

B.Sc. (I. T.) Sem. - I (CBCS - 2015 Course) : WINTER - 2018

SUBJECT: DIGITAL ELECTRONICS AND COMMUNICATIONS

Day: Monday
Date: 03/12/2018

W-2018-1068

Time: 02.30 p.m. to 05.30 p.m.
Max Marks. 60

N.B. :

- 1) Question 1 is **COMPULSORY**.
 - 2) Attempt **ANY FOUR** of the remaining **SIX** Questions.
 - 3) Figures of right indicate **FULL** marks.
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Q.1 Attempt **ANY TWO** of the following: **(20)**

- a) State various steps involved in conversion of an analogue signal to a digital signal and briefly explain **ANY ONE** of them.
- b) What is the main function of a satellite transponder? Why is the uplink frequency of the satellite more than the downlink frequency?
- c) State the advantages of TDM over FDM.
- d) Show the construction of EX-NOR gate using NAND gates.

Q.2 Explain the functioning of a 3-bit asynchronous counter using JK flip-flops, with the help of a neat circuit diagram. Show the output of the flip-flops for all states of the counter in a tabular form. **(10)**

Q.3 Starting from the Truth table of a Half-adder, derive the expression for Sum and Carry outputs using K-maps. Construct the Half-adder based on the expressions derived, using basic gates. **(10)**

Q.4 Design a parity generator using basic gates to produce 4-bit word (including the parity bit) with odd parity. **(10)**

Q.5 a) Construct a 16 x 8 memory using two 16 x 4 memory chips. **(05)**
b) Explain Phase Shift Keying. What are its advantages over Amplitude and Frequency Shift Keying? **(05)**

Q.6 With the help of neat diagrams show circuits for the conversion of following flip-flops and verify the same using Truth tables - **(10)**
a) D flip-flop to T flip-flop
b) SR flip-flop to JK flip-flop

Q.7 Use Karnaugh maps (K-maps) to simplify the following functions in sum of products form - **(10)**
a) $(X, Y, Z) = \sum (0, 1, 6, 7)$
b) $(A, B, C, D) = \sum (0, 2, 4, 6)$

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