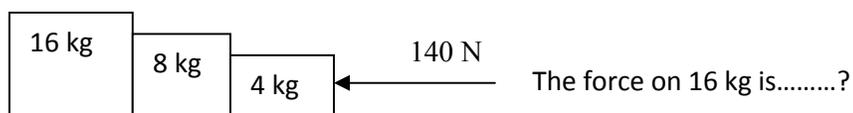


Sr. No.	Question
---------	----------

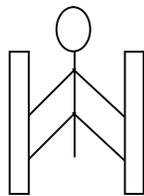
- While walking on smooth surface one should take small steps to ensure  
 (A) Large friction (B) Small friction  
 (C) Larger normal force (D) Smaller normal force
- What happens to a vehicle travelling in an unbanked curved path if the friction between the road and tires suddenly disappears  
 (A) Moves along tangent (B) Moves radially in  
 (C) Moves radially out (D) Moves along the curve
- A ball of mass 0.2 kg strikes an obstacle and moves at  $60^\circ$  to its initial direction. If its speed changes from 20m/s to 10m/s the magnitude of impulse received by the ball is -----Ns  
 (A)  $2\sqrt{7}$  (B)  $2\sqrt{3}$   
 (C)  $2\sqrt{5}$  (D)  $3\sqrt{2}$
- A spacecraft of mass 2000kg moving with 600 m/s suddenly explodes into two pieces. One piece of mass 500 kg is stationary. The velocity of other part in m/s is  
 (A) 600 (B) 800  
 (C) 1500 (D) 1000

5.



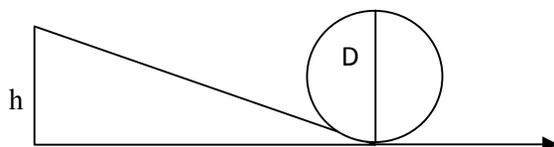
- (A) 140N (B) 120N  
 (C) 100N (D) 80N

- A man of mass 40 kg is at rest between the walls. If coeff. of friction between man and wall is 0.8, find the normal reaction exerted by wall on man (take  $g = 10 \text{ m/s}^2$ )



- (A) 100 N (B) 250 N  
 (C) 80 N (D) 50 N

7.



Find minimum height in terms of D to complete the loop

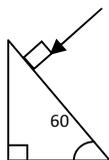
- (A)  $7D/4$  (B)  $9D/4$   
 (C)  $5D/4$  (D)  $3D/4$

8. Gravitational force between two bodies is  $F$ . The space around the mass is now filled with a liquid of specific gravity 3. The gravitational force will be  
 (A)  $F/9$  (B)  $3F$   
 (C)  $F$  (D)  $F/3$
9. A man weighs 75 kg on the surface of earth. His weight on the geostationary satellite is  
 (A) infinity (B) 150kg  
 (C) zero (D)  $75/2$  kg
10.  $g$  at a depth of 1600 km inside the earth in m/s/s is  
 (A) 6.65 (B) 7.35  
 (C) 8.65 (D) 4.35
11. A block of mass  $19M$  is suspended by a string of length 1m. A bullet of mass  $M$  hits it and gets embedded in it. If the block completes the vertical circle the velocity of bullet in m/s is  
 (A) 140 (B)  $20\sqrt{19.6}$   
 (C)  $20\sqrt{9.8}$  (D) 20
12. A rubber ball falls from a height of 4m and rebounds to 1.5m. The % loss of energy during the impact is  
 (A) 20 (B) 62.5  
 (C) 23 (D) 60
13. 25 kg of sand is deposited each second on a conveyor belt moving at 10m/s. The extra power required to maintain the belt in motion is  
 (A) 2600W (B) 250W  
 (C) 325W (D) 2500W
14. A uniform rod of mass  $M$  and length  $L$  standing vertically on a horizontal floor falls without slipping at the bottom. The moment of inertia will be  
 (A)  $ML^2/3$  (B)  $ML^2/6$   
 (C)  $ML^2/9$  (D)  $ML^2/12$
15. If the velocity of C.M of a rolling body is  $V$ , then velocity of highest point in the body will be  
 (A)  $\sqrt{2}V$  (B)  $V$   
 (C)  $2V$  (D)  $V/\sqrt{2}$
16. The angular momentum of two rotating bodies are equal. If the ratio of their M.I is 1:4, the ratio of their rotational K.E is  
 (A) 1:2 (B) 2:1  
 (C) 1:4 (D) 4:1
17. The level of water in a tank is 5m. A hole  $1\text{ cm}^2$  is made at the bottom. The rate of leakage in  $\text{m}^3/\text{s}$  is (take  $g=10\text{ m/s/s}$ )  
 (A)  $10^{-3}$  (B)  $10^{-4}$   
 (C) 10 (D)  $10^{-2}$
18. Two blocks A and B float in water. A floats with  $1/4^{\text{th}}$  of its volume immersed and B floats with  $3/5^{\text{th}}$  of its volume immersed. The ratio of their densities is  
 (A) 5:12 (B) 12:5  
 (C) 3:20 (D) 20:3

