

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech.

Stream: ME

PAPER TITLE: Engineering Design Optimization

Maximum Marks: 40

Total No of questions: 9

Semester: I

PAPER CODE: EME61107

Time duration: 3 hours

Total No of Pages: 2

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Differentiate single objective and multiobjective optimization problem?
- b) What do you mean by stochastic programming problem?
- c) What is probabilistic and deterministic model of optimization?
- d) What do you mean by an optimal solution of a problem?
- e) Discuss Newton Raphson method?

Group B

(Answer any three questions)

3 × 5 = 15

2. Describe Genetic Algorithm (GA) Optimization?
3. Discuss engineering application of optimization?
4. What are the steps involved in decision making for optimizing a solution? Explain?
5. A cooperative society of farmers has 50 hectares of land to grow two crops X and Y. The profit from crops X and Y per hectare are estimated as Rs 10,500 and Rs 9,000 respectively. To control weeds, a liquid herbicide has to be used for crops X and Y at rates of 20 litres and 10 litres per hectare. Further, no more than 800 litres of herbicide should be used in order to protect fish and wild life using a pond which collects drainage from this land. How much land should be allocated to each crop so as to maximize the total profit of the society?
6. Solve the problem using shortest processing time rule to optimize the scheduling and calculate
(a) Make span time (b) Total flow time (c) Average job flow time

Jobs	Processing time	Due Date
A	12	52
B	16	37
C	8	28
D	20	57
E	6	31

Group C

(Answer any two questions)

2 × 10 = 20

7. Briefly explain: (a) Linear programming problem (b) Quadratic problem optimization (c) Heuristic Technique optimization
8. Maximize $Z = 0.65X + 0.45Y$ Subjected to Constrained equations $2X + 3Y \leq 400000$, $3X + 1.5Y \leq 300000$, $X \leq 90000$; $X, Y \geq 0$. Solve by Simplex Method?
9. A construction company has five large bulldozers located at five different garages. The bulldozers are to be moved to four different construction sites. The distances in miles between the bulldozers and the construction sites are given below. How should the bulldozers be moved to the construction sites in order to minimize the total distance traveled?

Bulldozer/Site	A	B	C	D	E
1	135	160	140	55	50
2	120	130	110	35	50
3	130	175	125	80	80
4	160	190	170	80	80
5	175	200	185	105	110

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M. Tech
Stream: Electrical Engineering
PAPER TITLE: Electrical Distribution System
Maximum Marks: 40
Total No of questions: 09

Semester: I

PAPER CODE: EEE 61111
Time duration: 3 hours
Total No of Pages: 02

Note:

1. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
2. Assumptions made if any, should be stated clearly at the beginning of your answer.
3. No Mobile Phones will be permitted in the Examination Hall.

Answer all the Groups

Group A

(Answer all the questions)

$$5 \times 1 = 5$$

1. a) How is voltage control achieved?
b) State whether the tap changer in a transformer is provided on hv side or lv side?
c) What kind of protection is offered by a fuse?
d) What is flexible bus?
e) List out the equipments used in a substation.

Group B

(Answer any three questions)

$$3 \times 5 = 15$$

2. Show that

(i) The six feeders can carry 1.50 times as much load as the four feeders if they are thermally limited

(ii) The six feeders can carry 1.25 times as much load as the four feeders if they are voltage drop limited [2.5+2.5]

3. What is sectionalizer? Mention the necessary factors which should be considered when selecting a sectionalizer. [1+4]

4. What are the commonly used static VAR schemes? [5]

5. What are the main functions of AVR's ? [5]

6. Explain the method of improving power factor by using synchronous condenser and discuss the merits of the above mentioned method. [3+2]

Group C

(Answer any two questions)

$$2 \times 10 = 20$$

7. a) A 3 phase 500 hp, 50 Hz, 11 kV star-connected induction motor has a full load efficiency of 85% at a 0.75 p.f. and is connected to a feeder. If the power factor of load is desired to be corrected to 0.9 lag. determine the size of the capacitor bank in kVAR and capacitance of each unit if the capacitors are connected in delta and as well as in star.
- b) Why is excitation system required in a power station?
- c) What is static VAR system? [6+2+2]
8. a) Derive the expression for power loss in an uniformly distributed main feeder.
- b) What are the drawbacks of electromechanical AVR? [6+4]
9. a) What are the advantages of static excitation system?
- b) Why dc excitation systems have been superseded by ac excitation systems?
- c) In a rotating thyristor excitation system, the main alternator field rectifier usually consists of four parallel thyristors each having a fuse in its circuit. Why? [3+3+4]

ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION (DEC 2019)
(Academic Session: 2019 – 20, Semester Term: Aug. 2019 – Dec 2019)

Name of the Program: M.Tech.
Stream : Environmental Engineering
PAPER TITLE: Air and Noise Pollution
Maximum Marks: 40
Total No of questions: 9

Semester: I
PAPER CODE: ECE 61107
Time duration: 3 hours
Total No of Pages: 1

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. (i) Classify lapse rate.
(ii) How does the 'photochemical smog' is formed?
(iii) Define Air quality Index.
(iv) Ozone is an essential component of which layer of the atmosphere?
(v) Why do CO is taken as major air pollutants?

Group B

(Answer any three questions)

3 × 5 = 15

2. Differentiate between radiation inversion and Subsidence inversion.
3. Discuss the sources of NO₂ and SO₂ in the atmosphere ?
4. What are the different types of plumes?
5. Differentiate between ELR and ALR.
6. Write an note on Venturi scrubbers?

Group C

(Answer any two questions)

2 × 10 = 20

7. Discuss the technologies are involved in controlling gaseous pollutants?
8. a) Define Noise pollution. Define decibel. Discuss the effects of noise pollution on human health?
b) Write a note on Unstable, stable and neutral environment.
9. What do you understand by air pollution? State the different types of air pollution. Discuss the adverse effects of air pollution on human health. Describe the control measures of air pollution.

