Total No. of Pages01

Roll No. 059

SEVENTH SEMESTER

B. Tech. (MCE)

MID SEMESTER EXAMINATION ***September-2016***

MC-401 COMPUTER GRAPHICS

Time: 1:30 Hours ***Max. Marks: 20***

Note: Answer ***ALL*** questions. All questions carry equal Marks
Assume suitable missing data, if any.

1. Differentiate between Raster scan and Random scan display. Explain, which is better and why?

2. Describe Midpoint Ellipse Algorithm.

3. Prove that two-dimensional rotation and scaling commutative
$$S_x = S_y \quad or \quad \theta = n\pi$$

4. A rectangular parallelepiped is given having length on x-axis, y-axis and z-axis as 3, 2, 1 respectively. Perform a rotation by an angle -90 degree about x-axis and an angle 90 degree about y-axis.

MC/59

SEVENTH SEMESTER **B.TECH (MC)**
MID SEMESTER EXAMINATION **SEPTEMBER 2016**
MC-402 APPLIED GRAPH THEORY

Time: 1:30 Hours **Maximum Marks: 20**

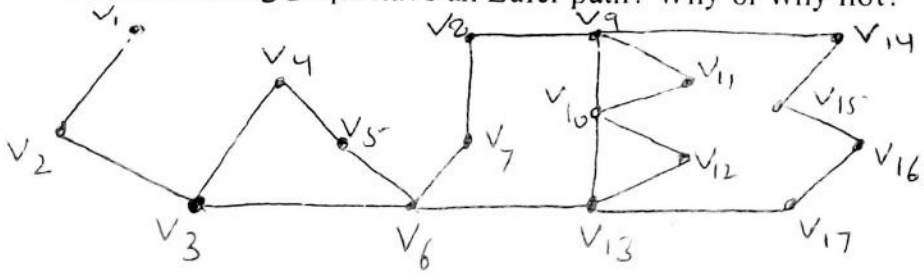
Note: Answer **ALL.**

Q1.

i. Draw a connected graph with seven vertices and no circuits. How many edges does it have?

ii. Draw a graph with 6 vertices, each of degree 3 such that the graph is
Connected
Disconnected

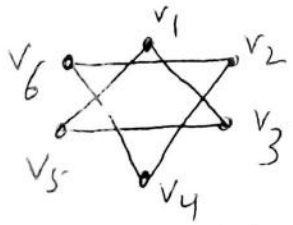
iii Does the following graph have an Euler path? Why or why not?



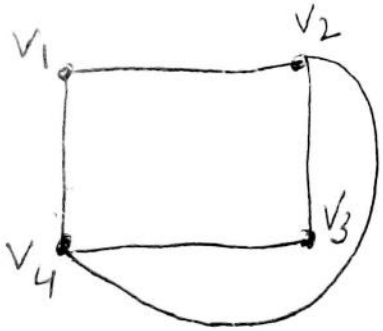
iv Is there a graph with 8 vertices of degree 2,2,3,6,5,7,8,4?

v Draw the smallest possible graph that is not bipartite.

vi Is the graph given below connected? If not then draw its components.

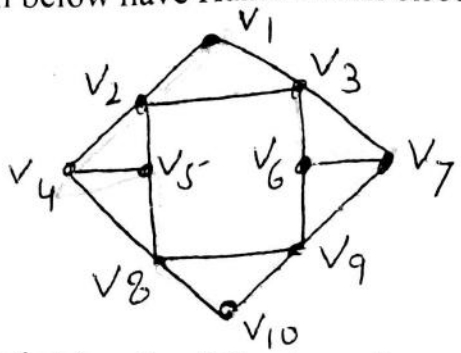


vii Does the following graph have Eulerian circuit? Give reason.



viii Is there a non-empty simple graph with twice as many edges as vertices? If yes, draw the graph.

ix Does the graph below have Hamiltonian circuit? Give reason.



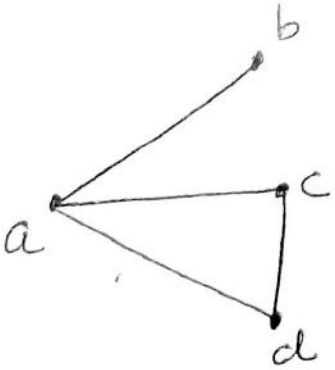
x Find the graph that has the following adjacency matrix

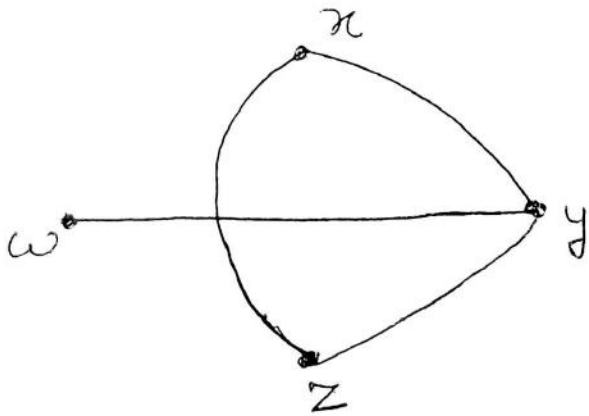
$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 0 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$

Q2. Prove that a simple graph with n vertices and k components can have at most

$(n-k)(n-k+1)/2$ edges.