19. The terminal velocity of a spherical ball of lead of radius  $R$  is  $V$  while falling through a viscous liquid varies with  $R$  such that  
 (A)  $V/R$  is constant (B)  $VR$  is constant  
 (C)  $V$  is constant (D)  $V/R^2$  is constant
20. A hydraulic press uses a piston of  $100 \text{ cm}^2$  to exert a force of  $10^7$  dynes on water. The area of the other piston that supports a mass of  $2000 \text{ kg}$  is (take  $g = 10 \text{ m/s}^2$ )  
 (A)  $100 \text{ cm}^2$  (B)  $10^9 \text{ cm}^2$   
 (C)  $2 \times 10^4 \text{ cm}^2$  (D)  $2 \times 10^{10} \text{ cm}^2$
21. When kerosene and coconut oil of coeff. of viscosity  $0.002$  and  $0.0154 \text{ Ns/m}^2$  are followed through the same pipe, under same pressure difference and same time collects  $1 \text{ lit}$  of coconut oil. The volume of kerosene that flows is  
 (A)  $5.5 \text{ lit}$  (B)  $6.6 \text{ lit}$   
 (C)  $7.7 \text{ lit}$  (D)  $8.8 \text{ lit}$
22. There is a circular hole in metal plate. When the plate is heated the radius of the hole becomes  
 (A) increased (B) decreased  
 (C) unchanged (D) depends on metal
23. Specific heat of a substance depends on 1. Nature of substance. 2. Mass of substance. 3. Heat given to substance  
 (A) Only one is correct (B) Both 1 and 2 are correct  
 (C) All are correct (D) Only 1 and 3 are correct
24. In a give process  $dW=0$ ,  $dq$  is  $<0$  then for a gas  
 (A) Temperature increases (B) Volume decreases  
 (C) Pressure increases (D) Pressure decreases
25. The efficiency of carnot engine depends on  
 (A) Working substance (B) Sink temperature  
 (C) Source temperature (D) Both B and C
26. A  $200$  turn coil of self inductance  $30 \text{ mH}$  carries a current of  $5 \text{ mA}$ . Find the magnetic flux linked with each turn of coil.  
 (A)  $7.5 \times 10^{-7} \text{ Wb}$  (B)  $1.6 \times 10^{-7} \text{ Wb}$   
 (C)  $3 \times 10^{-7} \text{ Wb}$  (D)  $1.5 \times 10^{-7} \text{ Wb}$
27. The instantaneous value of current in an AC circuit is  $I = 2 \sin (100 \pi t + \pi/3) \text{ A}$ . At what first time the current will be maximum?  
 (A)  $1/100 \text{ s}$  (B)  $1/200 \text{ s}$   
 (C)  $1/500 \text{ s}$  (D)  $1 \text{ s}$

28. What in electric system represents force in mechanical system ?  
 (A) L (B) I  
 (C)  $1/C$  (D) q
29. A capacitor of  $1 \mu\text{F}$  is charged with  $0.01\text{C}$  of electricity. How much energy is stored in it?  
 (A) 30 J (B) 40 J  
 (C) 50 J (D) 60 J
30. An electromagnetic wave is travelling in vacuum with a speed of  $3 \times 10^8 \text{ m/s}$ . Find the velocity in a medium having relative electric and magnetic permeability 2 and 1, respectively.  
 (A)  $3/\sqrt{2} \times 10^8 \text{ m/s}$  (B)  $1.5 \times 10^8 \text{ m/s}$   
 (C)  $2 \times 10^8 \text{ m/s}$  (D) No change

31. Trace the path of ray of light passing through a glass prism as shown in the figure. If the refractive index of glass is  $\sqrt{3}$ , find out the value of angle of emergence from prism.

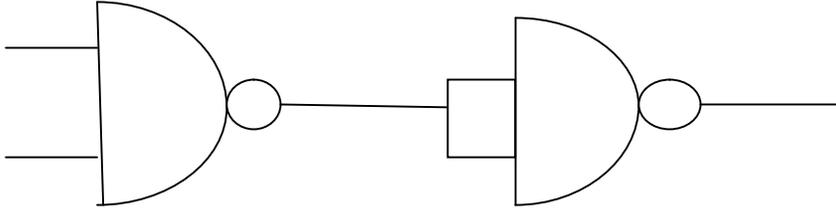


- (A) 30 (B) 45  
 (C) 60 (D) 75
32. Light wave from two coherent sources of intensities in ratio 64:1 produces interference. Calculate the ration of maximum and minima of the interference pattern.  
 (A) 8:1 (B) 64:1  
 (C) 9:7 (D) 81:49
33. In young's experiment, the width of the fringes obtained with light of wavelength  $6000 \text{ \AA}$  is 2 mm. What will be the fringe width, if the entire apparatus is immersed in a liquid of refractive index 1.33?  
 (A) 1 mm (B) 1.5 mm  
 (C) 2 mm (D) 2.5 mm
34. Unpolarised light is incident on plane glass surface. What should be the angle of incidence in degrees, so that the reflected and refracted rays are perpendicular to each other?  
 (A) 37 (B) 47  
 (C) 57 (D) 67
35. Determine the de-Broglie wavelength associated with an electron, accelerated through a potential difference of 100 V.  
 (A)  $1.227 \text{ \AA}$  (B)  $12.27 \text{ \AA}$   
 (C)  $122.7 \text{ \AA}$  (D)  $1227 \text{ \AA}$

36. A particle with rest mass  $m_0$  is moving with velocity  $c$ . What is the de-Broglie wavelength associated with it?
- (A) infinity (B) zero  
(C) radio wave (D) X ray

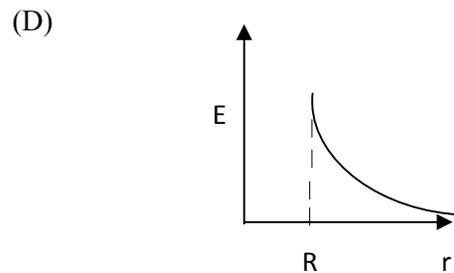
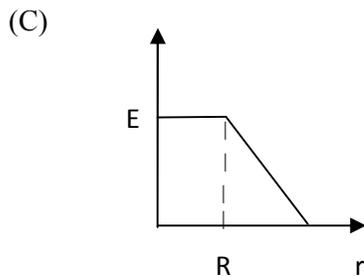
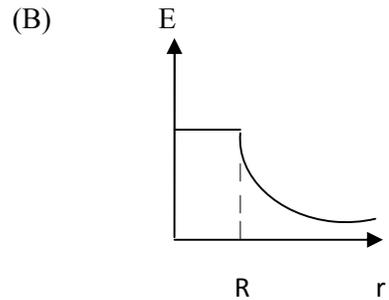
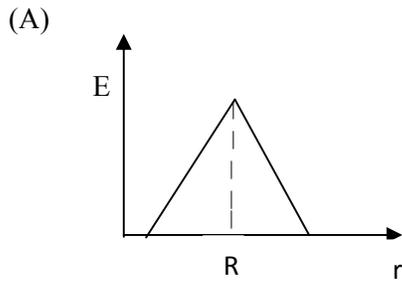
37. Which among the following series gives visible light?
- (A) Lyman (B) Balmer  
(C) Brackett (D) None of these

