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Computer Aided Design
(1020)

P. Pages : 2

Time : Three Hours **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any five** questions.
5. Neat diagrams must be drawn wherever necessary.
6. Figures to the right indicate full marks.
7. Use of non-programmable electronic pocket calculator, mollier charts, steam tables & statistical table are allowed.

1. a) List and explain different applications of computer graphics. **10**

b) Write DDA line drawing algorithm. **10**

2. a) A rectangle ABCD has vertices A (1, 1) B (2, 1) C (2, 3), D (1, 3). It is to be rotated by 30º ccw about point P (3, 2). Determine the new coordinates of rectangle. **5**

b) Explain Constructive Solid Geometry Modeling Techniques in Detail with Example. **5**

c) Explain the concept of Homogeneous coordinates. **5**

d) Sketch the geometric parameters required to create these surfaces operations :
tabulated cylinder, revolve, loft, offset. **5**

3. a) Point P has coordinates (3, 2, 1). Translate P in x, y, z direction by -1, -1, -1 units respectively followed by +30 deg rotation @ x axis & +45 deg rotation @ y axis. **10**

b) Drive an equation of B-Spline quadratic curve with 3 points (4, 2) (0, 0) and (2, 8). **10**

4. a) Explain mathematical model of helical spring to compute deflection for given load. Assume suitable data. **10**

b) Write program steps (with relevant formula) to design gib head key. **10**

5. In a certain reservoir pump installation, the first cost of the pipe is given by $(100D + 50D^2)$, where D is the diameter of the pipe in centimeters. The cost of the reservoir decreases with an increase in the quantity of fluid handled and is given by 20/ Q. where Q is the rate at which the fluid is handled (cubic meters per second). The pumping cost is given by $(30OQ^2/D^5)$. Find the optimal size of the pipe and the amount of fluid handled for minimum overall cost. **20**

6. a) Draw a flowchart for heat load required in design of Heat exchangers. **10**

b) Write an algorithmic step to design heat exchanger. **10**

7. a) For the following for y measured for a set of values of x, fit a second degree polynomial **10**

x	1	2	3	4	5	6	7	8	9
y	7.6	13.2	27.4	33.0	62.5	86.4	115.1	147.0	182.2

b) Find a root of equation $x^3 - x + 4 = 0$ between 1 and 2 to four places of decimal, by Newton Raphson method. **10**

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