

Student ID: _____

NAVRACHANA UNIVERSITY
SBL, BCA PROGRAMME
END SEMESTER EXAMINATION
1st Year, Semester - II
Academic Year 2016 – 2017

Subject: Discrete Mathematics

Course Code: MA104 Marks: 40

Date: 11/05/2017

Time: 10:30AM – 12:30PM

Instructions:

- ➔ Calculator is permitted.
 - ➔ Write answers in answer book only.
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Section-A

Q-1) Answer ALL Questions. 8x2=16

1. Find the rank of the following matrix $A = \begin{bmatrix} 1 & 5 & 4 \\ 0 & 3 & 2 \\ 2 & 13 & 10 \end{bmatrix}$

2. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{bmatrix}$

3. Two persons A and B on interrogation said the following:

A says, 'B always lies'.

B says, 'A and I are opposite type'. What types are A and B? Find using contrapositive rule.

4. (i) Raj is shorter than Gopal

(ii) Gita is a doctor and Ram is an engineer.

Write predicates or propositional functions for these.

5. Given

p: Today is Saturday.

q: I am going to the college.

r: $3+4 = 6$

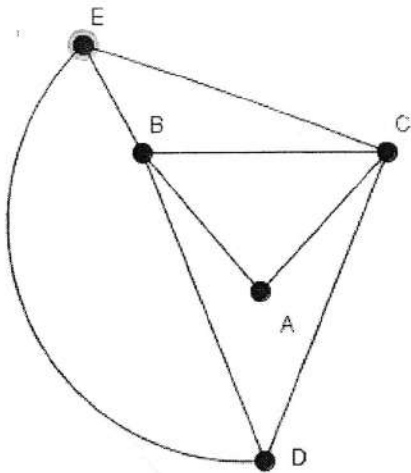
s: Computerscience class will be held.

. Write each of the following in symbolic logic.

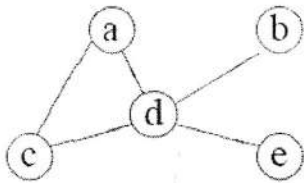
i) Today is Saturday and I am not going to the college.

ii) $3 + 4 \neq 6$ and Computerscience class will not be held.

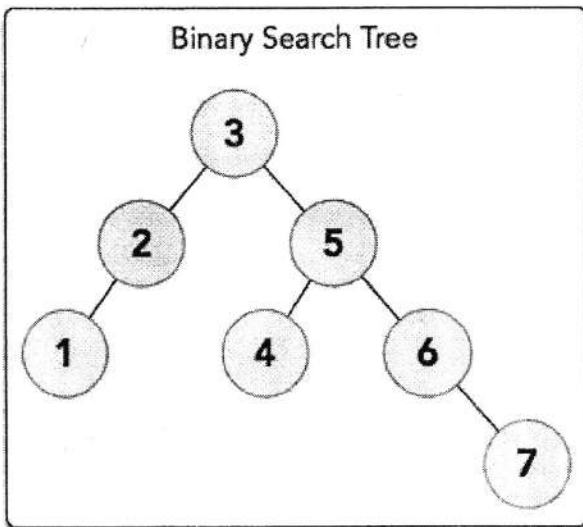
6. Write the adjacency matrix for the graph shown below:



7. Write two spanning trees of the following graph



8. What is the height of the following tree? Who are the ancestors of node '7'?



Section-B

Q-2) Answer the following questions. (Any Four)

4X6=24

(1) Solve the following system of equations by Gauss-elimination method.

$$2x_1 - 7x_2 + 4x_3 = 9$$

$$x_1 + 9x_2 - 6x_3 = 1$$

$$-3x_1 + 8x_2 + 5x_3 = 6$$

(2) Solve the following system of equations using Cramer's rule

$$x + y + z = 6$$

$$2x - 3y + 4z = 8$$

$$x - y + 2z = 5$$

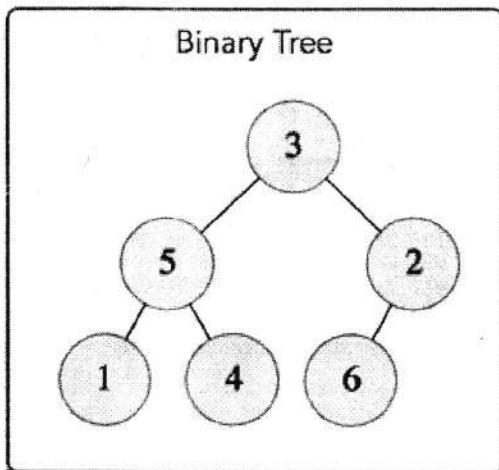
(3) i) Show that $\sqrt{2}$ is irrational

ii) Show that $\sim(p \vee q) \equiv \sim p \wedge \sim q$ using truth table.

(4) Construct truth table to determine which one is tautology or contradiction or contingency for the following

a) $p \wedge q \wedge \sim p$ b) $q \vee (\sim q \wedge p)$ c) $(p \rightarrow q) \wedge (p \wedge q)$ d) $(p \wedge q) \rightarrow p$ e) $p \vee \sim p$ f) $p \wedge \sim p$

5) Write pre order traversal, in order traversal and post order traversal of the following tree:



(6) (i) Define Group and give one example.

(ii) Define Ring and give one example.

(iii) Define vectorspace and give one example.