Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2020-21

EXM/P/09/00

Year and Program: F.Y. BCA | **School of Computer Science and Applications** | **Department: B.C.A.**

Course Code: BCA107 | **Course Title: Applied Mathematics** | **Semester : I**

Day and Date: Monday 10.05.2021 | **End Semester Examination** | **Time : 2 Hrs.** **Max Marks : 50**

Instructions:
1) All Questions are compulsory.
2) Use of non-programmable calculator is allowed.
3) Assume suitable data wherever necessary.

		Marks	Bloom's Level	CO
Q.1	**Solve the following (any two)**			
a)	Simplify the expression using rules of set theory i) $\overline{\overline{(A \cup B) \cap C} \cup \overline{B}}$, ii) $(\overline{A} \cup B) \cap \overline{B}$.	8	L1	CO2
b)	Prove that i) $p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$, ii) $p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$.	8	L1	CO2
c)	Let $p(x), q(x), r(x)$ denotes the following open statements. $p(x): x \leq 3$, $q(x): x+1$ is odd and $r(x) = x > 0$. If the universe consists of all integers. What are the truth values of following statements? i) $\sim p(3) \wedge (q(3) \vee r(3))$, ii) $[p(2) \wedge q(2)] \rightarrow r(2)$.	8	L1	CO1
Q.2	**Solve the following (any two)**			
a)	Define Group and prove that G is group with binary operation $*$ defined by $a * b = \frac{ab}{2}$, for $a, b \in G$, where G is set of rational numbers.	8	L3	CO1
b)	Simplify $\frac{(\cos 3\theta - i \sin 3\theta)^6 (\cos 2\theta + i \sin 2\theta)^{-2} (\cos 3\theta - i \sin 3\theta)^{-4}}{(\cos 4\theta - i \sin 4\theta)^6 (\cos \theta - i \sin \theta)^{-5} (\cos 2\theta + i \sin 2\theta)^{-3}}$.	8	L3	CO3
c)	Find the roots common to the equations $x^4 + 1 = 0$ and $x^6 - i = 0$.	8	L3	CO3

Q.3 **Solve the following (any two)**

a) A random variable X has the following probability distribution

X	0	1	2	3	4	5	6	7
P(X)	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

9 L2 CO4

i) Find k,

ii) Evaluate $P(X < 6)$, $P(X \geq 6)$ and $P(3 < X \leq 6)$.

b) Find the mean, median and mode from the following data

Class	15-25	25-35	35-45	45-55	55-65	65-75
Freq.	4	11	19	14	0	2

9 L2 CO4

c) Find the two lines of regressions for the following data

x	62	64	65	69	70	71	72	74
y	126	125	139	145	165	152	180	208

9 L2 CO4

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