Total No. of Pages: 06 Roll No. 515/14/10

FIFTH SEMESTER BE (ECE/COE/ICE)

B.E. END SEM. EXAMINATION, November 2012

EC-304/ICE-304/COE-304 Linear Integrated Circuits
Time: 3 hours Max. Marks: 70

Note: Attempt any 10 questions. All questions carry equal marks. Missing data, if any may be assumed suitably and mentioned the answer. Answer as precisely and briefly possible.

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1. Determine Y(s) of the circuit of Fig. 1 and comment upon the condition required for its stable operation.

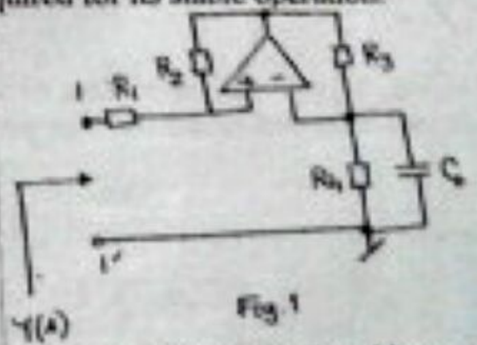

Fig. 1

2. Determine Z_{in} for the circuit of Fig. 2 and hence, the passive equivalent impedance realized by the given circuit.

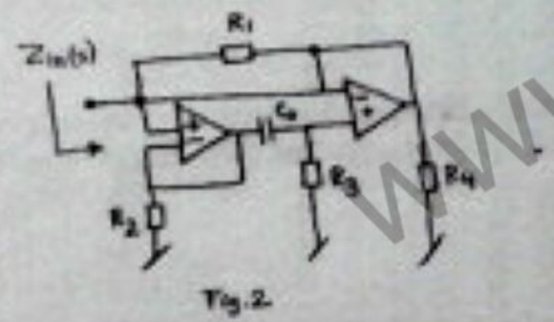

Fig. 2

3. Find the expression for the phase error of the compensated buffer of the circuit of Fig. 3 assuming $\omega << \omega_t$ where ω_t is the gain-bandwidth product of the identical op-amps (i.e. $A_1 = A_2 \equiv \frac{\omega_t}{s}$).

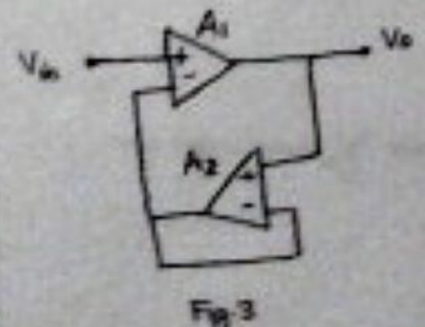

Fig. 3

4. For the OTA-C oscillator of Fig. 4 derive the characteristic equation and hence, obtain the condition of oscillation and frequency of oscillation.

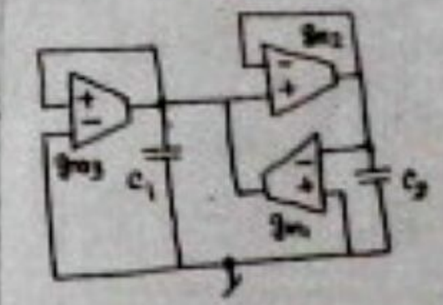

Fig. 4

5. Derive an OTA equivalent of the op amp circuit of Fig. 5 and deduce its transfer function

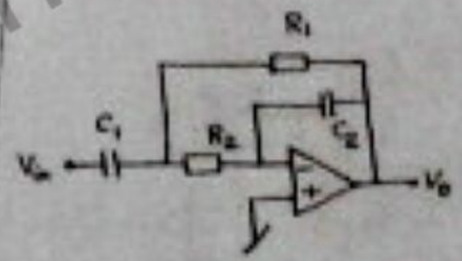

Fig. 5

6. Determine the relation between V_o and V_o' for the circuit of Fig. 6.

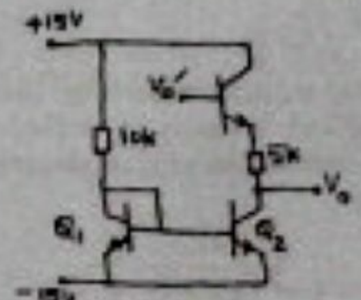

Fig. 6

7. Using $A_1 = A_2 \approx (A_o\omega_b)/s$ for $\omega >> \omega_b$, determine filter functions performed by circuit of Fig. 7 at V_{o1} and V_{o2}.