38. Identify the logic operation performed by this circuit



- (A) AND (B) OR  
(C) NAND (D) NOR
39. The number of silicon atoms per  $m^3$  is  $5 \times 10^{28}$ . This is doped simultaneously with  $5 \times 10^{22}$  atoms per  $m^3$  of arsenic and  $5 \times 10^{20}$  atoms per  $m^3$  of indium. Calculate the number of holes, given that  $n_i = 1.5 \times 10^{16} m^{-3}$ .
- (A)  $4.54 \times 10^9 m^{-3}$  (B)  $4.95 \times 10^{22} m^{-3}$   
(C)  $1.5 \times 10^{16} m^{-3}$  (D)  $5 \times 10^{28} m^{-3}$
40. Two charges  $+5\mu C$  and  $-5\mu C$  are placed 5 mm apart. Determine  $E$  at a point 10 cm from centre on the positive charge side along the axial line.
- (A)  $4.5 \times 10^5 N/C$  (B)  $4.5 \times 10^5 NC$   
(C)  $4.5 \times 10^{-5} N/C$  (D)  $4.5 \times 10^{-5} NC$
41. If the Gaussian surface is so chosen that there are some charges inside and some outside than the electric field is due to
- (A) Only inside charges (B) Only outside charges  
(C) All the charges (D) Cannot determine

42. The following is a diagram showing the variation of  $E$  with  $r$  from centre of uniformly charge spherical shell of radius  $R$



43. Net capacitance of 3 identical capacitor in series is  $1 \mu F$ . What is the net capacitance in  $\mu F$  if connected in parallel?

- (A) 3 (B) 6  
(C) 9 (D) 12

44. An inductor of  $5H$  carries a steady current of  $2A$ . In what time if the current is made zero can a  $40V$  self induced emf be produced in the inductor.

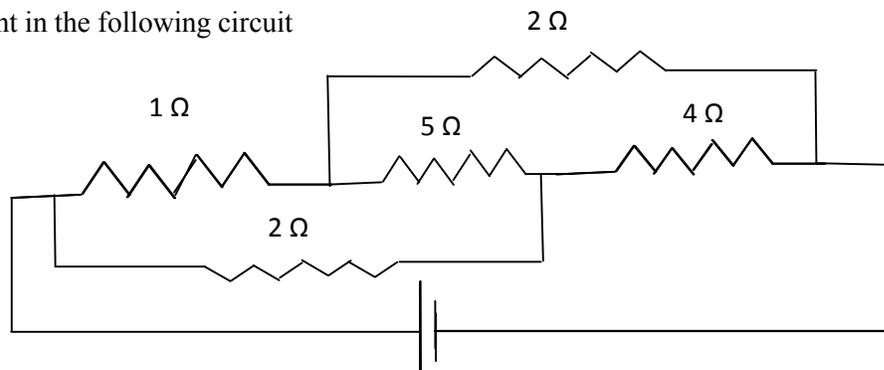
- (A) 2s (B) 1s  
(C) 0.5s (D) 0.25s

45. A cell of emf  $E$  and internal resistance  $r$  gives  $0.5A$  with  $R=12$  ohms and  $0.25$  with  $R = 25$  ohms. Its internal resistance in ohms will be

- (A) 0.5 (B) 1  
(C) 2 (D) 3

46.

Find current in the following circuit



- (A) 1A (B) 2A  
(C) 3A (D) 4A

47. Two identical circular loops P and Q of radius  $r$  are placed in parallel planes with same axis at a distance of  $2r$ . Find the midpoint of the axis between them if same current  $I$  flows through both loops.
- (A)  $\mu_0 I / 2^{3/2} r$  (B)  $\mu_0 2 I / 2^{3/2} r$   
 (C)  $\mu_0 I / 4\pi r$  (D) Cannot be determined
48. A block of mass 4 kg is kept on a rough horizontal surface. The coefficient of static friction is 0.8. If a force of 19 N is applied on the block parallel to the floor, then the force of friction between the block and floor is:
- (A) 19N (B) 18 N  
 (C) 16N (D) 9.8N
49. Current in a circuit falls steadily from 2A to 0A in 10 ms. Calculate L if emf induced is 200V.
- (A) 1H (B) 2H  
 (C) 3H (D) 4H
50. Self inductance of the air core inductor increases from 0.01 mH to 10 mH on introducing an iron core. What is the relative permeability of the core used?
- (A) 500 (B) 800  
 (C) 900 (D) 1000
51. Among the following, the most stable complex is
- (A)  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$  (B)  $[\text{Fe}(\text{NH}_3)_6]^{3+}$   
 (C)  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$  (D)  $[\text{Fe}(\text{Cl})_6]^{3-}$
52. Which is the correct coordination number (C.N) and oxidation number (O.N) of the transition metal atom in  $[\text{Co}(\text{NH}_3)_2(\text{H}_2\text{O})_2\text{Cl}_2]^+$ ?
- (A) C.N=3, O.N=+1 (B) C.N=4, O.N=+2  
 (C) C.N=6, O.N=+1 (D) C.N=6, O.N=+3
53. In a solid, oxide ions are arranged in ccp, cations A occupy one sixth of the tetrahedral voids and cation B occupy one third of the octahedral voids. The formula of the solid is:
- (A)  $\text{ABO}_3$  (B)  $\text{A}_3\text{BO}$   
 (C)  $\text{AB}_3\text{O}$  (D)  $\text{A}_3\text{B}_3\text{O}_3$
54. On mixing acetone to methanol some of the hydrogen bonds between methanol molecules break. Which of the following statements is correct about the above process?
- (A) At specific composition methanol acetone mixture will form minimum boiling azeotrope and show positive deviation from Raoult's law  
 (B) At specific composition methanol acetone mixture will form maximum boiling azeotrope and show positive deviation from Raoult's law  
 (C) At specific composition methanole acetone mixture will form minimum boiling azeotrope and show negative deviation from Raoult's law  
 (D) At specific composition methanole acetone mixture will form maximum boiling azeotrope and show negative deviation from Raoult's law
55.  $K_H$  value for argon, carbon dioxide, formaldehyde and methane gases are 40.39, 1.67,  $1.83 \times 10^{-5}$  and 0.413, respectively. The correct arrangement of these gases in the order of their increasing solubility is:
- (A) formaldehyde < methane < carbon dioxide < argon (B) formaldehyde < carbon dioxide < methane < argon  
 (C) argon < carbon dioxide < methane < formaldehyde (D) argon < methane < carbon dioxide < formaldehyde

