14CS302/14IT302

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

November, 2019 **Common to CSE& IT**

Third Semester **Discrete Mathematical Structures**

Time: Three Hours **Maximum:** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)

   a) What is meant by a proposition?

   b) State Modus pigeon's rule.

   c) Define Rule of Universal Existence.

   d) Write down the negation of the statement "If the triangle ABC is right angled triangle then $|AB|^2 + |BC|^2 = |AC|^2$ ".

   e) How many different words can be formed form the word MISSISSIPPI?

   f) In how many different ways can a committee of 5 teachers and 3 students be formed from 9 teachers and 6 students?

   g) Define a recurrence relation.

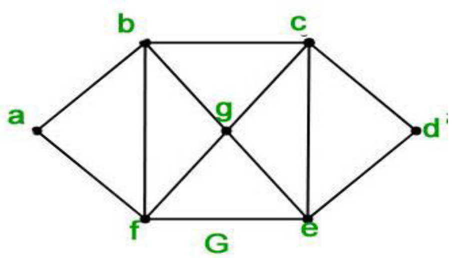
   h) What is out degree of a node? Give an example.

   i) Define a planar graph. Give an example.

   j) Define a lattice.

   k) State Euler's theorem on planar graph.

   l) What is meant by the chromatic number of a graph? Find the chromatic number of the given graph.



UNIT I

2. a) Check the validity of the inference (6M)

   All even numbers that are also greater than 2 are not prime.
   2 is an even number.
   2 is prime.
   Therefore some even numbers are prime.

   b) Prove by Mathematical induction that $3 + 11 + \ldots\ldots + (8n-5) = 4n^2 - n$. (6M)

(OR)

3. a) State at least three methods of proofs with examples. (6M)

   b) Prove that $[(r \rightarrow s) \wedge \{(r \rightarrow s) \rightarrow (t \rightarrow u)\}] \rightarrow (\sim t \vee u)$. (6M)

UNIT II

4. a) How many three-digit integers (numbers between 100 and 999 inclusive) are even? (6M)

   b) Determine the coefficient of x^{20} in $(x^3 + x^4 + x^5 + \ldots\ldots)^5$ (6M)

(OR)

5. a) A 10-member student leadership committee consists of juniors and seniors. There are 4 junior and 6 senior students. Exactly 6 students will be selected from this group to attend a national convention. How many committees can be formed with at least 3 seniors? (6M)

   b) Find the number of integral solutions to the equation $X_1 + X_2 + X_3 + X_4 + X_5 = 50$ where $X_1 \geq -4$, $X_2 \geq 2$, $X_3 \geq -14$, $X_4, X_5 \geq 10$. (6M)

UNIT III

6. a) Solve the Reccurence relation $a_n = -a_{n-1} + 4a_{n-2} + 4a_{n-3}$ with $a_0=8$, $a_1=6$ and $a_2=26$? 6M

b) Give examples of the following relations. 6M

i) Symmetic and Transitive but not Reflexive.

ii) Antisymmetic but not asymmetric.

iii) Reflexive and symmetric but not transitive.

(OR)

7. a) Solve the recurrence relation $a_n = 2a_{n-1} - a_{n-2} + 2^n$ for $n \geq 2$, with $a_0=1$ and $a_1=2$? 6M

b) Define Equivalance relation.Prove that R is Symmetic iff $R^{-1}=R$. 6M

UNIT IV

8. a) Define the following in a POSET. 6M

i) Maximal , Minimal elements.

ii) Greatest, Least elements

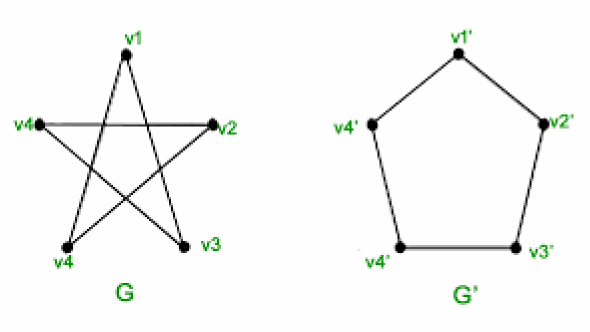
iii) Least upper bound,Greatest Lower bound of Subset.

