

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Program:	M. Tech.(ME)	Year/Semester:	1st Sem.
Course/Subject:	Computer Aided Engineering	Duration:	03:00 Hrs.
Course/Subject Code:	13140101	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all . Q.1 is compulsory. Attempt other four questions selecting one question from each unit .Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

- Q.1 Answer the following questions: (5x4=20)
- a) Define CAD and different CAD/CAM market trends.
 - b) Explain two and three dimensional graphics concepts.
 - c) Explain general procedure of FEM.
 - d) Discuss G and M Codes.

UNIT-I

- Q.2 What is typical Design process? How it becomes different with the aid of computer? (20)
- Q.3 a) What are the different types of computer programming languages? Explain. (10)
- b) Explain different CAD/CAM tools. (10)

UNIT-II

- Q.4 Explain mathematical representations of Solids and Surfaces. (20)
- Q.5 Discuss the parametric representation of a hyperbola. (20)

UNIT-III

- Q.6 What is FEM? Also write down the elemental stiffness matrix for linear solutions. (20)
- Q.7 Derive the shape function for linear solution. (20)

UNIT-IV

- Q.8 Explain the different parts of CNC in detail. (20)
- Q.9 a) Discuss NC, CNC and DNC with the differences in their technology. (10)
- b) Explain the tool path generation in CNC. (10)

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Programme:	M.Tech (ME)	Year/Semester:	1 st Sem.
Course/Subject:	Numerical and Optimization Method	Duration:	03:00Hrs.
Subject Code:	13140102	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all, Q.1 is compulsory, student are required attempt other four question by selecting one question form each section. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

- Q.1** a) Find the relative error if the number $X=0.00545828$ is (5x4=20)
- i. Truncated to three decimal digits
 - ii. Rounded off to three decimal digits
- b) Define Number and their Accuracy.
- c) Explain the solution of Differential equation with its initial and boundary conditions.
- d) Explain Chebyshev Polynomials.
- e) What are Elliptic, hyperbolic and parabolic equations.

SECTION – A

- Q.2** a) Describe types of Errors in numerical computation and its rule for estimating error. (10)
- b) Derive Newton Forward Interpolation formula (10)
- Q.3** a) Using Stirling's formula, estimate the value of $\tan 16^\circ$, data is: (10)

θ	0	5	10	15	20	25	30
$\tan\theta$	0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774

- b) Find $f(22)$ from the Gauss Forward Formula

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

(10)

SECTION – B

- Q.4** a) Define Numerical Differentiation and derive the forward difference formula. Also solve the problem given that

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

s

find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=1.1$ and $x= 1.6$ (10)

- b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using
- (i) Trapezoidal rule
 - (ii) Simpson's 1/3 rule
 - (iii) Simpson's 3/8 rule
 - (iv) Weddle's rule and compare the results with its actual value. (10)

- Q.5 a) Using Gauss-Jordan Method, find the inverse of matrix $\begin{matrix} 2 & 2 & 3 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{matrix}$ Explain the matrix inversion and properties of eigen values. (10)
- b) Using Newton's iterative method, find the real roots of $x \log_{10} x = 1.2$ correct to five decimal places. (10)

SECTION - C

- Q.6 a) i) Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $S_x = 0.2, 0.4$.
- ii) Solve by Taylor's series method the equation $\frac{dy}{dx} = \log(xy)$ for $y(1.1)$ and $y(1.2)$, given $y(1) = 2$. (5+5)
- b) Solve the elliptic equations $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary values as given in fig. (10)

0	500	1000	500	0
		C		
1000	U1	U2	U3	
2000	A	U4	U5	U6
1000		U7	U8	U9
0	500	1000	500	0
		D		

- Q.7 Derive the finite difference Approximations for Partial Derivatives. Using Jacobi's method, find all the eigen values and the eigen vectors of the matrix $\begin{matrix} 1 & 2 & 1 \\ 2 & 3 & 2 \\ 2 & 2 & 1 \end{matrix}$ (10+10)

