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**Question Paper Code: U2804**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Second Semester

Information technology

21UIT204- Object Oriented Programming in C++

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1. List the types of number system by stating its base value CO1- U
2. Convert the following Binary numbers into Decimal numbers: CO2- App
  - (i)  $110101_2$
  - (ii)  $1100.1011_2$
3. Illustrate OR gate with its truth table and diagram CO2- U
4. Realize the logic expression  $Y = \overline{BC} + \overline{AC} + \overline{AB}$  CO2- App  
using basic gates
5. Write short notes on Multiplexers and Demultiplexers. CO1- U
6. Outline on Encoder and Decoder CO1- U
7. Outline about sequential circuits CO1- U
8. Explain Latch CO1- U
9. Explain about race condition CO1- U
10. Explain about State Table CO1- U

PART – B (5 x 16= 80Marks)

11. (a) Develop a truth table for BCD adder, retrieve the Cout expression CO3-Ana (16)  
using K-Map, construct a 4-bit BCD adder logic diagram and  
Analyse the circuit by passing input value 1010 and a carry '1'.

Or

- (b) Convert the Binary inputs B<sub>0</sub>,B<sub>1</sub>,B<sub>2</sub>,B<sub>3</sub> to its corresponding Gray code outputs G<sub>0</sub>,G<sub>1</sub>,G<sub>2</sub>,G<sub>3</sub>. Develop a truth table ,reterive the expressions using K-Map, construct a logic diagram and Analyse the circuit by passing input value 1001. CO3-Ana (16)
12. (a) Analyze and simplify the logical expression  $ABCD + \overline{A} \overline{B} \overline{C} D + A \overline{B} C + AB$  and construct a 4-variable K-Map. Obtain the simplified expression from the map CO3-Ana (16)  
Or
- (b) Analyze and simplify the Boolean function using Quine-McMcluskey Method:  
 $F(a,b,c,d) = \sum m(0,2,3,6,7,8,10,12,13)$  CO3-Ana (16)
13. (a) Construct the truth table and build a circuit diagram, Derive Boolean expression by applying the logic of Half adder and Full Adder CO2-App (16)  
Or
- (b) Construct the truth table with block diagram and build a circuit diagram for Octal to Binary Encoder CO2-App (16)
14. (a) Construct an S-R Latch with input values S,R,Qn that starts from 000 to 111 and retrieve the next state using NAND gate with its logic diagram and truth table CO2-App (16)  
Or
- (b) Construct a S-R Flip-Flop with 2-bit input values 00,01,10 & 11 and reclaim its states necessary logic diagram CO2-App (16)
15. (a) Summarize on Race free assignments in detail CO1- U (16)  
Or
- (b) Infer on Analysis and design procedures of synchronous sequential circuits CO1- U (16)