56. The number of faradays of electricity required for electrolytic conversion of the mole of nitrobenzene to aniline is:
- (A) 3F (B) 4F  
(C) 6F (D) 5F
57. The positive value of the standard electrode potential of  $\text{Ag}^+/\text{Ag}$  indicates that:
- (A) This redox couple is a stronger reducing agent than  $\text{H}^+/\text{H}_2$  couple (B) This redox couple is a stronger oxidizing agent than  $\text{H}^+/\text{H}_2$  couple  
(C) Ag can displace  $\text{H}_2$  from acid (D) Ag can displace  $\text{H}_2$  from base
58. Milk is refrigerated in order to slow the rate of decomposition by bacterial action. The decrease in reaction rate is due to:
- (A) A decrease in surface area (B) A decrease in  $\Delta H$  for the reaction  
(C) A decrease in the fraction of particles possessing sufficient energy (D) The introduction of an alternative pathway with greater activation energy.
59. Which of the following statements is not correct?
- (A) The rate of a reaction decreases with passage of time as concentration of reactants decrease (B) The instantaneous rate a reaction is same at any time during the reaction  
(C) For a zero order reaction the concentration of reactants remains changed with passage of time (D) The rate of a reaction decreases with increase in concentration of reactant (s)
60. Which of the following gases shows the lowest adsorption per gram of charcoal? The critical temperatures are given in parenthesis:
- (A)  $\text{H}_2$  (33K) (B)  $\text{CH}_4$  (190K)  
(C)  $\text{SO}_2$  (630K) (D)  $\text{CO}_2$  (304K)
61. Freundlich adsorption isotherm is given by the expression  $x/m = kp^{1/n}$ . Which of the following statements are false?
- i. When  $1/n=0$ , the adsorption is independent of pressure.  
ii. When  $n=0$ , the plot of  $x/m$  vs  $p$  graph is a line parallel to  $x$  axis.  
iii. When  $1/n=0$ , the adsorption is directly proportional to pressure.  
iv. When  $n=0$ , plot of  $x/m$  vs  $p$  is a curve
- (A) i and ii (B) ii and iv  
(C) i and iii (D) all are false
62. In the extraction of chlorine by electrolysis of an aqueous solution of sodium chloride, which of the following statements are true?
- i.  $\Delta G^0$  for the overall reaction is positive  
ii.  $\Delta G^0$  for the overall reaction is negative  
iii.  $E^0$  for the overall reaction is positive  
iv.  $E^0$  for the overall reaction is negative
- (A) i and iv (B) i and iii  
(C) ii and iii (D) iii and iv

63. Which of the following pairs of ions are isoelectronic and isostructural ?  
 (A)  $\text{NO}_2^+$  and  $\text{NO}_3^-$  (B)  $\text{ClO}_3^-$  and  $\text{ICl}_4^-$   
 (C)  $\text{XeO}_3^{2-}$  and  $\text{PCl}_3$  (D)  $\text{ClO}_3^-$  and  $\text{SO}_3^{2-}$
64. Which of the following hydrides is the strongest reducing agent?  
 (A)  $\text{NH}_3$  (B)  $\text{PH}_3$   
 (C)  $\text{AsH}_3$  (D)  $\text{SbH}_3$
65. Consider the reactions,  
 i.  $\text{Zn} + \text{Conc. HNO}_3 (\text{hot}) \longrightarrow \text{Zn}(\text{NO}_3)_2 + \text{X} + \text{H}_2\text{O}$   
 ii.  $\text{Zn} + \text{dil. HNO}_3 (\text{cold}) \longrightarrow \text{Zn}(\text{NO}_3)_2 + \text{Y} + \text{H}_2\text{O}$   
 Compounds X and Y are, respectively  
 (A)  $\text{N}_2\text{O}$ ,  $\text{NO}$  (B)  $\text{NO}_2$ ,  $\text{NO}_2$   
 (C)  $\text{N}_2$ ,  $\text{N}_2\text{O}$  (D)  $\text{NO}_2$ ,  $\text{NO}$
66. When  $\text{KMnO}_4$  acts as an oxidizing agent in weakly alkaline medium, the oxidation number of manganese decreases by:  
 (A) 1 (B) 2  
 (C) 3 (D) 5
67. Acidified potassium dichromate solution turns green when  $\text{Na}_2\text{SO}_3$  is added to it due to the formation of:  
 (A)  $\text{CrSO}_4$  (B)  $\text{Cr}_2(\text{SO}_4)_3$   
 (C)  $\text{CrO}_4^{2-}$  (D)  $\text{Cr}_2(\text{SO}_3)_3$
68. The d-electron configurations of  $\text{Cr}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{2+}$  and  $\text{Co}^{2+}$  are  $d^4$ ,  $d^5$ ,  $d^6$  and  $d^7$ , respectively. Which one of the following complexes will exhibit minimum paramagnetic behavior? (atomic numbers of Cr=24, Mn=25, Fe=26, Co=27)  
 (A)  $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$  (B)  $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$   
 (C)  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$  (D)  $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$
69. When 2-Bromopentane is heated with potassium ethoxide in ethanol, the major product obtained is:  
 (A) 2-Ethoxypentane (B) Pent-1-ene  
 (C) Cis-Pent-2-ene (D) Trans-Pent-2-ene
70. Which of the following undergoes nucleophilic substitution exclusively by  $\text{S}_\text{N}^1$  mechanism?  
 (A) Chloroethane (B) Isopropyl chloride  
 (C) Chlorobenzene (D) Benzyl chloride
71. The number of possible stereoisomers for  $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}(\text{Br})\text{CH}_3$  is:  
 (A) 8 (B) 2  
 (C) 4 (D) 6
72. 2-Methoxy-2-methylpropane on heating with HI produces:  
 (A) Methanol and sec-propyl iodide (B) Methyl iodide and tert-butyl alcohol  
 (C) Methyl iodide and isobutene (D) Methanol and tet-butyl iodide
73. The least acidic compound among the following is:  
 (A) o-Nitrophenol (B) m-Nitrophenol  
 (C) p-Nitrophenol (D) Phenol