SECTION - D

- Q.8 a) Define Genetic Algorithm with its constrained and operators. Also define Multi objective optimization. (10)
- b) What is Global optimization and the Concept of Pareto optimality. (10)
- Q.9 Write an Algorithm for (20)
- a) Single-variable optimizations
- b) Bracketing Method
- c) Region-elimination method
- d) Point estimation method

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Program:	M. Tech. (ME)	Year/Semester:	1st Sem.
Course/Subject:	Production and Operations Management	Duration:	03:00
Course/Subject Code:	13140103	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt any five questions in all. Q.1 is compulsory. Attempt other four questions selecting one question from each unit. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

- Q.1** (a) Define Operations management and Operations Strategy. (5x4=20)
(b) List various Product design Strategies?
(c) What do you mean by 'Just In Time'? Give its salient features.
(d) What do you mean by 'Inventory'? Also give its classification.
(e) What is Supply Chain? List its components.

UNIT - I

- Q.2** (i) Write short notes on following in context of production and service systems: (10)
a) Productivity as a performance measure
b) Types of manufacturing systems.
- (ii) What are the objectives and parameters for plant location decision? Also briefly explain different types of plant layouts. (10)
- Q.3** (i) What do you mean by the terms "Part family" & "Group technology"? In this context briefly explain various methods to form part families. (10)
- (ii) Define facility planning. Differentiate between Product based layout and Process based layout. (10)

UNIT - II

- Q.4** Define DFMA? Explain principles of Design for assembly and manufacture. How DFMA works? Write some applications of DFMA? (20)
- Q.5** (i) What do you mean by "forecasting"? Explain in detail different types of forecasting techniques used for demand management. (12)
- (ii) The table below shows the demand for a new aftershave in a shop for each of the last 7 months.

Month	1	2	3	4	5	6	7
Demand	23	29	33	40	41	43	49

- a) Calculate a two month moving average for months two to seven. What would be your forecast for the demand in month eight?
- b) Apply exponential smoothing with a smoothing constant of 0.1 to derive a forecast for the demand in month eight.
- c) Which of the two forecasts for month eight do you prefer and why? (8)

UNIT - III

- Q.6 Write short notes on:** (20)
- a) MRP I and MRP II
 - b) Classification of inventory systems
 - c) Pull Vs Push system
 - d) JIT production.

- Q.7 (i) What is Lean Manufacturing? Briefly discuss all the wastes associated with it. (10)**
- (ii) Write short notes on:**
- a) CONWIP method
 - b) KANBAN production

UNIT - IV

- Q.8 (i) What is Supply chain management? Explain the phases of supply chain management. (10)**
- (ii) Discuss in detail about supply chain strategies and obstacles in achieving Strategic fit. (10)**

- Q.9 Discuss in brief about:** (20)
- a) Supply chain facilities
 - b) Role of sourcing in supply chain performance
 - c) Vendor-Managed Inventories
 - d) Role of forecasting in SC

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Program:	M. Tech. (ME)	Year/Semester:	1 st Sem.
Course/Subject:	Advance Design Of Mechanical System	Duration:	03:00 Hrs.
Course/Subject Code:	13140104	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all. Q.1 is compulsory. Attempt other four questions by selecting one question from each unit. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

Q.1 Attempt all:- (4x5=20)

- (a) Define Fluctuating stress.
- (b) What is Strain tensor?
- (c) Define Yield Strength.
- (d) Discuss Reliability factors used in designing.