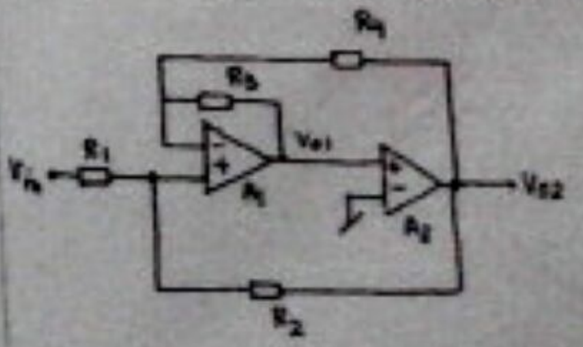

Fig. 7

8. For the circuit of Fig. 8, determine V_o as function of V_x and V_y assuming identical transistors with high β and ideal op-amps.

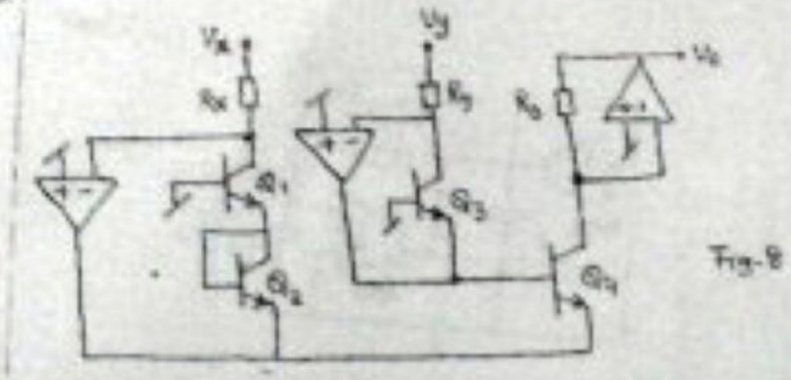

Fig-8

9. Assuming identical transistors with same β, determine I_o/I_{ref} in terms of β for the circuit of Fig. 9.

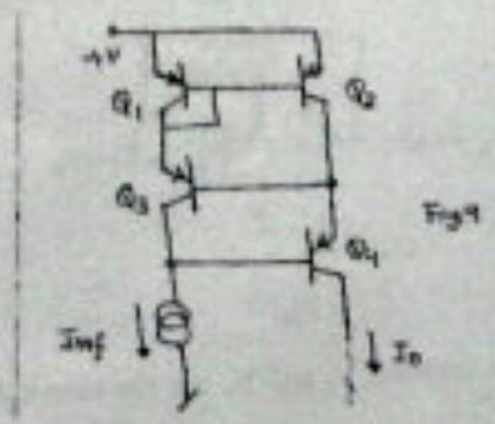

Fig-9

10. For general oscillator circuit model of Fig. 10 determine the condition of oscillation and frequency of oscillation and derive an active RC-op amp oscillator based upon this model using no more than two op-amps.

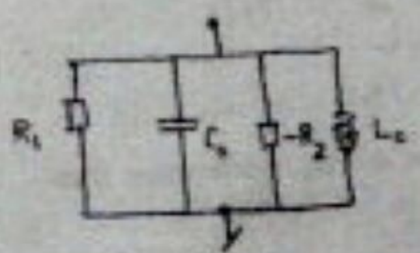

Fig. 10

11. Explain the operation of the circuit of Fig. 11, plot the waveforms at V_{o1} and V_{o2} and determine the frequency of the waveforms.

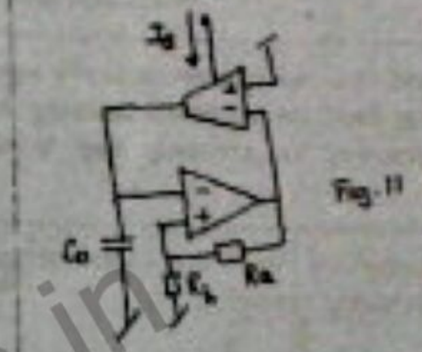

Fig. 11

12. For the circuit of Fig. 12 plot the waveforms of voltages $V_{o1}(t)$, $V_{o2}(t)$ and $V_{o3}(t)$ and comment on the function performed by the circuit.

