

M.TECH. (ME) – 1ST SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: COMPUTER AIDED ENGINEERING; PAPER CODE: 13140101)

TIME: 03:00 Hrs.**Max. Marks: 100****Instructions:-**

1. Write your Roll no. on the Question paper.
2. Candidate should ensure that they have been provided with the correct question paper. Complaints in this regards, If any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt One (01) question from each Unit. Marks are indicated against each question.
4. Draw Diagram wherever required.

Q.1. Answer the following questions: (4x5=20)

- a) Explain different CAD\CAM tools.
- b) What is Geometrical transformation?
- c) What is Convergence?
- d) Explain generative and hybrid approach.

UNIT-I

Q.2. What is typical design process? How it become different with the aid of computer. (20)

- Q.3. a) What are the different types of computer programming languages? Explain. (10)**
b) What are different input and output devices used in CAD? (10)

UNIT-II

Q.4. a) Draw a Bezier spline for the following control points: (0,0), (4,3), (8,4) and (12,0). (10)

b) Compare wireframe and solid frame modeling with example. (10)

Q.5. Discuss the parametric representation of a hyperbola. (20)

UNIT-III

Q.6. What is FEM. Explain the different steps of finite element modeling. Also write down elemental stiffness matrix for linear solution. (20)

Q.7. Derive the shape function for linear solution. (20)

UNIT-IV

Q.8. Explain different approaches for process planning in detail. (20)

Q.9. a) Review NC, CNC and DNC with the differences in basics of technology. (10)

b) Discuss methods of tool path generation. (10)

M.TECH. (ME) – Ist SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: NUMERICAL & OPTIMIZATION MANAGEMENT; PAPER CODE: 13140102)

TIME: 03:00 Hrs.

Max. Marks: 100

Instructions:-

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3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt One (01) question from each Unit. Marks are indicated against each question.
4. Draw Diagram wherever required.

Q.1. Answer the following questions:

(5x4=20)

a) Solve by Gauss Elimination Method:-

$$\begin{aligned} 2x + 4y + z &= 3 \\ 3x + 2y - 2z &= -2 \\ x - y + z &= 6 \end{aligned}$$

b) Using Newton's formula find the value of f(4) with the help of following data:-

x	0	1	2	3
F(x)	1	2	1	10

- c) Give formula to find 1st order derivative using forward difference formula.
- d) Short note on Numerical Solution of Ordinary differential Equations.
- e) State five point formula in PDE.

UNIT-I

Q.2. a) Find the relative error if the number X = 0.004997 is:-

(10)

- (i) Truncated to three decimal digits.
- (ii) Rounded off to three decimal digits

b) Find the root of $x^3 - 4x - 9 = 0$ correct to three decimal places, using Bisection method.

(10)

Q.3. a) Apply Newton's forward formula to find the value of f(22) from the table:-

(10)

X	20	25	30	35	40	45
f(x)	354	332	291	260	231	204

b) Using Lagrange's formula, evaluate f(9) given:-

(10)

X	5	7	11	13	17
F(x)	150	392	1452	2366	5202

UNIT-II

Q.4. a) Given that:-

(10)

X	1.0	1.1	1.2	1.3	1.4	1.5	1.6
Y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

find $\frac{dy}{dx}$ at $x = 1.1$ and 1.6

b) Solve $\int_0^6 \frac{dx}{1+x^2}$ using Trapezoidal rule and Simpson's rule. What are merits of Numerical Integration.

(10)

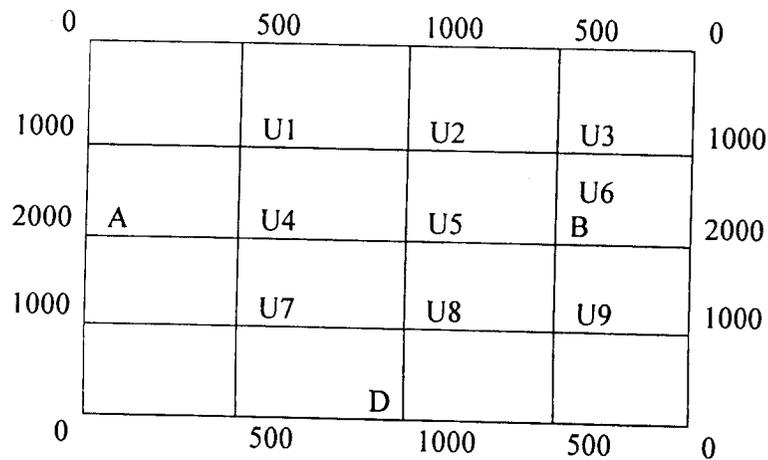
- Q.5. a) Find the root of $x^3 - 4x - 9 = 0$ correct to three decimal places, using Newton-Raphson method. (10)
- b) Apply Gauss Elimination Method to solve the equation:- (10)
- $$3x + 2y + 7z = 4, 2x + 3y + z = 5, 3x + 4y + z = 7$$