74. An alkene  $C_7H_{14}$  on reductive ozonolysis gives an aldehyde with formula  $C_3H_6O$  and a ketone. The ketone is:  
 (A) 2-Butanone (B) 2-Pentanone  
 (C) 3-Pentanone (D) Propanone
75. The increasing order of the rate of addition of HCN to the compounds i) Formaldehyde ii) Acetone iii) Acetophenone iv) benzophenone  
 (A)  $i < ii < iii < iv$  (B)  $iv < ii < iii < i$   
 (C)  $iv < iii < ii < i$  (D)  $iv < i < ii < iii$
76. The carboxylic acid that does not undergo Hell-Vohland-Zelinsky reaction is:  
 (A)  $CH_3COOH$  (B)  $(CH_3)_2CHCOOH$   
 (C)  $CH_3CH_2CH_2COOH$  (D)  $(CH_3)_3CCOOH$
77.  $C_2H_5NH_2 \xrightarrow{NaNO_2/HCl} X \xrightarrow{P/Br_2} Y \xrightarrow[NH_3]{(excess)} Z$   
 In the above sequence, Z is:  
 (A) cyanoethane (B) ethanamide  
 (C) methanamine (D) ethanamine
78. The attachment of which of the following group at para position in aniline will raise the  $K_b$  value?  
 (A)  $-SO_3H$  (B)  $-OH$   
 (C)  $-F$  (D)  $-Br$
79. Which of the following is an example of globular protein?  
 (A) myosin (B) collagen  
 (C) keratin (D) haemoglobin
80. Which one of the following is synthesized in our body by sun rays?  
 (A) Vitamin D (B) Vitamin B  
 (C) Vitamin K (D) Vitamin A
81. Caprolactum is the starting material for the synthesis of  
 (A) Nylon-6 (B) Nylon6,6  
 (C) Terylene (D) Nylon 10
82. The species which can serve as an initiator for cationic polymerization is  
 (A) Lithium aluminium hydride (B) Nitric acid  
 (C) Aluminium chloride (D) BuLi
83. Aspirin is an:  
 (A) analgesic (B) antipyretic  
 (C) antimalarial (D) Both analgesic and antipyretic
84. The equivalent mass of iron in the reaction  $2Fe + 3Cl_2 \rightarrow 2FeCl_3$  is:  
 (A) Half of its atomic mass (B) One third of its atomic mass  
 (C) Same as atomic mass (D) One fourth of its atomic mass

85. Which of the following sets of quantum numbers is correct for an electron in 4f subshell?  
 (A)  $n=4, l=3, m=4, s=+1/2$  (B)  $n=4, l=3, m=-4, s=-1/2$   
 (C)  $n=4, l=3, m=+1, s=+1/2$  (D)  $n=3, l=2, m=-2, s=+1/2$
86. The correct sequence of atomic radii is:  
 (A)  $\text{Na} > \text{Mg} > \text{Al} > \text{Si}$  (B)  $\text{Al} > \text{Si} > \text{Na} > \text{Mg}$   
 (C)  $\text{Si} > \text{Al} > \text{Mg} > \text{Na}$  (D)  $\text{Si} > \text{Al} > \text{Na} > \text{Mg}$
87. In which of the following, the bond angle around the central atom is maximum?  
 (A)  $\text{NH}_3$  (B)  $\text{NH}_4^+$   
 (C)  $\text{PCl}_3$  (D)  $\text{SCl}_2$
88. Which of the following molecule does not exist  
 (A)  $\text{NF}_3$  (B)  $\text{NF}_5$   
 (C)  $\text{PF}_5$  (D)  $\text{N}_2\text{H}_4$
89. If helium is allowed to expand in vacuum, it liberates heat because  
 (A) It is an inert gas (B) It is an ideal gas  
 (C) Its critical temp. is low (D) It is a light gas
90. i)  $\text{H}_2(\text{g}) + 1/2\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l}) + x \text{ KJ}$  ii)  $\text{H}_2(\text{g}) + 1/2\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{g}) + y \text{ KJ}$ ; For the given two reactions,  
 (A)  $x > y$  (B)  $x < y$   
 (C)  $x = y$  (D)  $x + y = 0$
91. If the bond dissociation energies of  $\text{XY}$ ,  $\text{X}_2$ ,  $\text{Y}_2$  (all diatomic molecules) are in the ratio 1:1:0.5, respectively and  $\Delta_f\text{H}$  of  $\text{XY}$  is  $-200\text{KJmol}^{-1}$ , the bond dissociation energy of  $\text{X}_2$  will be:  
 (A)  $400 \text{ KJmol}^{-1}$  (B)  $300 \text{ KJmol}^{-1}$   
 (C)  $200 \text{ KJmol}^{-1}$  (D)  $100 \text{ KJmol}^{-1}$
92. What will be the correct order of vapour pressure of water, ethanol and ether at  $30^\circ\text{C}$ ? Given that among these compounds water has maximum boiling point and ether has minimum boiling point.  
 (A)  $\text{Water} < \text{ether} < \text{ethanol}$  (B)  $\text{Water} < \text{ethanol} < \text{ether}$   
 (C)  $\text{Ether} < \text{ethanol} < \text{water}$  (D)  $\text{Ethanol} < \text{ether} < \text{water}$
93. Which of the following will occur if a 0.1M solution of a weak acid is diluted to 0.01M at constant temperature?  
 (A)  $[\text{H}^+]$  will decrease to 0.001M (B) pH will decrease  
 (C) Percentage ionization will increase (D)  $\text{K}_a$  will increase
94. Which of the following species involves the transfer of  $5N_A$  electrons per mole of it ?  
 (A)  $\text{MnO}_4^{2-} \rightarrow \text{MnO}_4^-$  (B)  $\text{MnO}_4^- \rightarrow \text{Mn}^{2+}$   
 (C)  $\text{MnO}_4^- \rightarrow \text{MnO}_2$  (D)  $\text{CrO}_4^{2-} \rightarrow \text{Cr}^{3+}$