Fig 12

13. Using an analog multiplier, alongwith a minimum number of op-amps and resistors, realize a voltage controlled resistance.

14. Write technical notes on any two of the following:
a) Phase locked loop
b) IC voltage regulator
c) Super diode using op-amp
d) Gilbert Multiplier

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FIFTH SEMESTER **BE (EC/CO/IC)**

B.E END SEMESTER EXAMINATION, NOV 2012

EC/CO/IC -305: INDUSTRIAL ORGANISATION AND MANAGERIAL ECONOMICS

Time: 3:00 Hrs. *Max. Marks: 70*

Note: Attempt any ten questions.
All questions carry equal marks.
Assume suitable missing data, if any.

1. What are the concept, history and development of Industrial Management? [7]
2. What are the concept, historical development and characteristics of Management Science? [7]
3. What are the objectives, principles and procedure of plant layout? [7]
4. What are the concept, purpose, elements and techniques of forecasting? [7]
5. What are the concept, need, objectives, advantages and procedure of Method Study? [7]
6. What are the definition, objectives, and applications of Ergonomics? What are the definition, symbols, and colours of various *Therbligs*? [7]
7. What are the concept, styles and qualities of leadership? [7]
8. What are Theory X and Y? What are the concept, aims and scopes of Industrial Psychology? [7]
9. What are the concepts, objectives, steps and advantages of MBO (Management By Objectives)? [7]
10. What is the social responsibility of business? What are the concept, objectives and methods of merit rating? [7]
11. With the help of activities given below draw a network. Determine its critical path, earliest start time, earliest finish time, latest start time, latest finish time and total project duration. [7]

Activity	*Duration (in weeks)*
1-2	4
1-3	1
2-4	1
3-4	1
3-5	6
4-9	5
5-6	4
5-7	8
6-8	1
7-8	2
8-9	1
8-10	8
9-10	7

PTO

12. A project has the following characteristics. [7]

Activity	Last time (a)	Greatest time(b)	Most likely time(m)
1-2	4	8	5
1-3	5	10	7
2-3	8	12	11
1-4	2	7	3
3-5	4	10	7
4-5	6	15	9
4-6	8	16	12
5-7	5	9	6
5-6	3	7	5
6-8	5	11	8
7-8	6	13	9

Construct a PERT network. Find critical path, EST, LST, EFT, LFT and project duration.

13. Differentiate among the following plant layouts. [7]

a) Product Layout
b) Plant layout — Position layout Fixed
c) Process Layout
d) Combination layout

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Fifth Semester

Roll no : .....
BE (COE)

END SEMESTER EXAMINATION, NOVEMBER – 2012

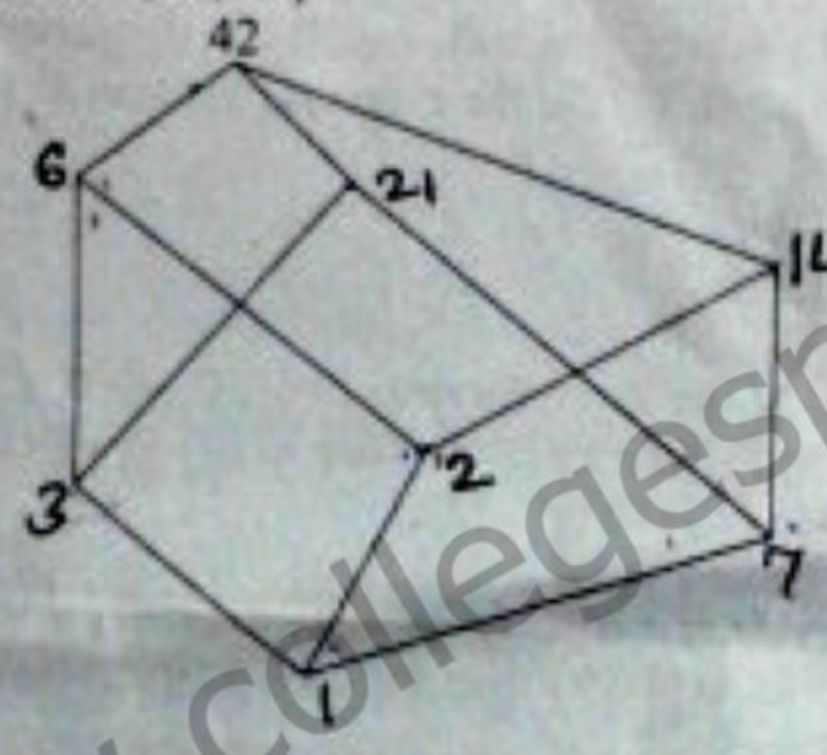
COE – 302 : DISCRETE MATHEMATICS AND DESIGN OF ALGORITHMS
(DMDA)

Time : 3 Hrs.

