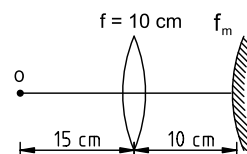
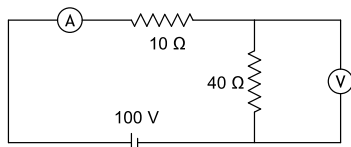




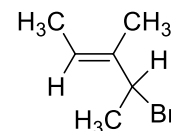


26. In an alley a 25m tall ladder is placed against a wall touching the wall at a point 24m high from the level ground. When the ladder is switched over to the wall on the other side of the alley, without changing the base position of the ladder, it touches the wall at a point 7m high from the ground. The width of the alley is  
 1) 28m                              2) 31m                              3) 33m                              4) 35m
27. There are 250 seniors in a class. 60% have plans to go to college. Of those with plans to go to college, 40% plan to go to a college out-of-state. The number of students plan to attend in-state college is  
 1) 60                                      2) 50                                      3) 90                                      4) 20
28. Sum of the cubes of the roots of  $x^3 - 15x^2 + 71x - 105 = 0$  is  
 1) 495                                      2) 105                                      3) 1060                                      4) -71
29. ABCDE is a pentagon inscribed in a circle with centre O. If  $AB = BC = CD$  and angle ABC is  $132^\circ$  then angle AEB is  
 1)  $48^\circ$                                       2)  $24^\circ$                                       3)  $60^\circ$                                       4)  $132^\circ$
30. Suppose  $f(x) = ax^2 + bx + c$ .  $f(x)$  leaves a remainder 18 when divided by  $x + 2$  and a remainder 13 when divided by  $x - 3$ . Also,  $f(0) = 4$ . Then  $2a + b + c$  is equal to  
 1) 2    2) 3    3) 5    4) -35
31. The apparent weight of a solid body when measured in water and a liquid are 90 N and 80 N respectively. If the true weight of the body is 100 N, the relative densities of the solid and the liquid are  
 1) 5 and 2                                      2) 10 and 2                                      3) 2 and 1                                      4) 8 and 4
32. A body moves in a circular path at a constant speed of  $\pi$  m/s. The magnitude of average velocity of this body for half a revolution is  
 1)  $1 \text{ ms}^{-1}$                                       2)  $2 \text{ ms}^{-1}$                                       3)  $3 \text{ ms}^{-1}$                                       4)  $4 \text{ ms}^{-1}$
33. A freely falling body strikes a horizontal surface and raises to a height  $1/64$  of the height from which it was dropped. If the velocity with which it hits the floor is  $v$ , the change in the magnitude of velocity due to impact with the floor is  
 1)  $7v/8$                                       2)  $5v/8$                                       3)  $3v/8$                                       4)  $9v/8$
34. In the previous question, magnitude of the change in the of velocity of the body due to impact is  
 1)  $7v/8$                                       2)  $5v/8$                                       3)  $3v/8$                                       4)  $9v/8$
35. The mass of a spherical planet is 8 times that of the earth and its density is same as that of earth. The acceleration due to gravity (in  $\text{ms}^{-2}$ ) on the surface of this planet will be ( gravity on earth is  $9.8 \text{ ms}^{-2}$ )  
 1) 78.4                                      2) 19.6                                      3) 9.8                                      4) 4.9
36. A constant horizontal force acts on a body of mass 9 kg lying at rest on a smooth horizontal surface for 10 s. If the body moves 25 m in this time, the magnitude of the force is  
 1) 4.5 N                                      2) 2 N                                      3) 3 N                                      4) 4 N
37. Steam at  $100^\circ\text{C}$  is passed in to a calorimeter of water equivalent 10 g containing 290 g of water at  $30^\circ\text{C}$  till the temperature of water raises to  $40^\circ\text{C}$ . The mass of steam condensed is (Latent heat of steam is  $540 \text{ cal/g}$ )  
 1) 10 g                                      2) 2.5 g                                      3) 3 g                                      4) 5 g
38. An electric bulb is rated 40 W at 80 V. If it is connected in parallel to a 40 V supply having negligible internal resistance, the current through the bulb is  
 1) 1 A                                      2) 2 A                                      3) 0.5 A                                      4) 0.25 A