Give an example which illustrates above.

b) Explain topological sorting with an example. 6M

(OR)

9. a) Check whether the following graphs are isomorphic or not 6M



b) State and explain 5-color problem on planar graphs. 6M

14CS302

Hall Ticket Number:

II/IV B.Tech (Regular/Supply) DEGREE EXAMINATION

November, 2019 — **Computer Science and Engineering**

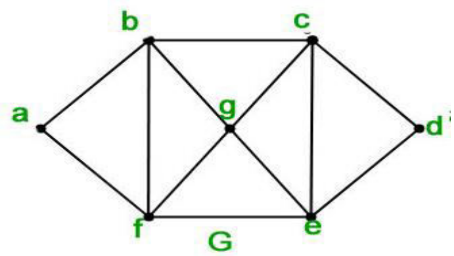
First Semester — **Discrete Mathematical Structures**

Time: Three Hours — **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)

a	What is meant by a proposition.
b	State Modus penon's rule.
c	Define Rule of Universal Existence.
d	Write down the negation of the statement " If the triangle ABC is right angled triangle then $\|AB\|^2 + \|BC\|^2 = \|AC\|^2$ ".
e	How many different words can be formed form the word MISSISSIPPI?.
f	In how many different ways can a committee of 5 teachers and 3 students be formed from 9 teachers and 6 students?.
g	Define a reccurence relation.
h	What is out degree of a node?. Give an example.
i	Define a planar graph. Give an example.
j	Define a lattice.
k	State Euler's theorem on planar graph.
l	What is meant by the chromatic number of a graph.Find the chromatic number of the given graph. 

UNIT – I

2.a	Check the validity of the inference All even numbers that are also greater than 2 are not prime. 2 is an even nuber. 2 is prime. Therefore some even numbers are prime.	6M
2.b	Prove by Mathematical induction that 3 + 11 + ... +(8n-5)= $4n^2$ –n.	6 M

(OR)

3.a	State atleast three methods of proofs with examples.	6 M
3.b	Prove that $[(r \rightarrow s) \wedge \{(r \rightarrow s) \rightarrow (t \rightarrow u)\}] \rightarrow (\sim t \vee u)$.	6 M

UNIT – II

4.a	How many three-digit integers (numbers between 100 and 999 inclusive) are even?	6 M
4.b	Determine the coefficient of x^{20} in $(x^3 + x^4 + x^5 + ...)^5$	6 M

(OR)

5.a	A 10-member student leadership committee consists of juniors and seniors. There are 4 junior and 6 senior students. Exactly 6 students will be selected from this group to attend a national convention. How many committees can be formed with atleast 3 seniors?.	6 M
5.b	Find the number of integral solutions to the equation $X_1+ X_2+ X_3+ X_4+ X_5 =50$ where $X_1 \geq -4, X_2 \geq 2 , X_3 \geq -14 , X_4, X_5 \geq 10$.	6 M

UNIT – III

6.a	Solve the Reccurence relation $a_n = -a_{n-1} + 4a_{n-2} + 4a_{n-3}$ with $a_0=8$, $a_1=6$ and $a_2=26$?	6 M
6.b	Give examples of the following relations. i) Symmetic and Transitive but not Reflexive. ii) Antisymmetic but not asymmetric. iii) Reflexive and symmetric but not transitive.	6 M

(OR)

7.a	Solve the recurrence relation $a_n = 2a_{n-1} - a_{n-2} + 2^n$ for $n\geq 2$, with $a_0=1$ and $a_1=2$?	6 M
7.b	Define Equivalance relation.Prove that R is Symmetic iff $R^{-1}=R$.	6 M

UNIT – IV

8.a	Define the following in a POSET. iv) Maximal , Minimal elements. v) Greatest, Least elements vi) Least upper bound,Greatest Lower bound of Subset. Give an example which illustrates above.	6 M
8.b	Explain topological sorting with an example.	6 M

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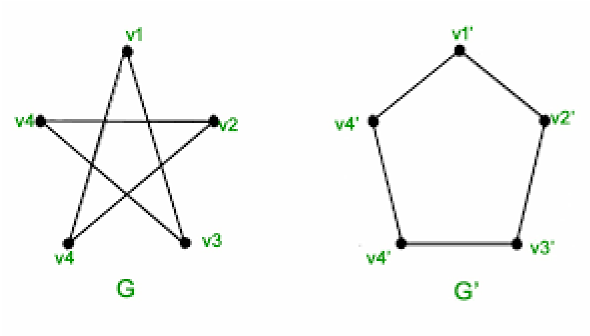
9.a	Check whether the following graphs are isomorphic or not  	6 M
9.b	State and explain 5-color problem on planar graphs.	6 M