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Re-accredited by NAAC with 'A' grade (3.58/4) | Awarded Category – I by UGC

Seat No.						

Institute: (0701) SYMBIOSIS INSTITUTE OF TECHNOLOGY, PUNE

Programme: (070122, 070124) BACHELOR OF TECHNOLOGY (CS/IT)

Batch: 2015-19, 2016-20

Semester: III

Course: Discrete Structures

Course Code: 070122301CS, 070124301IT

Date: 02/06/2021 **Maximum Marks: 60**

Day: Wednesday **Time: 3:00 pm – 05:30 pm**

Instructions:

1. **All questions are compulsory.**
2. **Assume data wherever necessary.**
3. **Draw diagram wherever applicable.**

Q.1	**a)**	Determine the power set P (A) of the set A= {Φ, {Φ}}.	**3**	**CO1**
	b)	State whether the following are proposition or not. Give an explanation to your answer: **i)** What time is it? **ii)** x + y = z **iii)** 2+ 2=3	**3**	**CO1**
	c)	Show that p⇔ q =(p v q) ⇒(p ∧ q) using: **i)** Truth table **ii)** Algebra of proposition	**4**	**CO1**

Q.2	**a)**	In a group of 6 boys and 4 girls, four children are selected. In how many different ways can they be selected such that at least one boy should be there?	**4**	**CO2**
	b)	How many different ways can letters of the word 'CORPORATION' be arranged so that the vowels always come together?	**4**	**CO2**
Q.3	**a)**	Explain the function and its types with the help of an example.	**6**	**CO3**
	b)	Show relation which is symmetric and transitive but neither reflexive nor anti-symmetric. Explain with example.	**5**	**CO3**
Q.4	**a)**	Explain Kruskal's algorithm with an example.	**5**	**CO4**
	b)	List and explain different types of graphs.	**4**	**CO4**
	c)	Define Isomorphic graph with the help of example.	**3**	**CO4**
Q.5	**a)**	Use Huffman coding to encode the following symbols with the frequencies listed : **A:0.25, B:0.1, C:0.2, D:0.15, E:0.26, F:0.04**	**6**	**CO5**
	b)	How many bits are required for encoding the message 'aibbibbirri'?	**5**	**CO5**
Q.6	**a)**	Explain semigroups and monoids with example.	**4**	**CO6**
	b)	State and explain different properties of groups.	**4**	**CO6**

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