Q3. Define Isomorphism in graphs. Show that the graphs below are isomorphic:





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SEVENTH SEMESTER B.Tech.

Mid SEMESTER EXAMINATION (September, 2016)

MC-403-4, Fuzzy Set and Fuzzy Logic

Time: $1\frac{1}{2}$ Hours Max. Marks: 20

*Note: Attempt **all** questions and assume the missing values.*

Q. 1. Consider the fuzzy sets $\widetilde{A}$ & $\widetilde{B}$ defined on the interval $X = [0, 10]$ of real numbers by the membership grade functions

$\mu_{\widetilde{A}}(x) = \frac{x}{x+2}$, $\mu_{\widetilde{B}}(x) = 2^{-x}$

(a) Determine mathematical formulas and graph of the membership grade functions of each of the following $\widetilde{A}$ and $\widetilde{B}$. (2)

(b) Evaluate $\widetilde{A} \cup \widetilde{B}$ & $\widetilde{A} \cap \widetilde{B}$ graphically. (2)

(c) Calculate the α-cut of both the fuzzy sets defined above for $\alpha = 0.5$. (2)

Q. 2. (a) Let $\widetilde{A}$ & $\widetilde{B}$ be fuzzy sets defined on the universal set X as follows:

$$\widetilde{A} = \left\{\frac{0.5}{-1} + \frac{1}{0} + \frac{0.5}{1} + \frac{0.3}{2}\right\}$$

$$\widetilde{B} = \left\{\frac{0.5}{2} + \frac{1}{3} + \frac{0.5}{4} + \frac{0.3}{5}\right\}$$

Let a function $f : X \times X \longrightarrow X$ be defined for all $x_1, x_2 \in X$ by $f(x_1, x_2) = x_1 + x_2$. Calculate $f(\widetilde{A}, \widetilde{B})$. (3)

(b) Consider the following two triangular-shape fuzzy numbers $\widetilde{A}$ and $\widetilde{B}$ defined as follows:

$$\mu_{\widetilde{A}}(x) = \begin{cases} 0 & \text{if } -1 \le x \text{ and } x > 3; \\ \frac{x+1}{2} & \text{if } -1 < x \le 1; \\ \frac{3-x}{2} & \text{if } 1 < x \le 3. \end{cases}$$

$$\mu_{\widetilde{B}}(x) = \begin{cases} 0 & \text{if } x \le 1, x > 1; \\ \frac{x-1}{2} & \text{if } 1 < x \le 3; \\ \frac{5-x}{2} & \text{if } 3 < x \le 5. \end{cases}$$

Compute $A + B$, $A - B$, $A.B$ and A/B using α-cut. Represent A, B, $A + B$, $A - B$, $A.B$, & A/B graphically. (4)

Q. 3. (a) Solve the fuzzy equation $\widetilde{A} \cdot \widetilde{X} = \widetilde{B}$ where $\widetilde{A}$ and $\widetilde{B}$ in the equation are the fuzzy numbers given in Q.2(b). (2)

(b) Let $\tilde{R}_1(x, y)$ and $\tilde{R}_2(y, z)$ be defined by the following relational matrices

$$\tilde{R}_1 = \begin{bmatrix} 0.1 & 0.2 & 0 & 0.1 & 0.7 \\ 0.3 & 0.5 & 0 & 0.2 & 1 \\ 0.8 & 0 & 1 & 0.4 & 0.3 \end{bmatrix}$$

and

$$\tilde{R}_2 = \begin{bmatrix} 0.9 & 0 & 0.3 & 0.4 \\ 0.2 & 1 & 0.8 & 0 \\ 0.8 & 0 & 0.7 & 1 \\ 0.4 & 0.2 & 0.7 & 0 \\ 0 & 1 & 0 & 0.8 \end{bmatrix}$$

Compute $\tilde{R}_1 \circ \tilde{R}_2$ by using Max-Min composition. (3)

(c) Define Transitive closure of a fuzzy relation $\widetilde{R}(X, X)$. *Give algorithm to obtain transitive closure* $\widetilde{R}_T(X, X)$ from a given fuzzy relation $\widetilde{R}(X, X)$. (2)

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B. Tech. (MC)

Seventh *Semester*

Mid Semester Examination

(Sep-2016)

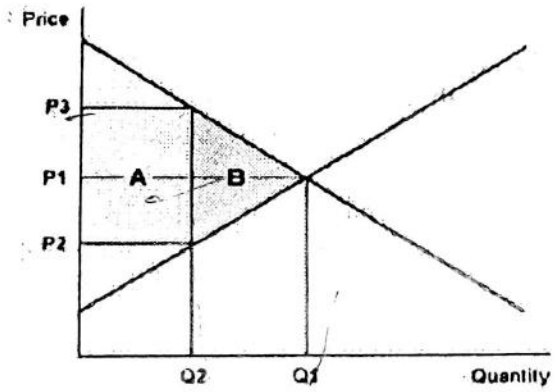
MC-404.1- Mathematical Economics and Econometrics

