system

134 **(c)**
The yellow colour of urine is caused by the pigment urochrome, which is breakdown product of haemoglobin from worm out RBCs

135 **(d)**

Renin-angiotensin mechanism



136 **(b)**

Ligaments consist of mainly collagen fibres and some elastic fibres. It connects end of a long bone to another.

137 **(b)**

Gluteus maximus (buttock muscle) is the largest muscle in the human body.

138 **(b)**

Hollow portion of vertebrae through which the neural canal passes

139 **(a)**

Pneumotaxic centre which can moderate the function of the respiratory rhythm centre is present in the **pons** region of the brain. Neural signal from this centre can reduce the duration of inspiration and thereby alter the respiratory rate.

140 **(d)**

Transmission of nerve impulse through nerve fibre occurs unidirectionally because axon of one neuron linked to the dendrite of another neuron through synapse. Synaptic vesicles are filled with a neurotransmitter (*eg*., acetylcholine) released by axon endings not by dendrites.

141 **(c)**

The pineal gland is located on the dorsal side of the forebrain. Pineal gland secretes a hormones called melatonin. Melatonin plays a very important role in regulating of 24 hour (diurnal) rhythm of our body

142 **(c)**

Hypersecretion of thymosine (hormone of thymus) may lead to myasthenia gravis characterised by abnormal neuromuscular excitation

145 **(b)**

A-Exine, B-Sporopollenin, C-Germ pore

146 **(d)**

According to **Farmer** and **Moore**, four daughter cells are formed from single cell in meiosis. As a result of microsporogenesis (meiotic division) in four microspore mother cells, 16 pollen grains will be produced.

147 **(d)**

Triple fusion in angiosperm is the fusion of second sperm with two polar nuclei or the secondary nucleus which results in the formation of a triploid **Primary Endosperm Nucleus** (PEN).

148 **(a)**

In rabbit, sperms are produced in **seminiferous tubles**, which open into a network called **rete testes**. It opens by several fine ductless glands called **vasa efferentia**, into **epididymis**. The basal end of each epididymis leads into a muscular tube called **vas deferens**.

149 **(a)**

In the given options, only labia minora belongs to the external genitalia of females

150 **(c)**

3rd month.

Summary of important development changes in the human embryo

Time from Fertilisation	Organ Formed
Week 1	Fertilisation cleavage starts about 24 hours after fertilisation cleavage to form a blastocyst 4-5 days after fertilisation. More than 100 cells implantataion 6-9 days after fertilisation
Week 2	The three primary germ layers (ectoderm, endoderm and mesoderm) develop
Week 3	Woman will not have a period. This may be the first sign that she is pregnant. Beginning of the backbone. Neural tube develops, the beginning of the brain and spinal cord (first organs)
Week 4	Heart, blood vessels,

	blood and gut start forming. Umbilical cord developing
Week 5	Brain developing, 'Limb buds', small swelling which are the beginning of the arms and legs. Heart is a large tube and starts to beat, pumping blood. This can be seen an ultrasound scan
Week 6	Eyes and ears start to form
Week 7	All major internal organs developing. Face forming. Eyes have some colour. Mouth and tongue develop. Beginning of hand and feet
Week 12	Foetus fully formed, with all organs, muscles, bones toes and fingers. Sex organs well developed. Foetus is moving
Week 20	Hair beginning to grow including eyebrows and eyelashes. Fingerprints developed. Fingernails and toenails growing. Firm hand grip. Between 16 and 20 weeks baby usually felt moving for first time
Week 24	Eyelids open. Legal limit of abortion in most circumstances
By Week 26	Has a good chance of survival if born prematurely
By Week 28	Baby moving vigorously. Responds to touch and loud noises. Swallowing amniotic fluid and urinating
By Week 30	Usually lying head down ready for birth
40 Weeks	Birth

151 **(b)**

Thalidomide should not be used during pregnancy because even a single dose of thalidomide can cause severe birth defects such as phocomelia (underdeveloped limbs) in foetus or foetal death.

152 **(a)**

Sperm motility decreases due to Cu ion.
Intra Uterine Devices (IUDs) for contraception
(i) There devices are inserted by the doctors into the uterus through vagina.
(ii) *There are three types of IUDs*
Non-medicated IUDs They increases the phagocytosis of the sperm within the uterus, *e*. *g*.,Lippes loop
Copper Releasing IUDs Along with phagocytosis of the sperms, the copper ions released, suppresses the sperm motility and the fertilizing capacity of the sperm. *e*. *g*., Cu-T, Cu-7, multiload-375
Hormone Releasing IUDs They makes the uterus unsuitable for implantation and the cervix hostile to the sperms, *e*. *g*, progestasert, LNG-20

153 **(a)**

National Smallpox Eradication Programme.
Universal Immunisation Programme WHO launched the programmes to immunise the children of the entire world against six diseases till 2000
(i) Diphtheria (ii) Pertussis (wooping cough)
(iii) Tetanus (iv) Polio
1. Tuberculosis (vii) Measles
National Programmes
These programmes were started by the government of India to erase the major communicable diseases
The major national programmes are
(a) National Malaria Eradication Programme (NMEP)
(b) National Cholera Control Programme (NCCP)
(c) National Leprosy Control Programme (NLCP)
(d) National Smallpox Eradication Programme (NSEP)
(e) National Filaria Control Programme (NFCP)
(f) Family Planning Programme (FPP)

154 **(a)**

Heredity (L. *Hereditas* – Heirship or inheritance) is the transmission of genetically based characters from parents to their offspring.
The process by which characters are transferred from one generation to the next generation is called inheritance

155 **(a)**
Genotypes of the parents shall be I^Ai and I^Bi.