Max Marks : 70

Note : Answer any five questions. Do all the parts of same question at one place. Assume suitable missing data, if any.

Q.1(a). Define lattice. Prove that the given figure is a lattice or not where
D = { 1,2,3,6,7,14,21,42 }

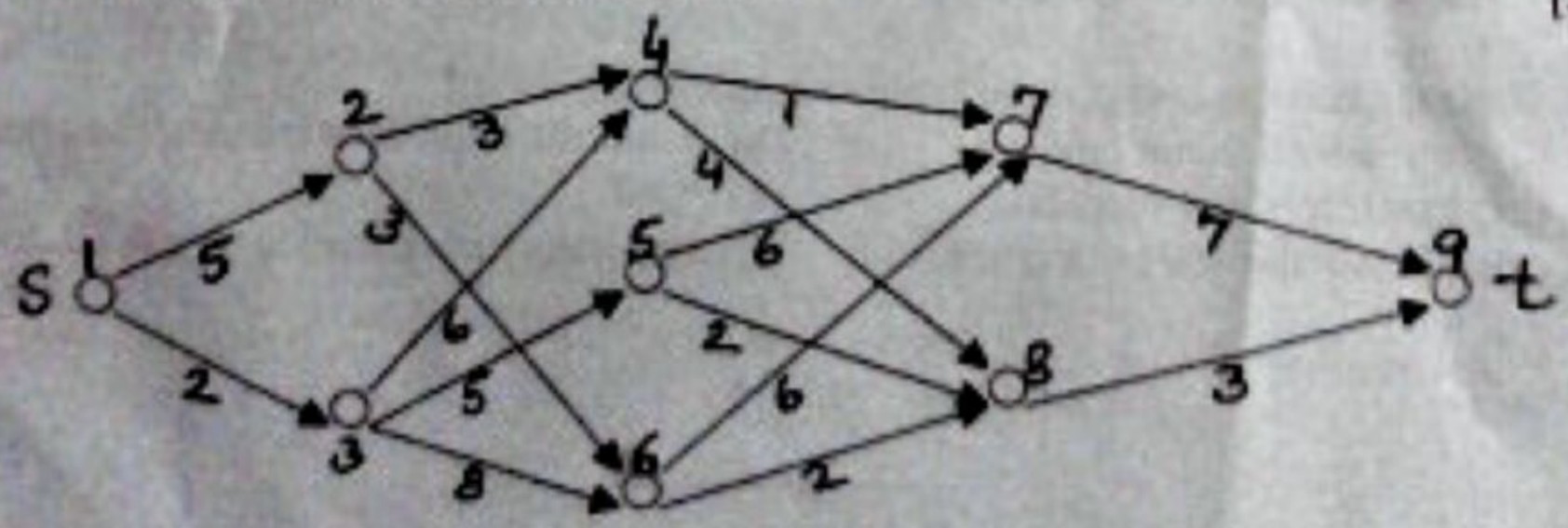


[4]

Q.1(b). What is lexicographic order. Give the algorithm for generating combinations in lexicographic order. Generate combinations in lexicographic order when four objects are selected from the set { 4,5,6,7,8,9}. Also find the number of different outcomes when 3 dices are rolled with repetition of numbers. [5+3+2]

Q.2(a). Differentiate between dynamic programming and greedy strategy using knapsack problem. Give suitable example. [4]

Q.2(b). Find the minimum cost path from s to t in the multistage graph in the figure. Do this first using the forward approach and then using the backward approach. Write the algorithms in both the cases. [5+5]



Q.3(a). What is a partition ? Let A = { l,m,n,o,p,q,r,s,t,u,v} and
Π1 = { lmn, opqr, st, uv}
Π2 = {lm, nuv, ot, prs, q }
Define and find sum and product of Π1 and Π2. [4]

Q.3(b). What is a function ? Determine the following whether it is *one-to-one, onto* or both.

