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Model Questions Paper
Entrance Examination for Ph.D Admission(March 2012)

PART A (Answer all questions**)   (10x1=10) Marks**

1 The first law of thermodynamics deals with
   (a) conservation of heat   (b) conservation of momentum
   (c) conservation of mass   (d) conservation of energy
2 In a BCC structure there are
   (a) one atom at the center of the   (b) six atoms at the faces of the cell
   cell
   (c) four atoms inside the cell   (d) None of these
3 Moderators are used in reactors because
   (a) to slow down the neutrons   (b) to slow down the electrons
   (c) to absorb gamma rays   (d) None of these
4 The final velocity of an electron accelerated through a potential of 1600 V (if the initial velocity is zero)

   (a) 2.7×10^7 m/s   (b) 0.27×10^7 m/s

   (c) 2.7×10^{10} m/s   (d) (a) 1.7×10^7 m/s

5 Avalanche breakdown is primarily dependent on the phenomenon of
   (a) collision   (b) doping
   (c) ionization   (d) recombination

PART B   (6x5=30) Marks

1 What are the quantities that are conserved for a system of particles in a nuclear reaction? Explain.
2 Why the Carnot cycle cannot be considered as a theoretical cycle for steam power plants even though its efficiency is maximum?
3 Given light wavelength 5100 Å from a narrow slit is incident on a double slit. If the overall separation of 10 fringes on a screen 20 m away is 0.1 m, find the slit separation.
4 Two photons A and B are moving in opposite directions each with a speed *C* Calculate the relative velocity of the photon A with respect to B
5 Find the output F of the logic circuit given below
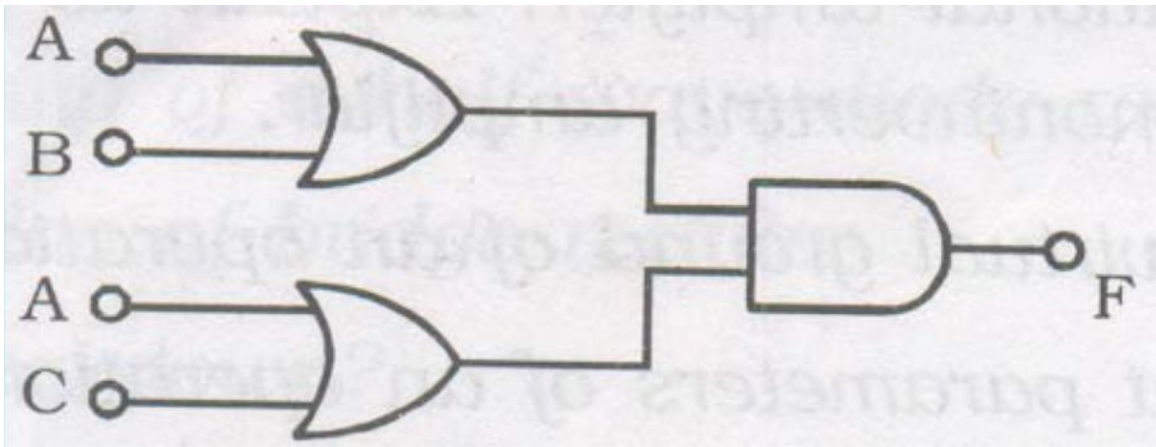
6   Find the output of the given circuit below.