UNIT-III

- Q.6. Apply Runge-Kutta fourth order method to find an approximate value of y when $x = 0.2$ given that:- (20)

$$\frac{dy}{dx} = x + y \text{ and } y = 1 \text{ when } x = 0$$

- Q.7. Solve the elliptic equation $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary value as shown in fig. (20)



UNIT-IV

- Q.8. Discuss Merits and Demerits of various Optimization Methods and its application to Mechanical Engg. (20)
- Q.9. Short note on any three:- (20)
- Uni-directional Search method.
 - Direct search method.
 - Gradient based method.
 - Genetic algorithms.
 - Global optimization

M.TECH. (ME) – 1ST SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: PRODUCTION & OPERATION MANAGEMENT; PAPER CODE: 13140103)

TIME: 03:00 Hrs.

Max. Marks: 100

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3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt One (01) question from each Unit. Marks are indicated against each question.
4. Draw Diagram wherever required.

Q.1. Answer the following questions:**(5x4=20)**

- a) Differentiate between process and product layout based design.
- b) Define concurrent engineering and Quality Function Development (QFD)
- c) What are the various production “waste” that needs to be eliminated?
- d) What do you mean by ‘Inventory’? Also give its classification.
- e) What is Supply Chain? List its components.

UNIT-I**Q.2. a) Write short notes on following in context of production and service systems:****(10)**

- i) Productivity as a performance measure
- ii) Operations strategy and competitiveness
- b) What do you mean by the terms “Part family” & “Group technology”? In this context briefly explain various methods to form part families

(10)**Q.3. a) What are the objectives and parameters for plant location decision? Also briefly explain different types of plant layouts.****(10)**

- b) Differentiate between production and service systems. Also explain the role of operations management and different types of decisions taken in this context.

(10)**UNIT-II****Q.4. Write short notes on:-****(20)**

- a) Break-even analysis.
- b) Concurrent engineering.
- c) Quality function Deployment.
- d) Product development process

Q.5. a) What do you mean by “forecasting”? Explain in detail different types of forecasting techniques used for demand management.**(12)**

- b) The demand for a product in each of the last five months is shown below:

(8)

Month	1	2	3	4	5
Demand	1300	1700	1900	2300	2400

- i) Use a two month moving average to generate a forecast for demand in month 6.
- ii) Apply exponential smoothing with a smoothing constant of 0.9 to generate a forecast for demand in month 6.
- iii) Which of these forecasts do you prefer and why?

UNIT-III

- Q.6. a) What is Master production schedule and various methodologies for it? Differentiate MRP and MRP II. (10)
- b) Write in brief about various types of Inventory systems. Discuss in detail about various Inventory control methods. (10)
- Q.7. Write short notes on:- (20)
- a) KANBAN production.
- b) JIT production.
- c) CONWIP method.
- d) Lean manufacturing

UNIT-IV

- Q.8. a) What is Supply chain management? Explain in detail about its salient features like objective, components, phases etc. (10)
- b) Discuss in detail about various Supply Chain facilities. (10)
- Q.9. Discuss in Detail about:- (20)
- a) Bullwhip effect.
- b) Role of sourcing in supply chain performance.
- c) Cycle and safety inventory in SC.
- d) Role of forecasting in SC

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M.TECH. (ME) – 1ST SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: ADVANCE DESIGN OF MECHANICAL SYSTEMS; PAPER CODE: 13140104)

TIME: 03:00 Hrs.**Max. Marks: 100****Instructions:-**

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3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt One (01) question from each Unit. Marks are indicated against each question.
4. Draw Diagram wherever required.