39. Electromagnetic radiations in the increasing order of wavelength from the following is  
 1) Infrared waves, radio waves, x rays, visible light  
 2) radio waves, Infrared waves, visible light, x rays  
 3) x rays , visible light, Infrared waves, radio waves  
 4) radio waves, visible light, Infrared waves, x rays
40. The angle of minimum deviation of an equilateral prism is  $30^\circ$ . The velocity of light inside the prism is (velocity of light in vacuum =  $3 \times 10^8 \text{ ms}^{-1}$ )  
 1)  $1.8 \times 10^8 \text{ ms}^{-1}$       2)  $2 \times 10^8 \text{ ms}^{-1}$       3)  $2.121 \times 10^8 \text{ ms}^{-1}$       4)  $7.07 \times 10^7 \text{ ms}^{-1}$
41. The resistivity of the material of a wire is  $10^{-7} \Omega \text{ m}$ . If the wire is stretched to increase its length by 50%, then its resistivity will be (assume stretching does not change the temperature)  
 1)  $10^{-7} \Omega \text{ m}$       2)  $1.5 \times 10^{-7} \Omega \text{ m}$       3)  $2.25 \times 10^{-7} \Omega \text{ m}$       4)  $2 \times 10^{-7} \Omega \text{ m}$
42. The reading of the ammeter (below, left) in the circuit (Assume voltmeter and ammeter are ideal) is  
 1) 2 A      2) 1A      3) 3 A      4) 4 A
43. In the previous question, reading of the voltmeter is  
 1) 20 V      2) 40 V      3) 80 V      4) 60 V



44. A convex lens of focal length 10 cm and a convex mirror of focal length  $f_m$  are mounted coaxially (above, right). The image of a point object located on the axis 15 cm to the left of the lens coincides with the object itself. Focal length  $f_m$  of the mirror is  
 1) 5 cm      2) 10 cm      3) 15 cm      4) 20 cm
45. In the previous question if the mirror is removed, the distance between the image and object will be  
 1) 30 cm      2) 45 cm      3) 60 cm      4) 75 cm
46. A long straight horizontal wire carries a current from south to north. Magnetic field vertically above the wire is directed  
 1) westward      2) eastward      3) northward      4) southward
47. All atoms of same element must have same  
 1) number of neutrons      2) number of nucleons  
 3) atomic number      4) mass number
48. A charged particle is moving in a magnetic field at right angles to the field in a circular path of radius R. If a particle with same charge and twice greater mass were to be moving with half the velocity in the same magnetic field with its velocity at right angles to the field, the radius of its circular path would be  
 1) 2R      2) R      3) 3R      4) 4R
49. A radionuclide of atomic mass 300 amu on fission liberates 200 MeV of energy. The energy liberated when 1 g of this radionuclide undergoes fission is (given Avogadro number =  $6 \times 10^{23}$ )  
 1)  $6.4 \times 10^{10} \text{ J}$       2)  $6.4 \times 10^{11} \text{ J}$       3)  $6.4 \times 10^{12} \text{ J}$       4)  $6.4 \times 10^{13} \text{ J}$
50. A nuclear reactor operates using the fissionable material mentioned in the previous question. If it were to use 540 g of the material in a day, it's power would be (assume 50% efficiency in conversion of energy released in the fission in to electrical energy)  
 1) 100 MW      2) 200 MW      3) 300 MW      4) 400 MW