UNIT - I

- Q.2 (a) Discuss strain rosettes, principal stress and normal stress. (10)
(b) Explain stress-strain curve for pure metals with its physical significance. (10)

OR

- Q.3 (a) Write formulae involved for pure tension, simple bending, buckling and deflection. (10)
(b) Define compatibility concept in detail with physical significance. (10)

UNIT - II

- Q.4 Explain static failure theories with illustration and applications. (20)

OR

- Q.5 Give interrelationship of elastic constants in strength of materials. Also explain individual elastic constant. (20)

UNIT - III

- Q.6 Discuss Soderberg and modified Goodman diagram in design for cyclic loading with detailed line diagram. (20)

OR

- Q.7 (a) Explain Cumulative Fatigue damage with factors affecting fatigue. (10)
(b) Discuss Miner's equation. (10)

UNIT - IV

- Q.8 (a) Explain the engineering design process with engineering and conceptual design. (10)
(b) Discuss Material selection process and evaluation techniques for material consideration in design. (10)

OR

- Q.9 Discuss product life cycle depicting each phase involved with suitable illustration. (20)

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Programme:	M.Tech (ME)	Year/Semester:	1 st Sem.
Course/Subject:	Advance Fluid Mechanics	Duration:	03:00 hrs.
Course/Subject Code:	13140105	Maximum Marks:	100
Roll No.:			

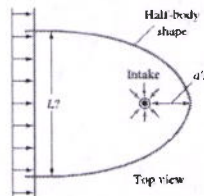
Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all. Q.No. 1 is compulsory. Attempt other four questions, by selecting one question from each unit. All questions carry equal marks Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

- Q.1 a) Explain the concept of continuum. (5X4=20)
 b) Derive the relation between coefficient of friction and Reynolds number.
 c) Discuss the various type of flows.
 d) Explain the type of flow meters.

UNIT-I

- Q.2 a) Derive the Reynolds transportation theorem for Arbitrary Fixed Control Volume. (15)
 b) An offshore power plant cooling-water intake sucks in $42.5 \text{ m}^3/\text{s}$ in water 9.1 m deep, as in figure. If the tidal velocity approaching the intake is 0.213 m/s . Find how far downstream does the intake effect extend and how much width L of tidal flow is entrained into the intake? (5)



- Q.3 Derive the expression for the flow past over a cylinder for uniform and vortex flow. (20)

UNIT-II

- Q.4 a) Define turbulence stress. Derive Reynolds equations of turbulence for the flow flowing through a pipe. (10)
 b) What are the semi-empirical theories of turbulence? Explain the concept of mixing length introduced by Prandtl. Also derive a relationship between turbulent shearing stress and mixing length. (10)
- Q.5 Derive the expression of velocity distribution for smooth and rough pipe including friction factor. (20)

UNIT-III

- Q.6 Air flows adiabatically through a duct. At point 1 the velocity is 240 m/s , with $T_1 = 320 \text{ K}$ and $P_1 = 170 \text{ kPa}$. Compute (a) T_0 , (b) P_{01} , (c) ρ_0 , (d) Ma , (e) V_{max} , and (f) V^* . At point 2 further downstream $V_2 = 290 \text{ m/s}$ and $P_2 = 135 \text{ kPa}$. (g) What is the stagnation pressure P_{02} ? (20)

- Q.7 a) A normal shock wave occurs in air flowing at a Mach number of 1.5. The static pressure and temperature of the air upstream of a shock wave are 1 bar and 300 K. Find Mach No., pressure and temperature downstream of the shock wave. Also find shock strength. (10)
- b) Explain the distribution of pressure and velocity throughout a convergent and divergent nozzle when the exit pressure of the gas is reduced from intake pressure. (10)

UNIT-IV

- Q.8 Derive the expression for the fully developed laminar flow for viscous fluid in a circular pipe and also derive the expression for heat losses. (20)
- Q.9 An oil with ρ 900 kg/m³ and ν 0.0002 m²/s flows upward through an inclined pipe as shown in Figure. The pressure and elevation are known at sections 1 and 2, 10 m apart. Assuming steady laminar flow, (a) verify that the flow is up, (b) compute h_f between 1 and 2, and compute (c) Q , (d) V , and (e) Re_d . Is the flow really laminar? (20)