- Q.1. Answer the following questions: (4x5=20)**
- a) Explain the strain rosette.
 - b) What is Generalized Hooks law?
 - c) Define endurance limit.
 - d) Explain system design approach in terms of aesthetic look.

UNIT-I

- Q.2. Explain the transformation of stresses using elementary tetrahedron. (20)**
- Q.3. a) Explain the transformation equations for strains. (10)**
b) What is a strain tensor? (10)

UNIT-II

- Q.4. What is significance of elasticity constants also explain their interrelationship? (20)**
- Q.5. What is factor of safety? Why and how it is used in design? (20)**

UNIT-III

- Q.6. Explain:- (20)**
- a) S-N diagram.
 - b) Soderberg and modified Goodman diagram.
- Q.7. What is Notch sensitivity? Why it is required? What are its extreme values for fully sensitive and no sensitive material to notch effects? (20)**

UNIT-IV

- Q.8. Compare Talent and creativity. How talent enters in a design process. (20)**
- Q.9. Explain:- (20)**
- a) Concurrent engineering design.
 - b) Standardization in design.

M.TECH. (ME) – 1ST SEMESTER EXAMINATIONS; JANUARY-2018
(SUB.: ADVANCED FLUID MECHANICS; PAPER CODE: 13140105)

TIME: 03:00 Hrs.

Max. Marks: 100

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3. Attempt Five (05) Questions in all, Question No.-01 is Compulsory. Students are required to attempt One (01) question from each Unit. Marks are indicated against each question.
4. Draw Diagram wherever required.

Q.1. Answer the following questions:**(4x5=20)**

- a) Define concept of continuum.
- b) Explain energy equation.
- c) Explain effects of turbulence.
- d) Explain friction factor for smooth and rough pipe.

UNIT-I

- Q.2. a) What do you mean by fluid? Explain Newtonian and Non-Newtonian types of fluid. **(10)**
 b) What do you understand by uniform flow, source and sink flow, all types of vortex flow, Doublet flow? **(10)**
- Q.3. a) Explain Reynolds transport theorem and derive the integral form of continuity equation. **(10)**
 b) A two dimensional source of strength $1.8 \text{ m}^2/\text{s}$ has been placed at the origin in a stream of inviscid incompressible fluid moving with a uniform velocity 0.6 m/s . Make calculations for the fluid velocity both in magnitude and direction at a point $r=0.75 \text{ m}$ and $\theta=120^\circ$. **(10)**

UNIT-II

- Q.4. a) Explain in detail the growth of instability and the transition from laminar to turbulent flow showing all regions with diagram. **(10)**
 b) Prove and interpret the Darcy equation for turbulent flow through a circular pipe. Calculate the pressure drop and the power required to maintain $0.05 \text{ m}^3/\text{s}$ of petrol (sp. Gr 0.7) flow through a steel pipe 0.2 m diameter and 1000 m long. Take coefficient of friction $f=0.0025$ in Darcy relation. **(10)**
- Q.5. a) Explain the various effects of turbulence, intensity and scale of turbulence, hydraulically smooth and rough pipes. **(10)**
 b) An oil of mass density 950 kg/m^3 and dynamic viscosity 1.0 Ns/m^2 is carried at the rate of $0.14 \text{ m}^3/\text{s}$ through a 30 cm diameter pipe over 1000 m length. Due to increase in environmental temperature, the viscosity of oil change by a factor of 8. If the same quantity of oil is to be conveyed, compare the cost of pumping. **(10)**

UNIT-III

- Q.6. Explain briefly the concept of wave propagation and sound velocity. Explain Mach number and compressible flow regimes corresponding to it/ (20)
- Q.7. Derive the basic equation for 1-D compressible flow and prove the momentum equation for a compressible flow. (20)

UNIT-IV

- Q.8. Derive the Navier Stokes equation of motion and also represent it in the vector form. Explain briefly the flow in circular pipes. (20)
- Q.9. When a sudden contraction is introduced in a horizontal pipeline from 50 cm dia to 25 cm dia, the pressure changes from 105 kPa to 69 kPa. If the coefficient of contraction is assumed to be 0.65, Calculate the water flow rate. The contraction is subsequently followed by a sudden enlargement from 25 cm dia to 50 cm dia. If the pressure at the 25cm section is 69 kPa, work out the pressure at the 50 cm enlarged section. Take the specific wt. of water = 10kN/m^3 . (20)

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