95. 30-volume hydrogen peroxide means:  
 (A) 30%  $\text{H}_2\text{O}_2$  by volume (B) 30g of  $\text{H}_2\text{O}_2$  solution containing 1g of it  
 (C) 1  $\text{cm}^3$  of solution liberates 30  $\text{cm}^3$  of  $\text{O}_2$  gas at STP (D) 30  $\text{cm}^3$  of the solution contains one mole of  $\text{H}_2\text{O}_2$
96. The correct sequence of covalent character is represented by:  
 (A)  $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$  (B)  $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$   
 (C)  $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$  (D)  $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$
97. Which of the following is known as pyrene?  
 (A)  $\text{CCl}_4$  (B)  $\text{CS}_2$   
 (C)  $\text{S}_2\text{Cl}_2$  (D) Solid  $\text{CO}_2$
98. The most stable carbocation amongst the following is:  
 (A)  $(\text{CH}_3)_2\text{CH}^+$  (B)  $\text{Ph}_3\text{C}^+$   
 (C)  $\text{CH}_3\text{CH}_2^+$  (D)  $\text{CH}_2=\text{CH}-\text{CH}_2^+$
99. The molecule that will have dipole moment is:  
 (A) 2,2-Dimethylpropane (B) Cis-2-Butene  
 (C) Trans-2-Butene (D) 2,2,3,3-Tetramethylbutane
100. Of the five isomeric hexanes, the isomer which can give two monochlorinated compound is:  
 (A) 2-Methylpentane (B) 2,2-Dimethylbutane  
 (C) 2,3-Dimethylbutane (D) n-Hexane
101. Crossing over occurs in meiosis I during:  
 (A) Metaphase (B) Telophase  
 (C) Anaphase (D) Pachytene
102. Power house of the cell:  
 (A) Golgi body (B) Ribosomes  
 (C) Mitochondria (D) Lysosomes
103. Genetics is the study of:  
 (A) Heredity (B) Variation  
 (C) Both A and B (D) None of these
104. In sex-linked inheritance, characters are passed from father to the grandsons through his:  
 (A) Daughter (B) Son  
 (C) Both daughter and son (D) Any of them
105. Which of the following bases is not present in RNA:  
 (A) Uracil (B) Thymine  
 (C) Adenine (D) Cytosine

106. Mendel's principle of independent assortment can be demonstrated through:  
 (A) Monohybrid cross (B) Dihybrid cross  
 (C) Both A and B (D) Any of them
107. On hydrolysis, maltose gives  
 (A) glucose + glucose (B) glucose + lactose  
 (C) glucose + fructose (D) glucose + galactose
108. A dipeptide has ----- peptide bonds.  
 (A) Three (B) One  
 (C) Two (D) None of them
109. Which vitamin can be synthesized by green plants and various micro-organisms but not by mammals?  
 (A) Ascorbic acid (B) Pantothenic acid  
 (C) Thiamine (D) Retinol
110. Bacterial cell wall is made up of:  
 (A) Chitin (B) Cellulose  
 (C) Peptidoglycan (D) All the above
111. Plant viruses are generally of:  
 (A) RNA (B) DNA  
 (C) mRNA (D) tRNA
112. Gram positive aerobic, filamentous bacteria with hyphae are known as:  
 (A) Algae (B) Actinomycetes  
 (C) Bacteria (D) Fungi
113. Conversion of organic matter into simple inorganic forms is called:  
 (A) Immobilization (B) Mineralization  
 (C)  $\text{CO}_2$  fixation (D) Nitrification
114. Excess carbon ( $> \text{C/N}$  ratio) leads to rate of decomposition:  
 (A) Slow (B) Fast  
 (C) Optimum (D) None
115.  $\text{N}_2$  fixing cells of cyanobacteria are known as:  
 (A) Cyst (B) Akinetes  
 (C) Spores (D) Heterocyst
116. Livestock is important source of:  
 (A) Milk (B) Meat  
 (C) Manure (D) All of these

117. Dairy cattle and buffalo can be called as:  
(A) Caprine (B) Ovine  
(C) Bovine (D) Equine
118. Best breed of buffalo in India:  
(A) Nili Ravi (B) Murrah  
(C) Surti (D) Toda
119. Best layer poultry strain is:  
(A) WLH (B) Minorca  
(C) Karaknath (D) Sutlez
120. Normal birth weight (Kg) of healthy buffalo calf is:  
(A) 20 (B) 30  
(C) 40 (D) 50
121. Number of teats in buffalo:  
(A) 2 (B) 4  
(C) 6 (D) 8
122. Dry matter requirement (kg) of a cow weighing 400 kg is:  
(A) 8 (B) 10  
(C) 12 (D) 14
123. Green fodder requirement of adult cattle (kg):  
(A) 30 (B) 40  
(C) 50 (D) 60
124. Which of the following crops is the best for hay making:  
(A) Jowar (B) Bajra  
(C) Berseem (D) Oat
125. Normal body temperature of healthy poultry bird (°F):  
(A) 37.0 (B) 98.6  
(C) 107.0 (D) 117.0
126. ICAR-National Dairy Research Institute (NDRI) is located at:  
(A) Karnal (B) New Delhi  
(C) Bareilly (D) Anand
127. Excessive gas accumulation in rumen indicates:  
(A) Impaction (B) Bloat  
(C) Milk fever (D) Foot and Mouth Disease

