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UG/I/CSC/H/II/16(New)

2016

COMPUTER SCIENCE

[Honours]

PAPER – II

Full Marks : 90

Time : 4 hours

*The figures in the right hand margin indicate marks
Candidates are required to give their answers in their
own words as far as practicable*

Illustrate the answers wherever necessary

[NEW SYLLABUS]

GROUP – A

Answer any two questions : 15 × 2

1. (a) Draw and describe Master-Slave JK flip-flop using NAND gate. 6

(Turn Over)

(b) Prove that

$$(A+B)(\overline{A}C+C)(\overline{B+AC}) = \overline{A}B \quad 4$$

(c) What is meant by edge triggering? Give the difference between positive edge triggering and negative edge triggering. 2 + 3

2. (a) Use mathematical induction to show that

$$1 + 2 + 2^2 + \dots + 2^n = 2^{n+1} - 1,$$

for all non-negative integers n . 5

(b) Determine whether the sequence $\{a_n\}$, where $a_n = 3n$ for every non negative integer n , is a solution of the recurrence relation

$$a_n = 2a_{n-1} - a_{n-2}. \quad 5$$

(c) Show that

$$\neg(p \vee (\neg p \wedge q)) \text{ and } (\neg p \wedge \neg q)$$

are logically equivalent. 5

3. (a) With the help of a circuit diagram, explain the working of a half wave rectifier with capacity filter. 8

- (b) Explain the principle underlying working of oscillator. Mention the application of R-C oscillator. 6 + 1
4. (a) What is Data Communication ? Write down the different modes of Data flow in Data Communication. 2 + 5
- (b) Briefly explain the different layers of OSI model. 8

GROUP – B

Answer any five questions : 8 × 5

5. Draw the circuit of the transistor configurations. Why common emitter configuration is mostly used ? 6 + 2
6. Design an 8 : 1 MUX using two 4 : 1 MUX and necessary gates ? 8
7. Write down the different characteristic of zener diode. Describe the phenomenon of zener break down. 6 + 2

8. (a) Define Fan-out and Fan-in. 3
(b) Simplify using K-map
 $\Sigma (0, 2, 3, 6, 7, 8, 10, 11, 12, 15)$. 5
9. (a) Design of MOD-3 counter. 6
(b) What do you mean by positive logic and negative logic ? 2
10. (a) Describe Nyquist Bit rate and Shannon capacity of a channel. 6
(b) What is modem ? 2
11. Prove that if $f: x \rightarrow y$ and $g: y \rightarrow z$ be two one to one onto function, then $g \circ f$ is also one to one onto function. 8
12. Explain different types of IP addressing and thin thin mark. 8

GROUP -C

Answer any five questions : 4 x 5

13. List of advantages of a crystal oscillator. 4

(5)

14. Minimize the following functions :

$$f(A, B, C, D) = \Sigma m(2, 3, 8, 10, 11, 12, 13, 14, 15) \quad 4$$

15. What is network topology ? Briefly explain it. 4

16. Compare TCP and OSI model with suitable diagram. 4

17. Write a short note on seven segment display. 4

18. Write down the triod characteristics. 4

19. Explain the working principal of 1 : 4 demultiplexer. 4

[*Internal Assessment* : 10 Marks]