f : I -> I

f(j) = j/2 when j is even

and

f(j)= (j-1)/2 when j is odd [5]

Q.3(c). Demonstrate that R is a valid inference from the premises P->Q, Q-> R and P. Give the rules used. [5]

Q.4(a). Define well formed formula in predicate calculus. Write the predicate formula for " X is the father of the mother of Y " for the given predicates

P(x) : x is a person

F(x ,y) : x is the father of y and

M(x ,y) : x is the mother of y [4]

Q.4(b). Find the PCNF and PDNF of the given formula ((~ P) -> R) /\ (Q <-> P)) using method for converting PCNF to PDNF. Then verify it with the results obtained using truth tables. [5+5]

Q. 5(a). Describe the strassen's divide and conquer strategy to compute the product of two nxn matrices. Is this method faster than the conventional method of multiplication of two matrices. [4]

Q.5(b). State and analyse the job sequencing problem with deadlines. Describe the greedy method to obtain an optimal solution to this problem . What is the solution generated by greedy method when n = 7, {p1,.....p7} = { 5, 7, 22, 20, 3 , 8, 32 } and {d1,.....d7} = { 2, 4, 5, 4, 3, 2, 3 }. [5+5]

Q.6(a). Solve the following recurrence relation

$T(n) = 7\,T(n/2) + n^2$ [4]

Q.6(b). Describe the greedy methods used for solving any particular problem. How you will find Huffman's code using Greedy method. Write the algorithm and give suitable example for generating Huffman's codes. [5+5]

Q.7 Write short notes and give suitable examples [any four]

(a) Asymptotic notations.
(b) Composition of relations and functions.
(c) Quantifiers and predicates
(d) POSET
(e) All pair shortest path algorithm.
(f) Minimum cost spanning tree algorithms

[3.5 x 4]

7. Write short notes on any four of the following:
   i. Applications of Computer Graphics
   ii. Color CRT monitor
   iii. BSP Trees
   iv. Phong shading Model
   v. Antialiasing- Gupta Sproull Algorithm
   vi. Vanishing point and Principal vanishing point in 3D viewing

[3 ½ X 4]

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FIFTH SEMESTER **B.E. (COE)**

B.E. END SEM. EXAMINATION, NOV.-2012

COE-301: COMPUTER GRAPHICS

Time: 3:00 Hrs. Max. Marks: 70

Note: Attempt ANY FIVE questions. **Assume missing data (if any).**

1.
   a. A parametric cubic curve passes through the points (0, 0), (2, 4), (3, 3), (5, -2) which are parametrized at t = 0, ¼, ¾, and 1, respectively. Determine the geometric coefficient matrix.
   b. What do you mean by Convex Hull property of Bezier curves? Write a function that checks the convex hull property of a given control points (inputs of the function) of Bezier curve?
   c. Compute the size of a 1024X768 image at 480 pixels per inch.
   d. Find the transformation for cabinet projection with theta=30°

[4, 5, 2, 3]

2.
   a. Write the derivation for generating 2nd order Bresenham's Circle Drawing Algorithm in the 5th octant (between 180° and 225°). Traverse your algorithm by considering radius as 8 units. Show the digitized outputs.
   b. Explain polygon filling approach through VERTICAL SCANNING (Scanline Approach) on a given polygon whose vertices are A(1, 10), B(6, 5), C(8, 10), D(4, 10), E(6, 12), F(3, 15). Give the data structure that describes the edge.
      (i) Construct the Global Edge Table
      (ii) Traverse the Active Edge Table in filling the given polygon

[7, 7]

3.
   a. A cube has its vertices located at A(0, 0, 7), B(7, 0, 7), C(7, 7, 7), D(0, 7, 7), E(0, 0, 0), F(7, 0, 0), G(7, 7, 0), H(0, 7, 0). The Y axis is vertical and positive z axis is oriented towards the viewer. The cube is viewed from the point (20, 10, 40). Work out the perspective view of the cube

on a plane whose normal vector is i+j+k and a reference point on the plane is (10, 10, 10).

b. A tetrahedron is given by position vectors A(2, 2, -1),B(4, 2, -1),C(3, 2, -3) and D(3, 4, -2). Use Z-buffer method to find the visible planes of the tetrahedron if the viewing plane is XY-plane (i.e. z=0).Take screen resolution of 6X6 and background color as black (color value = 0). The color of the plane ACD is BLUE(1),CBD is green(2), BAD IS CYAN (3) and ACB is RED(4). Will the visible plane change if it is rotated about z axis by 45^0.

c. Discuss anomalies associated with perspective projections.