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech

Stream: ME

PAPER TITLE: Vibration Analysis

Maximum Marks: 40

Total No of questions: 09

Semester: I

PAPER CODE: EME61103

Time duration: 3 hours

Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) In case of viscous damping, damping force is proportional to _____.
- b) For a damped system under harmonic excitation, phase difference between the response and the excitation is always _____, when the frequency ratio is unity.
- c) A car having a mass of 1500 kg deflects its suspension springs by 3 cm under its own load. Find the natural frequency of the car in vertical direction.
- d) The response in the high frequency region is controlled mainly by the _____ of the system.
- e) Magnification factor vs frequency ratio curves have a left-ward shift with _____ (increase / decrease) in damping.

Group B

(Answer any **three** questions)

$3 \times 5 = 15$

2. A cylinder (Fig. 1) of mass 10 kg and mass moment of inertia 10 kg-m^2 is free to roll without slipping, but restrained by the spring of stiffness 10 N/m. Determine the natural frequency of oscillation.

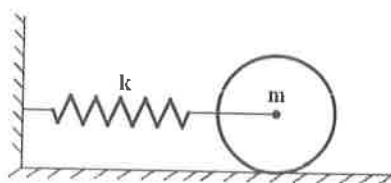


Fig. 1

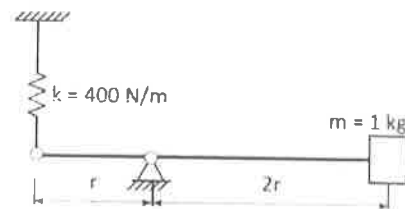


Fig. 2

3. Determine the natural frequency of the system shown in the Fig. 2. The hinged bar of length $3r$ is assumed to be rigid.
4. A spring-mass-damper system is defined by following parameters $M=20 \text{ kg}$, $K=150 \text{ N/m}$, $C=30 \text{ Ns/m}$. Determine the free vibration response of the above system for the initial velocity of 5 cm/s , and zero initial displacement.
5. What are under damping, critical damping and over damping of vibration systems? Explain through graph and mention their applications.

6. With a neat sketch, explain the working principle of a dashpot used to damp out the vibrations in a system.

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. A vehicle of mass 1200 kg travels over a rough road. The suspension system has a spring constant of 400 kN/m and a damping ratio of 0.5. If the vehicle speed is 20 km/h, determine the absolute and relative displacement amplitude of the vehicle. The road surface may be assumed to have a sinusoidal profile with the amplitude of 0.05 m and a wavelength of 6 m.
8. A gun barrel of mass 500 kg has a recoil spring of stiffness 40 MN/m. If the barrel recoils a distance of 1.5 m on firing, determine:
- i. The initial recoil velocity of the gun barrel.
 - ii. The critical damping coefficient of the dashpot which is engaged during both the recoil and return strokes.
 - iii. The time required for the barrel to return to a position of 15.0 cm from its initial position.
9. A machine of mass 100 kg is supported on springs of total stiffness 700 kN/m and has an unbalanced rotating element, which results in a disturbing force of 350 N at a speed of 3000 rev/min. Assuming a damping factor of 0.25, determine:
- i. Its amplitude due to the unbalance
 - ii. The transmissibility ratio
 - iii. The transmitted force
 - iv. The phase angles of the transmitted force and the machine motion with respect to the excitation force.

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: **M. Tech. in Power and Energy Systems** Semester: I

Stream: Electrical Engineering

PAPER TITLE: **Advanced Control Theory**

Maximum Marks: 40

Total No of questions: 9

PAPER CODE: **EEE61103**

Time duration: 3 hours

Total No of Pages: 2

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) Given the input-output transfer function as $\frac{Y(s)}{U(s)} = \frac{5}{s^2 + 4s + 1}$, write the differential equation of the system.

b) Consider the system $\frac{Y(s)}{U(s)} = \frac{1}{s^4}$. In the controllable canonical form representation of the system, what will be the rank of the system matrix?

c) The resolvent matrix of a matrix A is given by, $\phi(s) = [s\mathbf{I} - \mathbf{A}]^{-1} = \begin{bmatrix} \frac{s+6}{s^2+6s+5} & \frac{1}{s^2+6s+5} \\ -5 & s \\ \frac{s^2+6s+5}{s^2+6s+5} & \frac{s}{s^2+6s+5} \end{bmatrix}$.

Determine the eigenvalues of the matrix A.

d) Draw block diagram of a standard second order closed loop system with PD controller.

e) Determine the overall transfer function of a closed-loop system having a standard second order plant and a PI controller.

Group B

(Answer any three questions)

$5 \times 3 = 15$

2. Develop the following system in controllable and Jordan canonical forms.

$$\frac{Y(s)}{R(s)} = \frac{2}{(s+1)^2(s+2)}$$

3. Comment on controllability and observability of the following system.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} -3 & 1 & 0 \\ 1 & -2 & 1 \\ 1 & 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \\ 2 \end{bmatrix} u, \quad y = \begin{bmatrix} 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

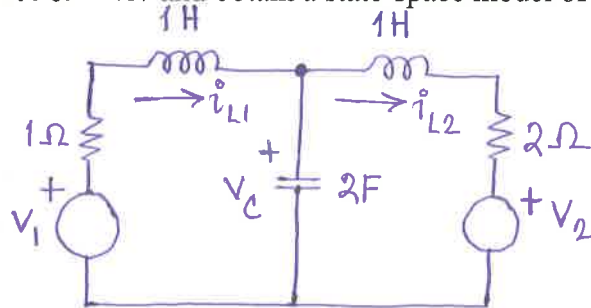
4. Determine state feedback gain matrix K for the following system, using method of substitution, so that the desired closed loop poles are located at $-1 \pm j1, -2$.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

5. (a) How many states does the following system have?

(b) Choose the states suitably and obtain a state-space model of the system.

(1+4=5)



6. (a) What is meant by 'Type' of a transfer function? (b) Find if the steady state error of a closed loop system having a Type-1 transfer function will be zero/ finite/ infinite for a step input.

Group C

(Answer any two questions)

2 × 10 = 20

7. For the system $\dot{\mathbf{x}} = \mathbf{A}\mathbf{x} + \mathbf{B}u$; $y = \mathbf{C}\mathbf{x}$, the state feedback control input for tracking problem is given by $u = -\mathbf{K}\mathbf{x} - K_i x_i$, where x_i is defined by $\dot{x}_i = r - \mathbf{C}\mathbf{x}$. Draw the relevant state diagram for designing state feedback controller considering integral control. Also determine the condition for achieving zero steady state error.

