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GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS, PONDA-GOA
B.C.A (SEMESTER-II) EXAMINATION, JULY 2021
CC – 203 APPLIED MATHEMATICS

Duration: 2 Hours Max. Marks: 30

Q 1) Answer <u>ANY 5</u> of the following questions. (5x2=10 Marks)

(i) Convert the following decimal number $(59352)_{10}$ to its hexadecimal form.

(ii) State the Principle of Mathematical Induction.

(iii) Simplify the following using Boolean algebra.

$$xy + \bar{x}y\bar{z} + yz$$

(iv) Let $\{x | x\ is\ an\ even\ integer\ between\ 3\ and\ 23\}$ is the universal set. $A = \{6, 8,\ 12, 14\},\ B = \{10, 16, 22\}$. Verify that

a) $B^C - A^C = A - B$

b) $B - A = B \cap A^C$

(v) Let $R = \{(a,\ b): a\ is\ a\ multiple\ of\ b\}$. Show that R is reflexive and transitive but not symmetric.

(vi) Let $f(x) = \frac{4x+3}{6x-4}, x \neq \frac{2}{3}$. Show that $(f \circ f)(x) = x$.

(vii) Find the fifth term in the expansion of $\left(2x^2 - \frac{3}{2x}\right)^7$.

(viii) State the Principle of Counting.

Q 2) Answer <u>ANY 4</u> of the following questions. (4×5=20 Marks)

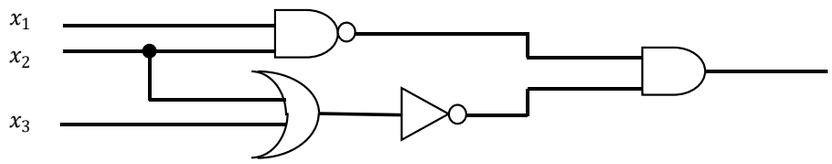
(i) In how many ways can a cricket team of 11 be chosen out of a batch of 15 players such that team must

(a) Include a particular player.

(b) Exclude a particular player

(ii) In a hostel 25 students take tea, 20 students take coffee, 15 students take milk. 10 of them take both tea and coffee, 8 students take both milk and coffee. None of them take tea and milk both and everyone takes at least one beverage. Find the number of students in the hostel.

(iii) Draw the symbol and truth table for XOR gate. Also find the output from the following circuit.



(iv) Prove the following by using Principle of Mathematical Induction.

$$1^3 + 2^3 + \cdots + n^3 = \frac{n^2(n-1)^2}{4}, \qquad n \geq 1$$

(v) Verify whether the following statements are equivalent.

$[(p \wedge \sim q) \rightarrow (q \wedge \sim q)]$ and $(p \rightarrow q)$

(vi) Convert $(4.0625)_{10}$ to its binary equivalent and find the decimal form of $(11101011)_2$.

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