156 **(c)**
In Mendel's dihybrid cross out of 16 progenies, 6 are recombinants so in case of 1280 progenies, the recombinants are

$=\frac{1280\times6}{16} = 480$ progenies.

157 **(a)**
Frameshift mutation (deletion or addition) gives the genetic bases of proof that codon is triplet and reads in contagious manner. Deletion or addition of an base pair disturb the reading frame of DNA or *m*RNA

158 **(c)**
*t*RNA was known before the genetic code was postulated later on *t*RNA was then called *s*RNA (soluble RNA). Its role as an adaptor molecule was reported later

159 **(a)**
Biological concept of species was given by Ernst Mayer. Alternative ways of defining a species

Biological Aspect	Definitions
Breeding	A group of organisms capable of interbreeding and producing fertile offspring
Genetic	A group of organisms showing close similarity in genetic karyotype
Ecological	A group of organisms sharing the same ecological niche; no two species can share the same ecological niche
Evolutionary	A group of organisms sharing a unique collection of structural and functional characteristics

160 **(b)**
Rate and survival of organism is different due to variation is not a concept of Lamarckism.

161 **(a)**
Tobacco contains a large number of chemical substances including nicotine, an alkaloid
Tobacco contains large number of chemical substances including nicotine, an alkaloid. Nicotine stimulates adrenal gland to release adrenaline and nor-adrenaline into blood circulation, both of which raise blood pressure and increases the heart rate

162 **(a)**
Tuberculosis, commonly called TB is caused by a rod-shaped bacterium named *Mycobacterium tuberculosis.*

163 **(a)**
Chewing of tobacco causes oral cancer, which becomes fatal in extreme conditions

164 **(a)**
Mirobes Like *Spirulina, Methylophilusmethylotropus*can be grown in industrial scale as sources of good protein

166 **(b)**
Biofortification differs from ordinary fortification because it focuses on making plant foods more nutritious as the plants are growing rather than nutrients added to the foods when they are being processed.

167 **(c)**
*Azospirillum*and *Azotobacter*are free living nitrogen fixing bacteria. Free living N_2-fixing bacteria fix atmospheric nitrogen in the soil and make it available for the higher plant

168 **(b)**
Recombinant DNA technology involved the following steps
(i) Isolation of DNA
(ii) Fragmentation of DNA by restriction endonucleases
(iii) Isolation of a desired DNA fragment
(iv) Amplification of the gene of interest
(v) Ligation of the DNA fragment into a vector
(vi) Insertion of recombinant DNA into the host
(vii) Culturing the host cells on a suitable medium at a large scale
(viii) Extraction of the desired gene product
(ix) Downstream processing of the products as finished product, ready for marketing

171 **(d)**
Restriction endonucleases are the enzymes, which cut a DNA molecule within certain specific sites that have specific base sequence, e.g., *Hae* III, *Eco* RI, *Bam* II, *Hind* II, *Pst* I, etc. DNAse-I is not a restriction endonuclease enzyme. DNA polymerase-III synthesizes DNA, while DNA polymerase-I erases printer and fills gaps during

DNA replication.

172 **(a)**
Gene for human alpha lactalbumin was introduced into the genes of first transgenic cow, which made the milk nutritionally richer

173 **(b)**
Some organisms are tolerant to wide range of salinities called euryhaline, *e*. *g*., salmon fish but others are restricted to narrow range called stenohaline like shark and string rays. Many freshwater animals cannot live for long in sea water and *vice-versa* because of the osmotic problems they would face

174 **(c)**
In the interference competition two species interfere in each other's natural resources for living hood. Naturally they effect on each other's intrinsic growth rate (r). The volume of 'r' *is low significantly in interference competition*

176 **(b)**
Stratification involves vertical changes, within the community. Stratification in a forest community (especially tropical forests) is most complicated, where as many as five vertical sub-divisions may be recognized, *i.e.,* subterranean sub-division, forest floor, herbaceous vegetation, shrubs and trees.

177 **(b)**
In the biosphere reserve, people are an integral part, but not in National Parks and wild life sanctuaries.

178 **(b)**
Manas Wildlife Sanctuary is situated at Kamrup (Asom). It covers 80 sq km area. It's key vertebrate species are tiger, wild boar, sambhar, golden langoor, one-horned rhino, swamp deer, wild dog and wild buffalo.

179 **(d)**
Ozone depletion in stratosphere shall result in increased incidence of skin cancer and cataract.

180 **(c)**
Many of pesticides such as DDT,aldrin and dieldrin have a long life time in the environment.They are fat soluble and generally non-biodegradable.They get incorporated into the food chain and ultimately deposited in the fatty tissues of animals and humans.In the food chain,because of their build up, they get magnified at higher trophic level, called biological magnification.