



**ACE**  
Engineering College  
(with a Difference in Excellence)

An AUTONOMOUS Institution



Question Paper Code:

CS301PC

ACE-R20

**Semester End Examination**  
**II B. Tech- I Semester- MARCH-2022**  
**DISCRETE MATHEMATICS**  
**(COMMON TO CSM,CSD,CSO )**

Time: 3 Hours

Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1.	Show that $p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ are logically Equivalent	14M
2. a)	Give the Direct proof of "if n is odd integer ,then $n^2$ is odd"	7M
b)	Define conjunction , Disjunction with truth table	7M
3. a)	Draw the Hasse diagram for the positive divisors of 36 ( $D_{36}$ ).	7M
b)	Show that the relation greater than or equal ( $\geq$ ) is a partially ordering relation on Integers	7M
4. a)	Show that if n is positive integer ,then $1+2+3+\dots+n = \frac{n(n+1)}{2}$ by using mathematical induction	7M
b)	Give recursive algorithm for computing the greatest common divisor of two non- negative integers a and b with $a < b$ .	7M
5. a)	Let A and B be two sets then prove that $A \cap (B - A) = \emptyset$	7M
b)	Let $f_1$ and $f_2$ are two functions from R to R such that $f_1(x) = x^2$ and $f_2(x) = x - x^2$ then find $f_1+f_2(x)$ and $f_1 f_2(x)$ .	7M
6. a)	What is the chance that a non-leap year should have 53 Sundays ?	7M
b)	Solve the recurrence relation $a_n + 4a_{n-1} + 4a_{n-2} = 8$ for $n \geq 2$ and $a_0 = 1, a_1 = 2$	7M
7. a)	Draw the graphs of $K_7$ and $K_{4,4}$	7M
b)	Show that a simple graph G with n vertices is connected if it has more than $(n-1)(n-2)/2$ edges	7M
8. a)	An urn contains four balls . Two balls are drawn at random and are found to be white. What is the probability that all balls are white?	7M
b)	Suppose that G and H are isomorphic simple graphs .Show that their complementary graphs $\bar{G}$ and $\bar{H}$ are also isomorphic.	7M