B.Sc. Sem V (PHYSICS)	*April · 2016*	Paper	:504
Title	: Digital Electronics and Solid state devices		
Code	: 4297	Total : 70 marks	
		Time : 2.30 h	

Q:1 [a] What is called logic circuit? Write its truth table for three inputs NOR gate and Explain diode based circuit. [7]

 [b] What is OR gate? Explain it diode based circuit. [7]

OR

Q:1 [a] What is universal gate? Explain NOR gate as universal gate with necessary block diagram. [8]

 [b] Explain AND gate with transistor circuit. [6]

Q:2 Write Boolean expression, reduce it using mapping and implement in NOR logic: F= m(0,2,5,12,13,14,15) using SOP method [14]

OR

Q:2 Write Boolean expression, reduce it using mapping and implement in NOR logic: F= m(0,2,4,6,7,9,10,13,14,15) using POS method. [14]

Q:3 [a] Reduce the following Boolean expression. [12]

[1] $(\overline{\overline{AB} + A\beta C})(\overline{A}\beta \overline{C})$

[2] $(A + \overline{\beta C})(\overline{\overline{A\beta} + C})$

[3] $(\overline{A} + \beta\overline{\overline{C}})(\overline{\overline{A}\beta\overline{C}})$

[4] $\overline{A + \overline{A + \beta C}} \ (\overline{A + \overline{\beta C}})$

[b] Find designated value of $A\beta C$, $A\overline{\beta}C$, $A\beta C$, $\overline{A}\,\overline{\beta C}$ [02]

Q:3 [a] Without reducing covert following Boolean expression in to NOT/AND and OR logic. [12]

[1] $A\overline{\beta C} + \overline{A}\beta C$

[2] $(A + \overline{\beta C})(\overline{A} + \beta C)$

[3] $(\overline{A} + \overline{\beta} + \overline{C})(A + \beta + C)$

[4] $(A + \beta)(\overline{A} + \overline{\beta})$

[b] Write Boolean expression for the $F(3,5,7)$ [02]

Q:4   [a]   Without reducing convert the following expression to AND,OR and NOT logic. Then convert it in NOR logic circuit (two INPUT) Mention number of gates used.   [10]

[1] $(A + \overline{\overline{B} + C})(A\overline{\overline{B} + C})$

[2] $(A + \overline{BC})(A\overline{BC})$

[b]   Write application of LED.   [04]

OR

Q:4   [a]   What is DIAC ? Describe its construction, characteristic and operation with   [08] necessary circuit diagram.

[b]   How a Bipolar transistor can be used as ac and dc switch?   [06]

Q:5   [a]   Explain full adder with block diagram.   [6]
        [b]   What is IC? Explain classification of IC's by function briefly.   [8]

OR

Q:5   [a]   Write short note on diode as an ac switch.   [8]
        [b]   explain photo diode.   [6]