Time: 1 hr 30 min

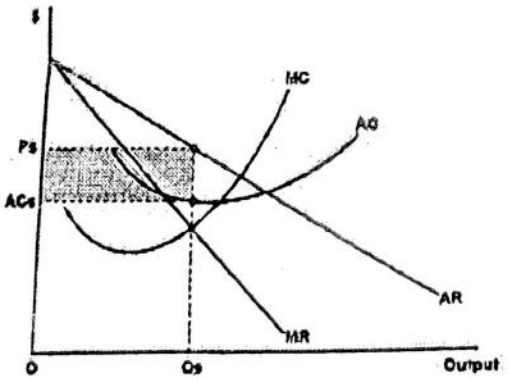
Max. Marks: 20

Note: All Questions are Compulsory.
Assume suitable missing data, if any.

1 What do you mean by Consumer's Surplus and Producer's Surplus? How to calculate them? 4

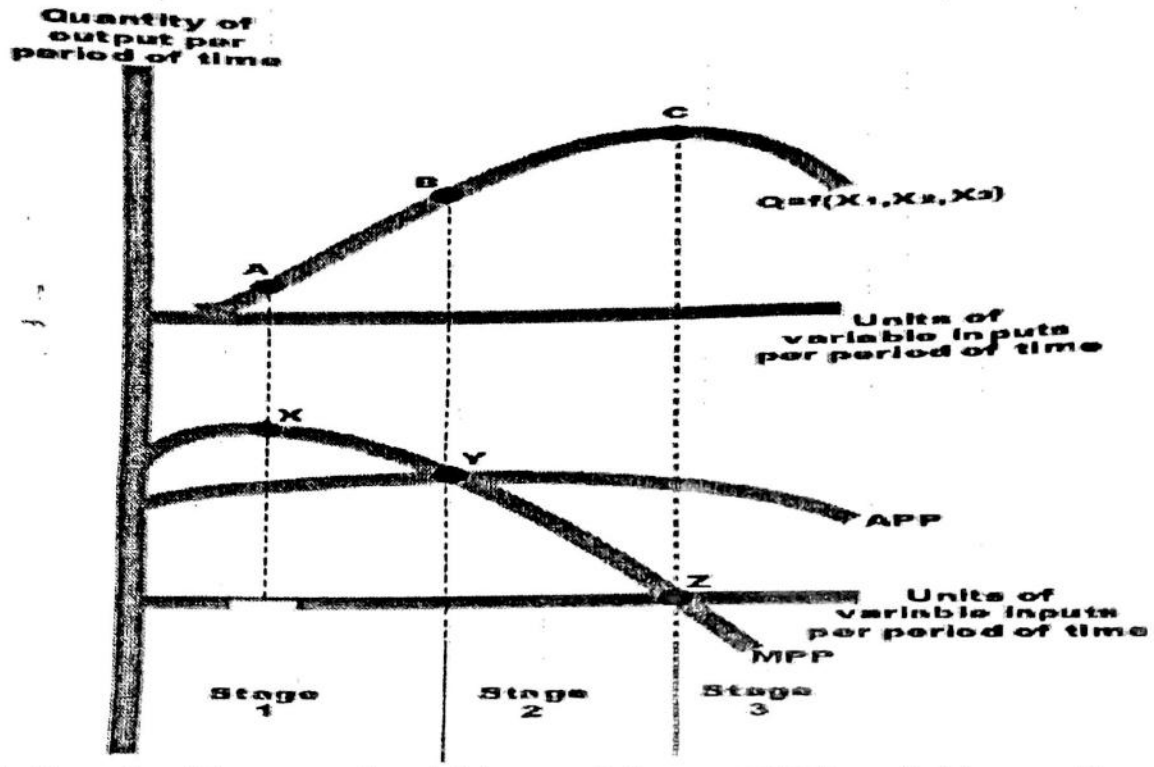


2 4



Discuss Super Normal Profit of a Monopolist? How it can be calculated? Write suitable equation for it?

Q3



4

A firm should operate in which stage? Suggest. Write suitable equation.

Q4 A shop sells 20 table fans, 30 ceiling fans and 10 pedestal fans in a month. The price of a table fan is Rs. 300, that of a ceiling fan is Rs. 400 and of a pedestal fan is Rs. 500. The cost to the shop is Rs. 220 for a table fan, Rs.325 for a ceiling fan and Rs. 400 for a pedestal fan. Find the monthly profit of the shop. 2

Q5 Two sample of size 40 and 50 respectively have the same mean 53 but different standard deviations 19 and 8 respectively. Find the standard deviation of combined sample size of 90. 2

Q6 Differentiate Mathematical Economics and Econometrics? Discuss their relevance for Engineers. 4