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E-255

B. E. VIII Semester (Main & Re-Exam) Examination – May, 2016

COMPUTER AIDED DESIGN

Branch : Mech. Engg.

Time : Three Hours]

[Maximum Marks : 75

[Minimum Marks : 30

Note : Attempt *all* questions from **Section - A** (Objective type questions), *four* questions from **Section – B** (Short answer type questions) and *three* questions from **Section – C** (Long/Essay type questions).

SECTION – A [Marks : 1.5 × 10 = 15

(Objective Type Questions)

1. CAD/CAM is the relation between :

   (a) Design and marketing (b) Design and manufacturing

   (c) science and engineering (d) Manufacturing and marketing

2. Number of lines required to represent a cube in wire frame model are :

   (a) 8 (b) 12 (c) 16 (d) 24

3. The first commercial CNC machine was developed in the year :

   (a) 1970 (b) 1972

   (c) 1976 (d) 1980

P. T. O.

4. While setting up a mechanical drawing in AUTOCAD the drafter should set the units to :

(a) Decimal
(b) Fractional
(c) Metric
(d) Architectural

5. The Newton Raphson method fails when :

(a) $f'(x)$ is negative
(b) $f'(x)$ is too large
(c) $f'(x)$ is zero
(d) Never fails

6. Which of the following rules is used to determine the direction of revolution in CAD Softwares :

(a) right hand rule
(b) right hand thumb rule
(c) left hand rule
(d) left hand thumb rule

7. Which one of the following Boolean operations is used to create an extruded feature by removing material from the existing feature :

(a) unite
(b) subtract
(c) intersect
(d) create

8. In CAD software's, Two or more different sections can be blended together using ..... tool :

(a) Extrude
(b) Revolve
(c) Unite
(d) Swept

9. Which file extension is generally used in Auto CAD files :

(a) .prt
(b) .dwg
(c) .stl
(d) IGES

10. How many methods are there to draw arcs in Auto CAD :

(a) 4 (b) 2

(c) 6 (d) 5

SECTION – B

[Marks : 6 × 4 = 24

1. Describe the different types of mating conditions.

2. Describe the IGES methodology.

3. CAD helps in integrating CAM- Justify this statement with an example.

4. What is the principle of least squares ? Write down the working procedure for straight line and Parabola.

5. Explain the basic curve fitting techniques.

6. Describe the importance of curve and surface modeling in computer aided graphics and design.

SECTION – C

[Marks : 12 × 3 = 36

1. (a) What is finite element analysis ? Explain how does it works.

   (b) How will we illustrate the FEM ? Also give the general form of FEM.

2. Define CAD ? Also give architecture and capabilities of CAD.

3. Define Bezier curve. Also give their properties. Find equation of bezier curve which passes through point (0,0) and (-2,1) and is controlled through points (7,5) and (2,0).

4. Derive two dimensional transformation matrix for rotation, scaling and translation.

5. Write short notes on the following :

   (a) Homogeneous coordinate

   (b) Rational B-Spline

   (c) Surface modelling

   (d) Raster Graphics system

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B.E. VIII Semester (Main & Re-Exam)

Examination, May 2017

COMPUTER AIDED DESIGN

Branch : Mech. Engg.

Time : Three Hours] *[Maximum Marks : 75*

[MinimumMarks : 30

Note : Attempt **all** questions from **Section-A**, **four** questions from **Section-B** and **three** questions from **Section-C.**

Section-A 1.5×10=15

(Objective Type Questions)

Note : Attempt **all** questions.

1. The first commercial CNC machine was developed in the year
   (a) 1970
   (b) 1972
   (c) 1976'
   (d) 1980

2. How many methods are there to draw ares in AUTO-CAD
   (a) 4 (b) 6
   (c) 2 (d) 5

3. When setting up a mechanical drawing in Auto CAD the drafter should set the units to
   (a) fractional (b) metric
   (c) architectural (d) decimal

P.T.O.

4. If you use the absolute coordinate system to create a line from a starting point of 0, 0 8 units on the X axis and 5 units on the Y axis you enter_____for the second point.

(a) 8,5

(b) 5,8

(c) 0,8

(d) 5,0

5. You can set viewport scale factor by

(a) Typing vscale

(b) Typing vpcale

(c) Typing view portscale

(d) None

6. Solve the equation ex−4x=0ex−4x=0 using Newton-Raphson iteration.

(a) Newton-Raphson iteration cannot be used since the answer oscillates between 2and −2

(b) x=0.61906 and x=1.51213.