[6, 6, 2]

4.

a. A clipping window ABCD is specified as A(0, 2), B(4, 5), C(6, 3), D(2, 0). And a line segment joining the points P(0, 1) and Q(6, 2). Find the visible portion of the line by traversing the following algorithm (show traversing Steps):

(i) Midpoint subdivision
(ii) Liang Barsky

b. What do you understand by Bezier curve? A cubic curve is defined by the points (1, 1), (2, 3), (4, 4) and (6, 1). Calculate the coordinates of parametric midpoint of this curve and verify that its gradient dy/dx is 1/7 at this point.

c. Why are homogeneous coordinates used for transformation computation in computer graphics? [7, 5, 2]

5.

a. Find the coordinates of a pyramid whose coordinates are A(0,0,0), B(1,0,0),C(0,1,0) and D(0,0,1) after mirror reflection with respect to the plane in both the cases when it passes through

(i) the origin
(ii) the point C(0,1,0)

and the plane have a normal vector whose direction is N = i+j+k (in both (i) and (ii)).

b. A capsule shaped Clip Polygon ABCD has been described in Fig. 1 (semicircle of radius 2 unit). Also, two subject polygons $V_1V_2V_3$ and PQRST have been described in the same. (i) Propose a Polygon Clipping Algorithm that can clip the given Subject Polygons. (ii) Traverse the proposed Polygon Clipping algorithm and show all steps that clip the given subject polygons against the given Clip Polygon(ABCD).

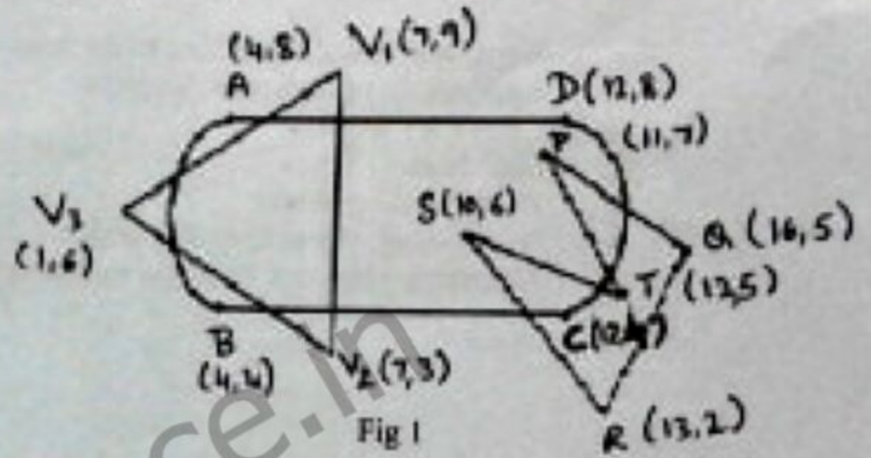

Fig 1

[5,9]

6.

a. Explain the working of Painter's algorithm. Enumerates its drawbacks and how BSP tree can address those drawbacks?

b. Transform the square ABCD into polar coordinates, Cartesian coordinates are given as A(5, 15), B(-20, 15), C(-20 , -10) & D(5, -10).

c.

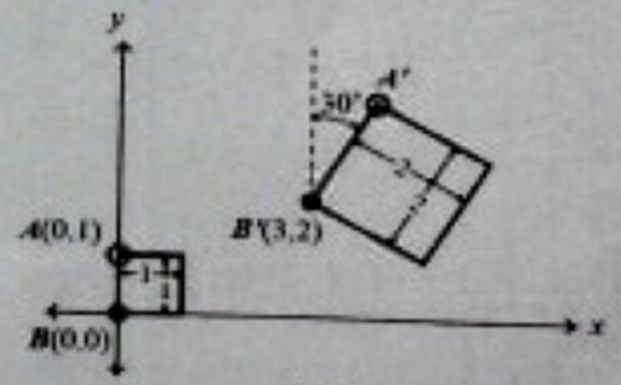

Fig. 2

Fig. 2 shows a complicated 2D transformation applied to a unit square. The overall transformation can be described in terms of a number of simpler transformations. Describe each of these simple transformations and give a matrix representation of each using homogeneous coordinates.

[6, 3, 5]