8. (a) A regulator system has a plant $\frac{Y(s)}{U(s)} = \frac{10}{(s+1)(s+2)(s+3)}$ in which state variables are defined as

$x_1 = y$, $x_2 = \dot{x}_1$ and $x_3 = \dot{x}_2$. The system uses the state feedback control $u = -\mathbf{K}\mathbf{x}$. The state feedback gain matrix \mathbf{K} which places the closed loop poles at $s = -10$ and $s = -2 \pm j2\sqrt{3}$ using the Ackermann's formula. (b) Write down Ackermann's formula and discuss.

(7 + 3 = 10)

9. (a) Define integral control. Represent it in the state space.

- (b) Given a system $\dot{\mathbf{x}} = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \mathbf{x} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$; $y = \begin{bmatrix} 1 & 0 \end{bmatrix} \mathbf{x}$, find the integral controller gain K_i so that the closed loop poles are placed at $s = -1$, $s = -2$ and $s = -3$. The integral control law is $u = -\mathbf{K}\mathbf{x} - K_i x_i$, where x_i is defined by $\dot{x}_i = r - \mathbf{C}\mathbf{x}$. Also determine the state feedback gain matrix \mathbf{K} . Draw the relevant state diagram.

(3 + 7 = 10)

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech.

Semester: I

Stream: CE (CPM)

PAPER TITLE: Probability Theory and Statistical Techniques

PAPER CODE: SMA61105

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 9

Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

$$5 \times 1 = 5$$

1. a) The critical value of Z for a one tailed test at 1% level of significance is

(i) 2.33 (ii) 1.645 (iii) 1.96 (iv) 2.58

- b) A r.v. X has the p.d.f, $f(x) = 2x; 0 < x < 1$, then, $E(2X^2)$ is

(i) 3 (ii) 1 (iii) 1/2 (iv) 0

- c) For the p.d.f. in b), the $\text{Var}(2X)$ is

(i) $\frac{2}{9}$ (ii) $\frac{1}{18}$ (iii) $\frac{1}{2}$ (iv) $\frac{1}{9}$

- d) The principle of maximum likelihood estimation consists in finding estimators that maximizes the function

- e) Given a hypothesis to be tested; $H_0: \theta = \theta_0$ against $H_1: \theta \neq \theta_0$, the test is a tailed test.

Group B

(Answer any three questions)

$$3 \times 5 = 15$$

2. Obtain the maximum likelihood estimator for the parameter θ of a population defined by the density, $f(x) = \theta e^{-\theta x}; x \geq 0$, based on a random sample of size n .
3. Fit a straight line to the following data

x	0	5	10	15	20	25
y	12	15	17	22	24	30

4. The following table gives the numbers of aircraft accidents that occurred during the various days of the week. Find whether the accidents are uniformly distributed over the week.

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
No. of accidents	14	16	8	12	11	9	14	84

5. A drug given to each of 12 persons resulted in the following changes in the blood pressure from normal -3, 2, 8, -1, 3, 0, 7, -2, 1, 5, 0, 4. Calculate if the changes is significant or not. Given, $t_{11,0.05} = 2.201$.
6. Two samples of size 9 and 8 give the sum of squares of deviations from their respective means equal to 160 inches square and 91 inches square respectively. Can they be regarded as drawn from the population with same variance? Given $F_{8,7,0.05} = 3.73$.

Group C

(Answer any two questions)

$$2 \times 10 = 20$$

7. The following table shows the lives (in hours) of four batches of electric lamps:

Batches	Life of Bulbs in Hours							
1	1600	1610	1650	1680	1700	1720	1800	
2	1580	1640	1640	1700	1750			
3	1460	1550	1600	1620	1640	1660	1740	1820
4	1510	1520	1530	1570	1600	1680		

Perform an analysis of variance of these data and show that a significance test doesn't reject their homogeneity.

8. X_1, X_2, X_3 is a random sample from a population with mean μ and variance σ^2 , T_1, T_2, T_3 are estimators to estimate the mean μ , and $T_1 = X_1 + X_2 - X_3$, $T_2 = 2X_1 + 3X_3 - 4X_2$, $T_3 = \frac{1}{3}(\lambda X_1 + X_2 + X_3)$
- (i) Are T_1 and T_2 unbiased estimators?
- (ii) Find the value of λ such that T_3 is an unbiased estimator.
- (iii) Find which among the three estimators is the best.
- (iv) Consider an estimator, $T = T_1 + T_2 - T_3$, verify if T is an unbiased estimator for μ . **2+2+3+3 Marks**
9. (i) Find the coefficient of correlation between industrial production and export using the following data

Production (in crore quintal)	55	56	58	59	60	61	62
Exports (in crore quintal)	35	38	38	39	44	43	44

(ii) A random sample of 400 male students have a mean height of 168 cm. Can it be regarded as a sample from a large population with mean height 167.8 cm and standard deviation 3.25 cm.

7+3 marks



ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech

Semester: I

Stream: EE

PAPER TITLE: Power System analysis and Operation

PAPER CODE: EEE61101

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 09

Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) What is Dynamic Stability?
- b) What is importance of load factor?
- c) What is different components of symmetrical faults?
- d) How hydrothermal combination can increase efficiency?
- e) Explain why the value of demand factor is less than 1.

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. Explain LLG fault with fault currents, equivalent circuits and impedance value?
3. What is equal area criterion? Explain the stability of a generator if sudden change in mechanical load.
4. Determine Y_{bus} for a 3 - bus system where the line impedances are as follows:

Line(bus to bus)	Impedance (pu)
1 - 2	$0.06 + j0.18$
1 - 3	$0.03 + j0.09$
2 - 3	$0.08 + j0.24$

5. Write the flowchart for Gauss - Seidel method.
6. Define i. Diversity factor ii. Annual load factor.

Group C

(Answer any two questions)

2 × 10 = 20

7. Derive a hydrothermal efficiency calculation with following data:

Day Interval Demand (MW)

1. 1st day 0 hour – 12.0 hour 1200
2. 1st day 12.0 hour – 24.0 hour 1500
3. 2nd day 0 hour – 12.0 hour 1100
4. 2nd day 12.0 hour – 24.0 hour 1800
5. 3rd day 0 hour – 12.0 hour 950
6. 3rd day 12.0 hour – 24.0 hour 1300

8. What are demand factor and load factor?

A diesel station supplies the following loads to various consumer:

Industrial consumer =1500kW; Commercial establishment =750kW; Domestic power =100kW;

Domestic light =450kW

If the maximum demand on the station is 2500kW and number of kWh generated per year is 45×10^6 ,

Determine: i. the diversity factor ii. Annual load factor.