128. Most fatal disease in farm animals is:  
 (A) Foot and Mouth Disease (B) HS  
 (C) Rinderpest (D) Anthrax
129. Semen is stored in liquid nitrogen at (°C):  
 (A) -79 (B) -196  
 (C) 79 (D) 196
130. During Artificial Insemination (AI) semen should be deposited  
 (A) Vagina (B) Cervix  
 (C) Uterus (D) Fallopian tube
131. Seeds of groundnut contain about:  
 (A) 25% oil and 50% protein (B) 20% oil and 40% protein  
 (C) 40% oil and 40% protein (D) 50% oil and 25% protein
132. Organic carbon is a measure of  
 (A) Available nitrogen in soil (B) Available nutrient in soil  
 (C) Excess of carbon in soil (D) Excess of iron in soil
133. Which among the following element is considered immobile in the plant  
 (A) Calcium (B) Phosphorus  
 (C) Nitrogen (D) Magnesium
134. Which among the following is recommended variety of durum wheat:  
 (A) HD 2960 (B) WH 896  
 (C) PBW 725 (D) WH 711
135. Recommended dose of nutrients for berseem (kg/acre) is:  
 (A) 10 kg N, 28 kg P<sub>2</sub>O<sub>5</sub> (B) 40 kg N, 25 kg P<sub>2</sub>O<sub>5</sub>  
 (C) 20 kg N, 40 kg P<sub>2</sub>O<sub>5</sub> (D) 20 kg N, 20 kg P<sub>2</sub>O<sub>5</sub>
136. Optimum row spacing for cotton is:  
 (A) 50 cm (B) 60 cm  
 (C) 67.5 cm (D) 75 cm
137. Optimum sowing time of summer moong in the state is:  
 (A) March (B) Second fortnight of February  
 (C) First fortnight of April (D) End June-early July
138. 'White alkali' soil refers to:  
 (A) Acid soil (B) Saline soil  
 (C) Salina sodic soil (D) Sodic soil
139. The exchange sodium percentage (ESP) of alkali soils is always:  
 (A) More than 15 (B) Any value  
 (C) Less than 15 (D) Less than 7.5

140. ICAR-Central Arid Zone Research Institute is located at:  
(A) Nagpur (B) Hyderabad  
(C) New Delhi (D) Jodhpur
141. India is divided in to ----- ecological zones.  
(A) 12 (B) 10  
(C) 15 (D) 20
142. Recommended seed rate (kg/ha) of dhaincha or sunhemp for green manuring is:  
(A) 20 (B) 30  
(C) 40 (D) 50
143. Recommended seed rate for *spring* season mungbean is  
(A) 15-20 kg per acre (B) 25-30 kg per hectare  
(C) 15-20 kg per hectare (D) 10 kg per hectare
144. For transplanting of pearl millet (bajra) in Haryana, optimum age of seedlings is:  
(A) Two weeks (B) Three weeks  
(C) Four weeks (D) Five weeks
145. Blind tillage refers to:  
(A) Summer ploughing (B) Primary tillage  
(C) Hoeing before germination (D) Hoeing in standing crop rows
146. Flame photometer is used for the determination of:  
(A) Nitrogen (B) Phosphorus  
(C) Potassium (D) Boron
147. Tetrazolium test is conducted to test the:  
(A) Physical purity of seed (B) Percentage of weed seeds  
(C) Viability of seed (D) Seed germination
148. World Food Day is celebrated on:  
(A) 5 June (B) 20 June  
(C) 28 February (D) 16 October
149. Which among the following is the best and cheapest method of weed control:  
(A) Cultural measures (B) Herbicide based weed control  
(C) Biological control (D) Preventive measures
150. Black soils in India belong to soil order:  
(A) Alfisol (B) Inceptisol  
(C) Vertisol (D) Oxisol
151. Which among the following crop has epigeal germination?  
(A) Sunflower (B) Chickpea  
(C) Rice (D) Pearl millet

152. Which fraction of soil organic matter is soluble in both alkali and acid:  
 (A) Humic acid (B) Fulvic acid  
 (C) Hymatomelonic acid (D) Humin acid
153. Nitrogen use efficiency in rice can be increased by:  
 (A) Delayed application of N (B) Use of biofertilizers  
 (C) Application of S-coated urea (D) Application of blue green algae
154. Which stage of sugarcane is most critical for irrigation?  
 (A) Germination (B) Formative stage  
 (C) Grand growth phase (D) Ripening stage
155. The largest producer of rapeseed-mustard in India is  
 (A) Haryana (B) Uttar Pradesh  
 (C) Rajasthan (D) Gujarat
156. The term Functional or Metabolic Nutrients was proposed by:  
 (A) JV Leibig (B) DJ Nicholas  
 (C) DI Arnon (D) Mosanoba Fukuoka
157. Botanical name of sunnhemp is  
 (A) *Sesbania aculeata* (B) *Trifolium alexandrinum*  
 (C) *Carthamus tinctorium* (D) *Crotolaria juncea*
158. The upper limit of soil moisture available for plant growth is:  
 (A) PWP (15 bars) (B) Hygroscopic coefficient  
 (C) Field capacity (1/3 bars) (D) Gravitational potential
159. For which fertilizer, India is fully dependent on import?  
 (A) N fertilizers (B) K fertilizers  
 (C) P fertilizers (D) S fertilizers
160. Agrostology is the branch of Agronomy that deals with cultivation of:  
 (A) Aromatic and medicinal crops (B) Non edible oilseeds  
 (C) Fodder crops (D) Green manure crops
161. With excessive use of nitrogen in sugarcane, the sugar content in juice is:  
 (A) Increased (B) Remains same  
 (C) Decreased (D) Not affected
162. Bacteria responsible for nitrogen fixation in soybean is  
 (A) *Rhizobium leguminosarum* (B) *Rhizobium japonicum*  
 (C) *Rhizobium phaseoli* (D) *Rhizobium trifoli*
163. The most critical stage of irrigation in maize is:  
 (A) Silking stage (B) Tasseling stage  
 (C) Grain development stage (D) Dough stage
164. Nipping in chickpea is beneficial to:  
 (A) Promote branching (B) Promote flowering  
 (C) Check excessive vegetative growth (D) Improve seed setting

