S.Y. Diploma : Sem. III

[CO/CM/CW/DE/EJ/ET/EN/EX/EQ/IE/IS/IC/MU]

Digital Techniques

Time: 3 Hrs.] Prelim Question Paper **[Marks : 70**

1. Attempt any **FIVE** of the following : **[10]**

(a) Write the 1's complement and 2's complement of $(10111)_2$

(b) Draw symbol and write the truth table of S-R flip-flop.

(c) Explain why multiplexers are needed in digital electronic system.

(d) Write excitation table for T flip-flop.

(e) With reference to ADC, define accuracy and conversion time.

(f) Simply using k-map
$f(A, B, C) = \sum m(0, 1, 2, 4)$

(g) Define modulus of a counter 1, Write down the number of flip-flop required for M-10 counter 7

2. Attempt any **Three** of the following : **[12]**

(a) Simplify using Boolean laws and draw logical diagram
$ABC + ABC + \bar{A}\bar{B}\bar{C} + A\bar{B}C + A\bar{B}\bar{C} + \bar{A}\bar{B}C + AB\bar{C}$

(b) Design 4-bit binary number to 4-bit gray number.

(c) Draw and explain PAL.

(d) Minimize the following expression using k-map
$f(A, B, C, D) = \pi M(0, 2, 3, 6, 7, 8, 9, 12, 13)$

3. Attempt any **Three** of the following : **[12]**

(a) Realize the following logic operations using only NOR gates : AND, OR, NOT.

(b) Compare TTL and CMOS logic families on the basis of following :
(i) Propagation delay (ii) Power dissipation (per gate)
(iii) Fan out (iv) Basic Gate

(c) Draw the circuit diagram and draw waveform for ring counter.

(d) Calculator analog output of 4 bit DAC for digital input 1010.
Assume V_{FS} = 5V.

4. Attempt any **Three** of the following : **[12]**

(a) Draw the symbol and write logic expression and truth table of the two input Ex-OR and Ex-NOR Gates.

(b) Describe function of full adder with its truth table, k-map simplification and logic diagram.

(c) Design 16:1 mux using 4:1 mux.

(d) With reference to JK flip flop, explain race–around condition

(e) What are the advantages of successive approximation ADC? An 8 bit successive approximation ADC is driven by a MHz. Find its conversion time.

5. Attempt any **TWO** of the following : **[12]**

(a) Design mod-3 Asynchronous counter and draw output waveform.

(b) (i) Compare volatile and Non-Volatile memory.

(ii) Compare EPROM and EEPROM.

(c) Perform the following operation :

(i) $(11100)_2 \div (100)_2$

(ii) $(1010.11)_2 \times (11)_2$

(iii) $(1011.11)_2 + (1100.01)_2$

6. Attempt any **TWO** of the following : **[12]**

(a) How can JC 7490 can used as a decade counter with neat block diagram.

(b) Draw the block diagram of dual slope ADC and explain its working with waveforms.

(c) Describe the operation of single digit BCD adder using IC – 7483 with circuit diagram.

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S.Y. Diploma Sem-III: Paper Discussion Schedule

Branches	Date	Day	Timing	Centres
Computer Group	8 Nov. 2018	Thursday	9 a.m. to 11 a.m.	Thane
	9 Nov. 2018	Friday	9 a.m. to 11 a.m.	Borivali, Dadar

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Branches	Date	Day	Timing	Centres
Electronics Group	8 Nov. 2018	Thursday	9 a.m. to 11 a.m.	Dadar