9. Define Application of SCADA in power system, maximum demand, demand factor, average load.

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech

Semester: I

Stream: CSE

PAPER TITLE: Foundation of Computing Science

PAPER CODE: ECS61101

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 9

Total No of Pages: 3

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Give Regular Expression for the following language:
Language of strings with no two consecutive 1's.
- b) Describe the following Regular Expression in english: $(0+1)^*00(0+1)^*$?
- c) $L = \{x \in \{0,1\}^* \mid x \text{ is of length 4 or less}\}$. Give a Regular expression for L.
- d) Give formal definition of DFA.
- e) Convert the following regular expression to NFA's with null-transitions: $(0 + 1)01$

Group B

(Answer any three questions)

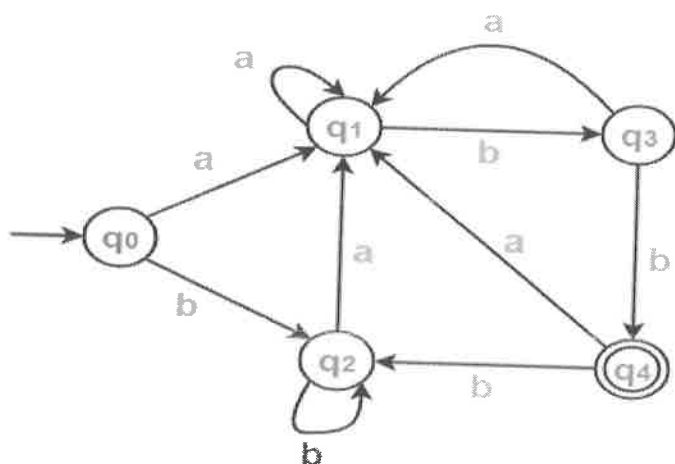
3 × 5 = 15

2. Test whether the following argument is valid:
"If Arindam wins then Abhijit will be happy. If Debu wins then Himadri will be happy. Either Arindam will win or Debu will win. However if Arindam wins, Himadri will not be happy and if Debu wins Abhijit will not be happy. So Abhijit will be happy if and only if Himadri is not happy."
3. (i) Show that $\sim \forall x(P(x) \rightarrow Q(x))$ and $\exists x(P(x) \rightarrow \wedge \sim Q(x))$ are logically equivalent.
(ii) What is the negation of the statement "There is an honest politician". (using quantifiers)

[2.5+2.5]

4. Prove that $(R - \{-1\}, *)$ is an abelian group, where the binary operation "*" is defined as $\forall a, b \in R - \{-1\}, a * b = a + b + ab$.

5. Minimize the given DFA-



6. Consider the following grammar-

$$S \rightarrow aB / bA$$

$$S \rightarrow aS / bAA / a$$

$$B \rightarrow bS / aBB / b$$

Draw parse tree for the string $w = aaabbabbba$. Show a leftmost and a rightmost derivation of w .

[2.5+2.5]

Group C

(Answer any two questions)

2 × 10 = 20

7. a. Describe Chomsky hierarchy of grammars and corresponding acceptors.

b. Construct a deterministic PDA for the following language:

$$L = \{a^n b^n | n \geq 0\}$$

[4+6]

8. a. Give Context Free Grammars that generate the following language:

$L1 = \{w \mid w \in \{0,1\}^* \text{ and } w \text{ starts and ends with the same symbol}\}$

b. Convert the following CFG into equivalent Chomsky Normal Form.

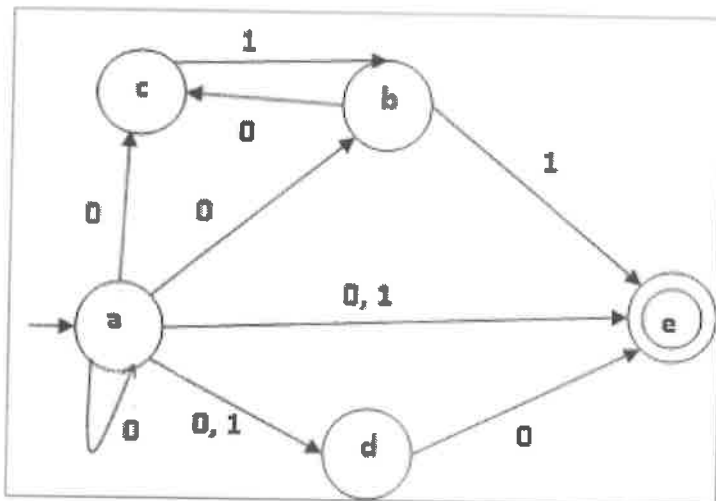
$S \rightarrow aXbX$

$X \rightarrow aY \mid bY \mid \epsilon$

$Y \rightarrow X \mid c$

[4+6]

9. a. Convert the following Non-deterministic Finite Automata to Deterministic Finite Automata.



b. Design a Turing Machine to compute the quotient when a decimal number is divided by 2.

[Use suitable encoding of numbers]

[4+6]



ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech.
Stream: CSE
PAPER TITLE: Advanced Algorithms
Maximum Marks: 40
Total No of questions: 9

Semester: I

PAPER CODE: ECS61103
Time duration: 3 hours
Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Name a data structure in which direct or random access of elements is not possible?
b) When does worst case occur in case of linear search algorithm?
c) Give an example of a sorting algorithm that follows divide and conquer approach.
d) Name two major parameters used for measuring the efficiency of an algorithm.
e) Name one example of tree data structure that uses both Back-Tracking and Branch-and-bound strategies.