165. Quantity of urea required by wheat for one acre at a dose of 125 kg per hectare is:  
 (A) 130 (B) 90  
 (C) 110 (D) 275
166. Congress grass (*Parthenium hysterophorus*) can be controlled by insect:  
 (A) *Chrysoperla* (B) *Dactylopius tomentosus*  
 (C) *Zygotogramma bicolorata* (D) *Bacillus thuringiensis*
167. Application of organic material with wider C:N ratio (usually more than (20:1) to soil leads to:  
 (A) N immobilization (B) N leaching  
 (C) Immediate release in N (D) N mineralization
168. Heavy shedding of buds and bolls in cotton occurs due to:  
 (A) Deficiency of N in soil (B) Water stress at bud formation stage  
 (C) Deficiency of P in soil (D) Excess of N in soil
169. 'Whip tail' in brassica is due to the deficiency of:  
 (A) Calcium (B) Magnesium  
 (C) Manganese (D) Zinc
170. Which kind of soil mineralogy has the highest 'cation exchange capacity':  
 (A) Kaolinite (B) Illite  
 (C) Montmorillonite (D) Humus
171. Optimum row spacing for fodder crops is:  
 (A) 30 cm (B) 60 cm  
 (C) 45 cm (D) 75 cm
172. The balance sheet of a dairy farm represents:  
 (A) Assets (B) Liabilities  
 (C) Both (A) and (B) (D) None of these
173. Main limitation in keeping farm records in India is:  
 (A) Illiteracy (B) Nature of farming  
 (C) Big size of holding (D) None of these
174. Profit and loss account is a type of:  
 (A) Personal account (B) Real account  
 (C) Nominal account (D) None of these
175. Which is the most prominent book for keeping farm records and accounts:  
 (A) Journal (B) Ledger  
 (C) Cash book (D) Purchase register
176. The list of all the physical property of a business along with their values at a specific point of time is known as:  
 (A) Assets (B) Liabilities  
 (C) Farm inventory (D) None of these
177. The decline in value of assets due to usage, accidental damage and time obsolescence is known as:  
 (A) Appreciation (B) Depreciation  
 (C) Interest (D) None of these

178. Which of the following is not a component of farm business:  
 (A) Capital (B) Land  
 (C) Market (D) Labour and management
179. Queen of Fruits is:  
 (A) Mango (B) Apple  
 (C) Litchi (D) Banana
180. Low chilling pears are trained by:  
 (A) Espalier system (B) Centre leader system  
 (C) Modified leader system (D) Y trellies system
181. Wind break established in the orchards is of:  
 (A) Jamun (B) Jhatti Khatti  
 (C) Karonda (D) Galgal
182. Strawberry is propagated through:  
 (A) Stolon (B) Runners  
 (C) Crown (D) Suckers
183. Epicotyl grafting is commonly done in:  
 (A) Guava (B) Litchi  
 (C) Pear (D) Mango
184. Daisy is cross between:  
 (A) Fortune x Fremont mandarin (B) King x Willow leaf  
 (C) *Citrus grandis* Osbeck × *Citrus Paradisi* Macf. (D) Sweet orange x *C trifoliata*
185. Arunika is cross between:  
 (A) Dashehari x Neelum (B) Neelum x Dashehari  
 (C) Amrapali x Vanraj (D) Sensation x Amrapali
186. *Phytophthora* is controlled with the application of:  
 (A) Ridomil (B) Bayleton  
 (C) c. M 45 (D) All of these
187. Yellow pigment in papaya fruit is:  
 (A) Xanthophyll (B) Carotene  
 (C) Lycopene (D) Caricaxanthin
188. Which garden is also referred as ‘Nature in Miniature’:  
 (A) Japanese (B) Mughals  
 (C) English (D) Persian
189. Tree with drooping inflorescence is:  
 (A) *Jacaranda mimosaeifolia* (B) *Salyx baylonica*  
 (C) *Bassia latifolia* (D) *Kigelia pinnata*
190. Red scarlet is a cultivar of:  
 (A) Radish (B) Carrot  
 (C) Onion (D) Turnip

191. Which of the following is a climacteric fruit?  
(A) Muskmelon (B) Tomato  
(C) Both A and B (D) None of these
192. Sun scalding incidence usually occurs in:  
(A) Brinjal (B) Tomato  
(C) Muskmelon (D) Cauliflower
193. Sex expression in pointed gourd is:  
(A) Monoecious (B) Andromonoecious  
(C) Dioecious (D) Hermaphrodite
194. Which of the following soil is most suitable for vegetables?  
(A) Sandy (B) Sandy Loam  
(C) Clay loam (d) Clay
195. The seed required for one hectare sowing of carrot is  
(A) 1-2 kg (B) 10-15 kg  
(C) 4-5 kg (D) 15-20 kg
196. The main reason for blanching of fruits and vegetables is:  
(A) To make them soft (B) To inactivate enzymes  
(C) To make the products taste better (D) For long term preservation of products
197. What is Canning  
(A) Placing of foods in sealed metal containers (B) Storage of foods in hermetically sealed containers  
(C) Placing cans in retorts (D) None of these
198. What is Brine  
(A) A solution of sugar and water (B) A solution of salt and water  
(C) A solution of vinegar and water (D) An additive used in food processing
199. The most economical way of drying fruits and vegetables is  
(A) Solar drying (B) Oven drying  
(C) Mechanical drying (D) None of these
200. Preservative used in tomato Ketchup is  
(A) Potassium Metabisulphite (B) Sodium Benzoate  
(C) Citric acid (D) None of these