P P SAVANI UNIVERSITY

First Semester of B. Sc. (I.T.) Examination
May 2019
SESH1040 Mathematics For Computer Application

13.05.2019, Monday   Time: 12:30 p.m. To 03:00 p.m.   **Maximum Marks: 60**

Instructions:
1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1	Do as Directed (Any Five)	**[05]**
(i)	State Distributive laws for propositions.	
(ii)	The binary equivalent of $(25)_{10} =$ _____	
(iii)	Write $p \vee q$ and $p \wedge q$ for p : It is raining , q : It is cloudy.	
(iv)	List the members of the set $\{x : x \text{ is a positive integer less than } \sqrt{24}\}$.	
(v)	Define Cardinality of a set.	
(vi)	Define Poset.	
(vii)	Define one-one function.	

Q - 2 (a)	Calculate $(1110011)_2 + (11001)_2$ and $(11011)_2 \times (101)_2$	**[05]**
2 (b)	Determine the Octal equivalent of $(432267)_{10}$.	**[05]**

OR

Q - 2 (a)	Determine the Hexadecimal equivalent of $(584666)_{10}$.	**[05]**
Q - 2 (b)	Calculate $(111001)_2 - (1100)_2$ and $(11011)_2 \div (10)_2$.	**[05]**
Q - 3 (a)	In a group of 70 cars tested by a garage in Delhi, 15 had faulty tyre ,20 had faulty brakes and 18 exceed the allowable emission limits. Also, 5 cars had faulty tyre and brakes, 6 failed on tyre and emission, 10 failed on brakes and emissions, and 4 cars were unsatisfactory in all three respects. How many cars had no fault in these three checks? Draw an appropriate Venn diagram.	**[05]**
Q - 3 (b)	Let $D = \{2,4,6,8,10,12,14,16\}$. Determine the truth value of each of the following statements	**[05]**
	(a) $(\forall x \in D) x + 6 < 21$. (b) $(\forall x \in D) x$ is divisible by 2.	
	(c) $(\exists x \in D) x$ is divisible by 4. (d) $(\exists x \in D) x - 5 = 11$.	

OR

Q - 3 (a)	Let A = {1, 2, 3, 4} and consider the relation R = {(1, 1),(1, 2), (1, 3),(2, 2), (3, 2), (3, 3), (4, 2), (4, 3), (4, 4)}. Show that R is a partial ordering and draw its Hasse diagram.	**[05]**
Q - 3 (b)	Let $K(x) : x$ is a student, $M(x) : x$ is clever, $N(x) : x$ is successful. Express the followings using quantifiers,	**[05]**
	(a) There exists a student.	
	(b) Some students are clever.	
	(c) Some students are not successful.	

Q - 4	Attempt any One.	
(i)	State Converse, Inverse and Contrapositive of "If R is a circle, then R is an ellipse."	**[05]**
(ii)	Verify D'Morgan's Law using truth table for proposition.	

SECTION – II

Q - 1 Do as directed. (Any Five) [05]

(i) Define Circle.

(ii) When two lines are said to parallel ?

(iii) Find the distance of the point $(3, -5)$ from the line $3x - 4y - 26 = 0$.

(iv) State any one property of determinant.

(v) State any property of $C(n, r)$.

(vi) Find value of n if $nP_2 = 72$.

(vii) How many arrangements can be made with the letters of the word CANADA ?

Q - 2 (a) There are 3 women and 5 men to dine at a round table. In how many ways they can seat themselves so that no two ladies are together ? [05]

Q - 2 (b) Find the equation of the hyperbola where foci are $(0, \pm 12)$ and the length of the latus rectum is 36. [05]

OR

Q - 2 (a) Among positive integers less than or equal to 100, let A be the set of even integers and let B be the set of integers divisible by 5. How many integers are even or divisible by 5 ? [05]

Q - 2 (b) Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of $4x^2 + y^2 = 400$. [05]

Q - 3 (a) Find minor and cofactor of each element of $\begin{bmatrix} 1 & 5 & 3 \\ 2 & 6 & 2 \\ 3 & 7 & 1 \end{bmatrix}$ [05]

Q - 3 (b) Using properties of determinant prove that $\begin{vmatrix} a+b & a & a \\ a & a+b & a \\ a & a & a+b \end{vmatrix} = b^2(3a + b)$. [05]

OR

Q - 3 (a) Describe solution cases in Cramer's Method. Also define consistent system. [05]

Q - 3 (b) Prove that $\begin{vmatrix} a+b & b+c & c+a \\ c & a & b \\ 3 & 3 & 3 \end{vmatrix} = 0$. [05]

Q - 4 Attempt any One. [05]

(i) Find the equation of a circle with centre $(2,2)$ and passes through the point $(4,5)$.

(ii) Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum for $x^2 = 16y$.

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