Group B

(Answer any three questions)

5 × 3 = 15

2. Prove that travelling salesman problem is NP-Complete.
3. Design an efficient algorithm for Matrix multiplication.
4. Explain “Divide and Conquer Technique”.
5. Write an algorithm to sort an array using merge sort.
6. Describe the Travelling sales person problem and discuss how to solve it using dynamic programming.
(2.5+2.5)

Group C

(Answer any two questions)

2 × 10 = 20

7. (a) Define the following term with example: (i) NP- hard (ii) NP- Complete (2 + 2)
(b) Derive time complexity of quick sort algorithm. (3)

(c) Under what circumstances will it be faster to use Insertion Sort to sort an array than to use Quick Sort?
(3)

8. Describe the algorithm for Hamiltonian cycles and determine the order of magnitude of the worst - case computing time for the backtracking procedure that finds all Hamiltonian cycles. (5+5)

9. Write a brute-force string matching algorithm. Determine the number of character comparisons made by the brute-force algorithm in searching for the pattern **GANDHI** in the following text.
THERE_IS_MORE_TO_LIFE_THAN_INCREASING_ITS_SPEED (5+5)

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech

Semester: I

Stream: Construction Engineering & Management

PAPER TITLE: Construction Planning Scheduling and Control

PAPER CODE: ECE61125

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 09

Total No of Pages: 01

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) List the types of project plans.
b) What are the purposes of work scheduling?
c) Mention the objectives of accounting.
d) Define hierarchical model.
e) What is the main feature of database?

Group B

(Answer any three questions)

3 × 5 = 15

2. What do you mean by precedence relationship?
3. Explain scheduling with resource constraints and precedence.
4. Write a short note on control of project cash flow.
5. Describe the computerized organization and use of information.
6. Elaborate conceptual models of database.

Group C

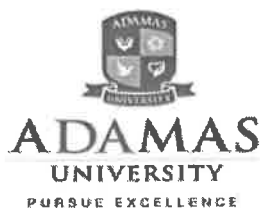
(Answer any two questions)

2 × 10 = 20

7. Explain the basic concepts in the development of construction plans.
8. The details of a network are given below. Find the critical path, project completion time and all floats.

Activity	A	B	C	D	E	F	G
Predecessor	-	-	A,B	C	C	D	D,E
Duration in days	3	5	4	6	3	2	4

9. Discuss the project budget in detail with an example.



ADAMAS UNIVERSITY

END SEMESTER EXAMINATION (DECEMBER 2019)

(Academic Session: 2019 – 20 Semester Terms: Aug 2019 – Dec 2019)

Name of the Program: M. Tech.

Semester: I

Paper Title: Process Chemistry for Water &
Waste Water Treatment

Paper Code: ECE-61109

Maximum Marks: 40

Time Duration: 3 hrs

No. of Pages = 02

No. of Questions = 10

Note:

1. Please follow all the Instructions given on the cover page of the Answer Booklet Strictly.
 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
 3. Assumptions made if any, should be stated clearly at the beginning of your answer.
 4. No Mobile Phones will be permitted in the Examination Hall.
-

Answer all the Groups

PART- A

ANSWER ALL THE QUESTIONS

5 x 1= 5

1. One word answer type question

- i) Problem of solid waste disposal can be reduced through
- ii) Which element is considered the main element triggering eutrophication in saltwater?
- iii) The chemical oxygen demand (COD) measures the
- iv) Conventional tertiary treatment is
- v) When would you expect the lowest concentration of dissolved oxygen (DO) in a facultative pond?

PART- B

ANSWER QUESTION (any Three)

5 x 3 = 15

2. Draw a cubical diagram for the characteristics of industrial waste.

3. What do you mean by activated sludge? Draw a schematic diagram of the conventional activated sludge process.
4. What is Membrane Bio-Reactor (MBR)? Write in tabular form the advantages & disadvantages of MBR.
5. Write the dilution factor with formula. What would be the diluted concentration if the standard/original concentration is 6.88 ppm?
6. State and explicit with examples the different types of chemical reactions. Classify and explain the organic matter depending on their degradability.

PART- C

ANSWER QUESTION (any Two)

10 x 2 = 20

7. Describe schematically in details of sewage treatment plant which you have visited recently.
8. Being an environmental engineer, what would be your approach for setting-up a waste water treatment system? Discuss briefly with a schematic diagram.
9. Write in a tabular form the differences between gravimetric and volumetric analysis.
A 10.0 ml solution containing Cl^- was treated with excess AgNO_3 to precipitate 0.4368 gm of AgCl . What was the concentration of Cl^- in the unknown? [$\text{AgCl} = 143.321 \text{ gm/mol}$].
10. Draw a schematic diagram of treatment methodologies for waste water treatment. Why Zero Liquid Discharge (ZLD) is so important now a days for the industries? What is the main aim of ZLD? Name the major ZLD technologies.

-----X-----X-----

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: Program: M.Tech

Semester: I

Stream: Construction Engineering Management

PAPER TITLE: Management Principles and Risk Analysis

PAPER CODE: ECE61123

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 09

Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1.

- An HR manager has to decide whether a worker is eligible for overtime payment at the end of a month. Explain with reasons as to whether this is a structured or an unstructured decision.
- What is meant by outcome orientation in the context of organizational culture?
- Give an example of a cross-functional business process.
- Between a supervisor of a production line and an operations manager, who is likely to spend more time on planning? Explain why.
- With reference to Question 1 d, who is likely to spend more time on controlling? Explain why.

Group B

(Answer any three questions)

3 × 5 = 15

5 × 1 = 5

2. PLAYCO produces two types of toys – Tom and Jerry. The marketing department of TOYCO expects the total monthly demand for the two toys to be at most 2000 and the individual demands for Tom and Jerry to be at least 1000 and 800 respectively. The production department however can make at most 2000 Toms and 1700 Jerrys per month. Each Tom sells for a profit of Rs. 120 and Jerry for Rs. 150. The company wants to maximize its profit out of the production and sale of the toys Tom and Jerry.

Formulate the above as a suitable LP (Linear Programming) problem clearly mentioning the objective function and constraints.

- Write down the dual of the LP in Question 2 clearly mentioning the objective function, constraints and the nature of variables (whether positive, negative or unrestricted).
- Solve the LP in Q2 graphically. How many units of Tom and Jerry should PLAYCO produce to maximise profits?
- A manufacturer is evaluating options regarding his production equipment. He is trying to decide whether he should refurbish his old equipment for Rs. 70,000, make major modifications to the production line for Rs.135,000, or purchase new equipment for Rs. 230,000. The product sells for Rs.