(c) x=0.35740 and x=2.15329.

(d) None of these

7. CAD/CAM is the relation between

(a) Marketing and design

(b) Science and engineering,

(c) Manufacturing and marketing

(d) All of above

8. By default, AutoCAD has the following workspaces

(a) 2D drafting and animation

(b) 3D modelling

(c) Workspace

(d) Autocad classic

9. Which Key do you press to cycle through the available snap points?

   (a) Alt

   (b) Tab

   (c) Shift

   (d) Ctrl

10. What does UCS means? (In the context of CAD)

   (a) User Coordinate System

   (b) United CAD Software

   (c) Unite, Cut and Select

   (d) None of these

Section-B

$6 \times 4 = 24$

(Short Answer Type Questions)

Note : Attempt any **four** questions.

1. Differentiate between classical design and computer aided design procedures.

2. Discuss various properties of Bezier curves. What is the main drawback of Bezier curve? How is it overcome in other form of space curves?

3. Explain the colour system used in raster scan display device. Explain various colour models. What is gray scale?

4. Write the design equations for the determination of suitable diameter of solid shaft subjected to combined bending and torsional loads. Write a computer for the same.

5. Describe Trapezoidal and Simpson method of numerical integration and compare the two.

6. Explain general methodology of solving a design problem using finite method. Also write the advantages of FEM.

Section-C

$12 \times 3 = 36$

(Long Type Questions)

Note : Attempt any **three** questions.

1. Explain briefly:

   (a) Blobby objects

   (b) Boundary representation

   (c) Super quadrics

   (d) Constructive solid geometry

2. Generate a three dimensional Bezier curve using following control point(5,4,2), (6,2,3), (5,−2,4) and (6,−4,3).

3. What is Newton Raphson method? Explain with geometrical interpretation. Write an algorithm for it? Find the real root of the equation $x \log_{10} x - 1.4 = 0$. Using Netwon Raphson method. Find solution correct to five places of decimal.

4. Discuss different type of forces in finite element structural analysis? Derive an expression for stiffness matrix of one dimensional truss element. Write steps for solving one dimensional problem.

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E-742

B. E. VIII Semester (Main & Re-Exam) Examination, May – 2018

COMPUTER AIDED DESIGN

Branch : ME

Time : Three Hours]

[Maximum Marks : 75
[Minimum Marks : 30

Note : Attempt *all* questions from Section-A, *four* questions from Section-B and *three* questions from Section-C.

SECTION – A $1.5 \times 10 = 15$

(Objective Type Questions)

Note : Attempt *all* questions :

1. The term that is used for geometric modelling like solid modelling, wire frame modelling and drafting is known as :

   (a) Software Package (b) Operating System

   (c) Application Software (d) None of these

2. Which of the following devices do not produce a hard copy ?

   (a) Impact Printers (b) Plotters

   (c) CRT Terminals (d) Non-impact Printers

3. The life cycle of a product includes :

   (a) Extraction of natural resource (b) Processing of raw materials

   (c) Manufacturing of products (d) All of these

P. T. O.

4. A feasible solution to the linear programming problem should :

(a) Satisfy the problem constraints

(b) Optimize the objective function

(c) Satisfy the problem constraints and non-negativity restrictions

(d) Satisfy the non-negativity restrictions

5. The next iterative value of the root of $x^2 - 4 = 0$, using Newton-Raphson Method, if the initial guess is 3, is :

(a) 1.5 (b) 2.067

(c) 2.167 (d) 3.000

6. A Benzier curve is a polynomial of degree ..... the number of control points used.

(a) One more than (b) One less than

(c) Two less than (d) None of these

7. The transformation in which an object can be shifted to any coordinate position in 3-D plane are called :

(a) Translation (b) Scaling

(c) Rotation (d) None of these

8. Spline curve can be lither :

(a) Bezier Spline (b) B-Spline

(c) Both (a) and (b) (d) None of these

9. The object refers to the 3-D representation through linear, circular or some other representation are called :

(a) Quadric surface (b) Sweep representation

(c) Torus (d) None of these

10. ..... refers to a model that represent all the dimension of a an object external as well as internal :

(a) Wire Frame Model (b) Constructive Solid Geometry

(c) Composite Tranformation (d) None of these

SECTION – B

$6 \times 4 = 24$

(Short Answer Type Questions)

Note : Attempt any ***four*** questions.

