DG-3120
Third Year B. Sc. (Sem. V) Examination
March / April - 2016
PHY - 5010 : Physics : Paper - X
(Instrument and Digital Electronics)

Time : 2 Hours] [Total Marks : 50

Instructions :

(1) Fill up strictly the details of signs on your answer book.

(2) Draw neat diagrams wherever necessary.
(3) Symbols used in the paper have their usual meaning.
(4) Figures to the right indicate full marks of the question.

1. Answer the following as required in brief:
   (i) Output \( Y = 1 + A = \) 
   (ii) Write Boolean expression of Exclusive OR gate.
   (iii) State De-Morgan’s First theorem.
   (iv) Define packing fraction.
   (v) Define binding energy of nucleus.
   (vi) Give the full from of TTL.
   (vii) Why glass is not used for work in the ultraviolet region?
   (viii) Which are universal gates?

2. (a) Answer any one of the following in detail.
   (i) Describe construction and working of the dempster mass spectograph. Discuss its uses.
   (ii) Describe construction and working of an electron microscope with necessary diagram.
(b) Attempt any one of the following:
   (i) Explain ultraviolet spectroscopy.
   (ii) Explain constant Deviation spectrograph.

3 (a) Answer any one of the following in detail.
   (i) Discuss simplification of Boolean function using K-map.
   (ii) What is NOR gate? Shows the circuit symbol and truth table for
        2-input NOR gate. Explain TTL NOR gate in detail.
   (b) Attempt any one of the following:
       (i) Draw neatly the circuit diagram for realizing OR gate using
           diode and explain their operation.
       (ii) Explain briefly sum–of–Products method.

4 Answer any two of the following.
   (i) Realize the following function using only NOR gates
       \[ Y = (A+C) \left( \overline{A} + B \right) \]
   (ii) Realization of basic gates using NAND gates.
   (iii) Explain Bain bridge’s mass spectrograph.
   (iv) Explain in detail quartz spectrograph for near Ultra violet
        region.