10, but the variable costs to make the product are expected to vary widely, depending on the decision that is to be made regarding the equipment. If the manufacturer refurbishes, the variable costs will be Rs. 7.20 per unit. If he modifies or purchases new equipment, the variable costs are expected to be Rs. 5.25 and Rs. 4.75, respectively. Which alternative should the manufacturer choose if the demand is expected to be 35000 units?

6. PROJCO is considering options for project investments. Project A would require an initial outlay of Rs. 100,000 and provide returns of Rs. 40,000 for each of the next three years. Project B would also require an initial outlay of Rs. 100,000 but provide a return of Rs 55,000 each for the next two years. PROJCO can invest in either or both of these projects or can keep its money in a bank deposit yielding 6% per year. What should PROJCO do?

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. Shaq Bryant sells newspapers on Sunday mornings in an area surrounded by three busy churches. Assume that Shaq's demand can either be for 100, 300, or 500 newspapers, depending on traffic and weather. Shaq has the option to order 100, 300, or 500 newspapers from his supplier. Shaq pays \$1.25 for each newspaper he orders and sells each for \$2.50

- (a) How many papers should Shaq order if he chooses the equally likely criterion?
(b) How many papers should Shaq order if he chooses the criterion of realism with $\alpha = 0.45$?

8. TOYCO assembles three types of toys-trains, trucks, and cars-using three operations. The daily limits on the available times for the three operations are 430,460, and 420 minutes, respectively, and the revenues per unit of toy train, truck, and car are \$3, \$2, and \$5, respectively. The assembly times per train at the three operations are 1, 3, and 1 minutes, respectively. The corresponding times per truck and per car are (2,0,4) and (1,2,0) minutes (a zero time indicates that the operation is not used).

TOYCO wants to maximize its revenue from toy production.

Letting X_1 , X_2 and X_3 represent the daily number of units assembled of trains, trucks and cars, respectively, the associated LP model is given as:

$$\text{Maximize } Z = 3X_1 + 2X_2 + 5X_3$$

Subject to:

$$X_1 + 2X_2 + X_3 \leq 430 \quad (\text{operation 1})$$

$$3X_1 + 2X_3 \leq 460 \quad (\text{operation 2})$$

$$X_1 + 4X_2 \leq 420 \quad (\text{operation 3})$$

$$X_1, X_2, X_3 \geq 0$$

A portion of the optimal simplex table for the above problem is provided below:

Basis	X1	X2	X3	S1	S2	S3	RHS
X ₂	-1/4	1	1	1/2	-1/4	0	100
X ₃	3/2	0	0	0	1/2	0	230
X ₆	2	0	0	2	1	1	20
Cj-Zj	-4	0	0	1	-2	0	?

- a. What are the feasibility ranges for Operations 1, 2 and 3? (6)
- b. Suppose TOYCO adds a new product bike and estimates the revenue per unit of bike to be \$5 and the assembly times to be (3,2,4). How will this impact the solution? (4)

9. a. Suppose in Question 8; a process improvement eliminates the need for Operation 2 for the toy train. How would this change the optimal solution assuming no other operational changes?

b. Suppose in Q8, the revenues per unit of toy train, truck, and car change to \$2, \$3, and \$4, respectively. Will the change benefit TOYCO?



ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION (DEC 2019)
(Academic Session: 2019 – 20, Semester Term: Aug. 2019 – Dec 2019)

Name of the Program: M.Tech.

Semester: I

Stream: Environmental Engineering

PAPER TITLE: Physico chemical Processes in Environmental engineering; PAPER CODE: ECE 61101

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 9

Total No of Pages: 1

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. (i) What is the name of the liquid waste which comes out from kitchen and bathroom?
(ii) Differentiate between DO, COD and BOD.
(iii) Blue baby syndrome is due to excess of which chemical in water?
(iv) What is the method adopted for removing bushes, debris and wood from water?
(v) Sub surface water is free from which impurity?

Group B

(Answer any three questions)

3 × 5 = 15

2. Differentiate between Attached growth system and suspended growth system?
3. Explain the working principle Activated sludge process in sewage treatment plant.
4. Explain the significance of E.coli in water quality criteria.
5. Differentiate between Primary, secondary and tertiary treatment of wastewater.
6. Explain the Concept of Biological treatment of wastewater.

Group C

(Answer any two questions)

2 × 10 = 20

7. Draw a layout of STP stating objectives of each unit process and operation for a medium strength sewage for a city .
8. Describe briefly the procedure followed in conducting test for biological analysis of water.
9. Discuss the Various impurities of physical, chemical and ~~microbiological~~ origin in raw water supplies and state their maximum permissible limiting values for obtaining potable municipal supplies.

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech. Semester: I

Stream: MEPAPER TITLE: Thermofluids PAPER CODE: EME61101

Maximum Marks: 40

Total No of questions: 09

Time duration: 3 hours

Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

$$5 \times 1 = 5$$

1. a) What is a Diaphragm?
b) Why should a steam or moisture separator be installed in the steam line next to a steam turbine?
c) What is meant by governing a steam turbine?
d) What can be the possible reasons for a turbine not developing the designed full power?
e) What are the basic causes of the problem of rotor failure?

Group B

(Answer any three questions)

$$3 \times 5 = 15$$

2. Show that the maximum efficiency of a steam turbine is a function of nozzle angle (α). (5)
3. Classify fire tube boilers. Write down specifications of locomotive boilers. (2.5 + 2.5)
4. What do you understand by 'boiler draught'? What is the function of boiler chimney. (3+2)
5. Write down merits and demerits of a steam turbine plant. Classify steam turbines. (3+2)
6. How corrosion and deposit problem of steam turbine blades can be diagnosed? Write down possible solutions. (3+2)

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. The steam used by the turbine is 5.4 kg/kWh at a pressure of 50 bar and a temperature of 350°C. The efficiency of a boiler is 82% with feed water at 150°C. How many kg of 28100 kJ coal are required per kWh? Also calculate the fuel cost per kWh if the cost of coal /tonne is 500 INR. [h_f at 150°C = 627 kJ/kg, $h_{sup} = 3068.4$ kJ/kg](10)
8. a) Find out the expression of the ratio of pressures in case of a convergent – divergent nozzle. (8)
b) Prove that the critical pressure ratio for superheated steam ($n=1.3$) is 0.546. (2)
9. a) Find out the maximum efficiency of a steam power plant. (8)
b) What is degree of reaction? (2)



ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech

Semester: I

Stream: Construction Engineering & Management

PAPER TITLE: Construction Project Management

PAPER CODE: ECE61133

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 09

Total No of Pages: 01

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) What are the critical issues involved in organization for project management?
- b) List the key factors for successful project as per owner and contractor's point of view.
- c) Define the term integrated system.
- d) What is labour productivity?
- e) Define cost indices.