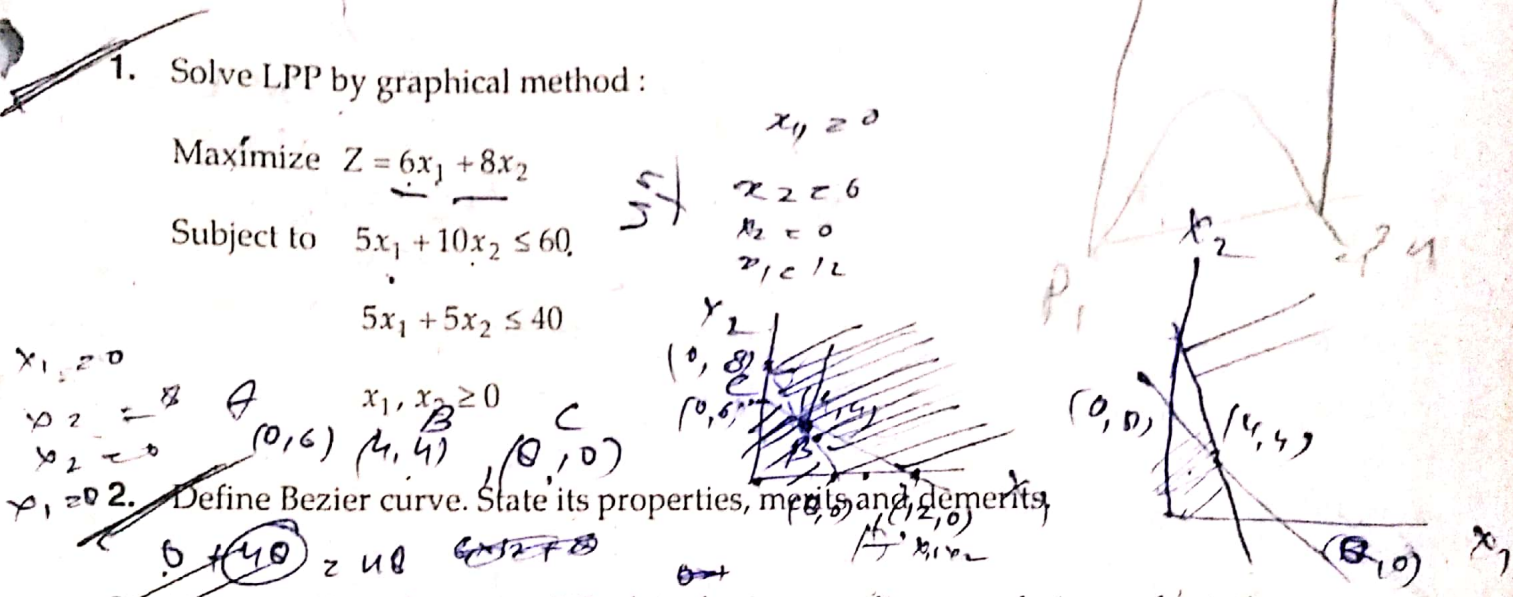
1. Solve LPP by graphical method :

Maximize $Z = 6x_1 + 8x_2$

Subject to $5x_1 + 10x_2 \leq 60$

$5x_1 + 5x_2 \leq 40$

$x_1, x_2 \geq 0$



2. Define Bezier curve. State its properties, merits and demerits.

3. What are Transformation ? Explain the terms scaling, translation and rotation.

4. Explain various design-related tasks which are performed by a modern computer aided system.

5. Distinguish between 2-D and 3-D wire frame models with neat sketches.

6. What do you understand by the term 'Interpolation' ? Using Newton's Forward Interpolation formula, find the value of f(1.6), if

x	1	1.4	1.8	2.2
$f(x)$	3.49	4.82	5.96	6.5

SECTION – C

$12 \times 3 = 36$

(Long Answer Type Questions)

Note : Attempt any *three* questions.

1. Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ correct to five decimal places. Also write the computer program in C for the above problem.

2. By the method of least squares, find the straight line that best fits the following data :

x	1	2	3	4	5
y	14	27	40	55	68

3. Explain Numerical Differentiation and Integration. On the basis of Newton-Cotes Quadrature Formula, Explain Trapezoidal Rule; Simpson's one-third rule; and Simpson's three-eighth rule.

4. Describe in detail the General procedure of Finite Element Method. Also write down the applications of FEM.

5. Make a comparative analysis of wire frame and solid modelling. Describe how the database is organized when building a solid model from the graphic primitives.