51. What is the IUPAC name of the following compound ?
- 1) 3-Bromo-1,2-dimethylbut-1-ene
  - 2) 4-Bromo-3-methylpent-2-ene
  - 3) 2-Bromo-3-methylpent-3-ene
  - 4) 3-Bromo-3-methyl-1,2-dimethylprop-1-ene
52. Iodine reacts with concentrated  $\text{HNO}_3$  to yield Y along with other products. The oxidation state of iodine in Y, is:-
- 1) 5
  - 2) 3
  - 3) 1
  - 4) 7
53. In a chemical reaction,  $\text{A} + 2\text{B} \rightleftharpoons 2\text{C} + \text{D}$ , the initial concentration of B was 1.5 times of the concentration of A, but the equilibrium concentrations of A and B were found to be equal. The equilibrium constant (K) for the aforesaid chemical reaction is:
- 1) 16
  - 2) 4
  - 3) 1
  - 4)  $\frac{1}{4}$
54. 50mL of 0.5 M oxalic acid is needed to neutralize 25mL of sodium hydroxide solution. The amount of NaOH in 500 mL of the given sodium hydroxide solution is :
- 1) 40 g
  - 2) 20 g
  - 3) 80 g
  - 4) 10 g
55. The metal that forms nitride by reacting directly with  $\text{N}_2$  of air, is :
- 1) K
  - 2) Cs
  - 3) Li
  - 4) Rb
56. For the reaction,  $2\text{A} + \text{B} \rightarrow \text{Products}$ , when the concentrations of A and B both were doubled, the rate of the reaction increased from  $0.3 \text{ mol L}^{-1}\text{S}^{-1}$  to  $2.4 \text{ mol L}^{-1}\text{S}^{-1}$ . When the concentration of A alone is doubled, the rate increased from  $0.3 \text{ mol L}^{-1}\text{S}^{-1}$  to  $0.6 \text{ mol L}^{-1}\text{S}^{-1}$
- Which one of the following statements is correct?
- 1) Order of the reaction with respect to B is 2
  - 2) Order of the reaction with respect to A is 2
  - 3) Total order of the reaction is 4
  - 4) Order of the reaction with respect to B is 1
57. For the following reaction, the mass of water produced from 445 g of  $\text{C}_{57}\text{H}_{110}\text{O}_6$  is :
- $$2\text{C}_{57}\text{H}_{110}\text{O}_6(\text{s}) + 163 \text{O}_2(\text{g}) \rightarrow 114 \text{CO}_2(\text{g}) + 110 \text{H}_2\text{O}(\text{l})$$
- 1) 495 g
  - 2) 490 g
  - 3) 890 g
  - 4) 445 g
58. When the first electron affinity of oxygen is  $-141 \text{ kJ/mol}$ , its second electron affinity is ;
- 1) almost the same as that of the first
  - 2) negative, but less negative than the first
  - 3) a positive value
  - 4) a more negative value than the first
59. An open vessel at  $27^\circ\text{C}$  is heated until two fifth of the air (assumed as an ideal gas) in it has escaped from the vessel. Assuming that the volume of the vessel remains constant, the temperature at which the vessel has been heated is :
- 1)  $750^\circ\text{C}$
  - 2)  $500^\circ\text{C}$
  - 3) 750 K
  - 4) 500 K
60. If  $K_{\text{sp}}$  of  $\text{Ag}_2\text{CO}_3$  is  $8 \times 10^{-12}$ , the molar solubility of  $\text{Ag}_2\text{CO}_3$  in 0.1 M  $\text{AgNO}_3$  is :
- 1)  $8 \times 10^{-12} \text{ M}$
  - 2)  $8 \times 10^{-10} \text{ M}$
  - 3)  $8 \times 10^{-11} \text{ M}$
  - 4)  $8 \times 10^{-13} \text{ M}$
61. Chlorine on reaction with hot and concentrated sodium hydroxide gives :
- 1)  $\text{Cl}^-$  and  $\text{ClO}_2^-$
  - 2)  $\text{Cl}^-$  and  $\text{ClO}_3^-$
  - 3)  $\text{Cl}^-$  and  $\text{ClO}^-$
  - 4)  $\text{ClO}_3^-$  and  $\text{ClO}_2^-$
62. 0.5 moles of gas A and x moles of gas B exert a pressure of 200 Pa in a container of volume 10  $\text{m}^3$  at 1000 K. given R is the gas constant in  $\text{JK}^{-1} \text{mol}^{-1}$ , x is :
- 1)  $\frac{2R}{4+R}$
  - 2)  $\frac{2R}{4-R}$
  - 3)  $\frac{4-R}{2R}$
  - 4)  $\frac{4+R}{2R}$