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. Describe in detail about strategic planning.
3. Summarize the organizational features of the mega project.
4. Enumerate the actions taken in the conceptual design process.
5. Discuss in detail about the process of pre project planning.
6. Write a short note on empirical cost interference.

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. List out the points considered for innovation and technological feasibility.
8. Elaborate the factors affecting job-site productivity.
9. Briefly explain cost indices and its application.



ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M. Tech. (Environmental Engg.)

Semester: I

Stream: CE

PAPER TITLE: Advanced Soil and Foundation Engineering

PAPER CODE: ECE61105

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 9

Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Evaluate the Degree of saturation, S_r of a natural soil deposit having water content 15%, specific gravity 2.50 and void ratio 0.4.
- b) Write down the equation for Quick sand condition.
- c) If a wall retain 5 m. high sandy backfill of $\phi = 30^\circ$, $\gamma = 10 \text{ kN/m}^3$. Then, what will be the resultant Passive thrust?
- d) What are the major categories of soil across the India?
- e) Write down the basic difference between actual velocity and Seepage velocity.

Group B

(Answer any three questions)

3 × 5 = 15

2. Explain the Coulomb wedge theory with diagram.
3. Describe the Unified soil Classification system of soil with graphs.
4. Derive the Terzaghi's bearing capacity equation for General shear failure with neat diagram.
5. Derive the equation for Steady radial flow for Dupuit's theory.
6. Write short notes on the following (write any *two*):
 - (a) Earth pressure co-efficient **2 × 2.5 = 5**
 - (b) Flow net
 - (c) Pump out test

Group C

(Answer any two questions)

2 × 10 = 20

7. Calculate the Active earth pressure beyond the vertical back face of a RCC Gravity wall of 5 m height and the top width of 0.8 m. The backfill is cohesionless and the submerged unit weight is 23 kN/m^3 and $\phi = 32^\circ$. Also find out the base width of the wall in such a manner that the eccentricity will be within the limit and no Bearing capacity failure will occur. Consider the water table is always at the G.L. and the permissible bearing capacity of the foundation soil is 10 Tonnes/m^2 .
8. Describe the Discharge equations for Fully and Partially penetrating Artesian gravity well with neat diagrams.
9. In order to determine the field permeability of a free aquifer, pumping out test was performed and following observations were made:
Diameter of well = 20 cm, Discharge from well = $240 \text{ m}^3/\text{hour}$, RL. Of original water surface, before pumping started = 240.5 m, RL. of water in well at constant pumping = 235.6 m, RL. of impervious layer = 210 m., RL. of water in observation well = 239.8 m., Radial distance of observation well from tube well = 50 m. Calculate ' k '.

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech

Semester: I

Stream: EE

PAPER TITLE: Extra HVAC Transmission

PAPER CODE: EEE61117

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 9

Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Which circuit element attenuates the steepness of traveling wave?
b) Which voltage range is considered as extra high voltage?
c) A 10 MVA generator has power factor 0.866 lagging. What is the amount of reactive power produced?
d) If the height of transmission towers is increased, which of the parameters is likely to change?
e) How to reduce corona loss of transmission lines?

Group B

(Answer any three questions)

3 × 5 = 15

2. What is the necessity of EHVAC transmission?
3. Write a short note on sphere gaps.
4. Describe the behavior of space- charge effects inside a corona envelope and discuss why load current cannot flow in a conductor inside the envelope even though it is conducting zone?
5. What are the purposes of reflection and refraction coefficients of travelling waves and its significance explain in detail.
6. What is power circle diagram and what is its use?

Group C

(Answer any two questions)

2 × 10 = 20

7. i) What are the merits and demerits of EHVAC transmission?
ii) A single-circuit 3-phase 50 Hz 400 kV line has a series reactance per phase of 0.327 ohm/km. Neglect line resistance. The line is 400 km long and the receiving-end load is 600 MW at 0.9 p.f. lag. The positive-

8. i) A single smooth conductor 1 cm in radius is strung 5 meters above ground; using Peek's formula for corona-inception gradient, find

(b) The equivalent radius of conductor to the outside of the corona envelope at 20% overvoltage. Take $\delta=1$.

ii) Define the terms (a) earthing coefficient, (b) earth fault factor, (c) residual voltage, (d) arrester rating, and (e) insulation co-ordination.



ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech.

Stream: ME

Semester: I

PAPER TITLE: Computer Integrated Manufacturing

Maximum Marks: 40

Total No of questions: 09

PAPER CODE: EME61105

Time duration: 3 hours

Total No of Pages: 02

Group – A

(Answer all questions)

1.

[5×1]

- i. State the different benefits of CAD
- ii. Name the basic components of NC system
- iii. State two advantages of CAPP
- iv. Define Automation
- v. Specify the statement L3 = LINE/P1, RIGHT, TANTO, C1

Group – B

(Answer any three questions)

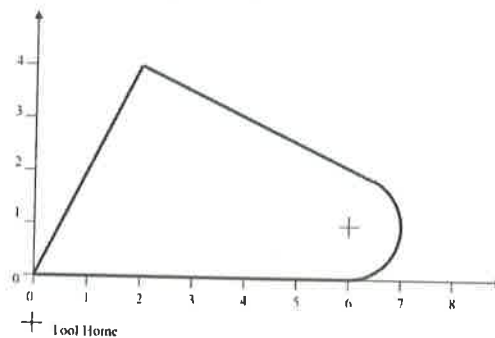
[3×5]

2. What are the benefits of flexible manufacturing system?
3. With a neat sketch explain the Retrieval CAPP system.
4. List the different preparatory and miscellaneous functions used in CNC machines with their functions.
5. State how a flexible manufacturing cell is different from a flexible manufacturing system. Show levels of flexibility through an Investment, Production rate Annual Volume vs. Number of machines plot.
6. Define Group Technology. How parts classification and coding is done in GT?

Group – C
(Answer any two questions)

[2×10]

7. Differentiate between mass production and batch production. Suppose a company has designed a new product line and is planning to build a new plant to manufacture this product line. The new line consists of 100 different product types, and for each product type the company wants to produce 10,000 units annually. The products average 1000 components each, and the average number of processing steps required for each component is 10. All parts will be made in factory. Each processing step takes an average of 1 min. Determine a) How many products? b) How many parts? c) How many production operations will be required each year, and d) How many workers will be required for the plant, if it operates one eight-hour shift for 250 day/year. [3+7]
8. An APT program for the profiling of the part in figure given is to be generated. The processing parameters are: (a) feed rate is 5.39 inches per minute; (b) spindle speed is 573 revolutions per minute; (c) a coolant is to be used to flush the chips; (d) the cutter diameter is to be 0.5 inches, and (e) the tool home position is (0, -1, 0).



[10]

9. A flexible machining system consists of a load/unload station and two machining workstations. Station 1 is load/unload station. Station 2 performs milling operations and consists of two servers (two identical CNC milling machines). Station 3 has one server that performs drilling (one CNC drill press). The stations are connected by a part handling system that has four work carriers. The mean transport time is 3.0 min. The FMS produces two parts, A and B. The part mix fractions and process routings for the two parts are presented in the table below. The operation frequency $f_{ijk}=1.0$ for all operations. Determine (a) maximum production rate of the FMS (b) Corresponding production rates of each product (c) utilization of each station, and (d) number of busy servers at each station

Part	Part Mix	Operation	Description	Station	Process Time
A	0.4	1	Load	1	4
		2	Mill	2	30
		3	Drill	3	10
		4	Unload	1	2
B	0.6	1	Load	1	4
		2	Mill	2	40
		3	Drill	3	15
		4	Unload	1	2

[10]

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech. (Construction Engg. & Management) Semester: I

Stream: CE

PAPER TITLE: Modern Construction Materials

Maximum Marks: 40

Total No of questions: 09

PAPER CODE: ECE61127

Time duration: 3 hours

Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

1. a) What is Prestressed Concrete?
- b) What is Precast Concrete?
- c) What is Light-Weight Concrete?
- d) What is High-Density Concrete?
- e) What is Air-Entrained Concrete?

$5 \times 1 = 5$

Group B

(Answer any three questions)

2. What properties of smart materials are useful in their construction applications?
3. How might smart materials assist in repair of Structure?
4. Write short notes on Medium carbon steel.
5. Write short notes on Stainless steel.
6. Write short notes on Ductile iron.

$3 \times 5 = 15$

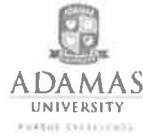
Group C

(Answer any two questions)

7. What is Fibre reinforced concrete? What is the need of Fibre reinforced concrete? Describe the types available. How toughness & ductility is improved for Fibre reinforced concrete?

$2 \times 10 = 20$

$(2+2+2+4)$



ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech. (Construction Engg. & Management)

Semester: I

Stream: CE

PAPER TITLE: Modern Construction Materials

PAPER CODE: ECE61127

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 09

Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) What is Prestressed Concrete?
- b) What is Precast Concrete?
- c) What is Light-Weight Concrete?
- d) What is High-Density Concrete?
- e) What is Air-Entrained Concrete?

Group B

(Answer any three questions)

3 × 5 = 15

2. What properties of smart materials are useful in their construction applications?
3. How might smart materials assist in repair of Structure?
4. Write short notes on Medium carbon steel.
5. Write short notes on Stainless steel.
6. Write short notes on Ductile iron.

Group C

(Answer any two questions)

2 × 10 = 20

7. What is Fibre reinforced concrete? What is the need of Fibre reinforced concrete? Describe the types available. How toughness & ductility is improved for Fibre reinforced concrete?

(2+2+2+4)

8. Write short notes on the followings-

a) U-box Test

b) L-box Test

(5+5)

9. How might smart materials assist humans during natural disasters? Where should smart materials & which type to be employed in buildings to be most useful?

(5+5)

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M. Tech

Semester: I

Stream: Electrical Engineering

PAPER TITLE: Renewable Energy Resources

PAPER CODE: EEE 61105

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 09

Total No of Pages: 02

Note:

1. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
2. Assumptions made if any, should be stated clearly at the beginning of your answer.
3. No Mobile Phones will be permitted in the Examination Hall.

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) What is the typical open circuit voltage of solar cell?
b) What is the energy payback period of wind generation?
c) What is the range of wind speed suitable for wind power generation?
d) Which turbine is used in a tidal range plant?
e) What is a fuel cell?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. Derive the expression for power extraction. What is Betz Criterion?
3. A propeller type wind turbine has the following data:

Speed of free wind at a height of 10 m = 12 m/s

Air density = 1.226 kg/m^3

$\alpha = 0.14$

Height of tower = 100 m

Diameter of rotor = 80 m

Wind velocity at the turbine reduces by 20%

Generator efficiency = 85%

Find

- i) The total power available in the wind.
- ii) Power extracted by the turbine.
- iii) Electrical power generated.
- iv) Axial thrust on the turbine.
- v) Maximum axial thrust on the turbine.

[5]

4. Derive the expression for total useful energy of dry rock.

[5]

5. A deep ocean wave of 2m peak to peak appears for a period of 8 s. Find the wavelength, phase velocity and power associated with the wave. At this power rate, what is the average annual wave energy in MWh/m? [5]
6. Compare the relative performance of a floating drum and fixed dome type biogas plants. [5]

Group C

(Answer any two questions)

2 × 10 = 20

7. a) With the help of block diagrams explain the operations of standalone and grid interactive Solar Photovoltaic System.
- b) What are the various factors contributing to losses and hence reduction of efficiency of a solar cell. [7+3]
8. a) A PV system feeds a dc motor to produce 1 hp power at the shaft. The motor efficiency is 85%. Each module has 36 multi crystalline silicon solar cells arranged in a 9 x 4 matrix. The cell size is 125mm x 125mm and the cell efficiency is 12%. Calculate the number of modules required in the array. Assume global radiation incident normally to the panel as 1 kW/ m².
- b) Explain how the variation of insolation and temperature affects the I-V characteristics of a solar cell [5+5]
9. a) Explain heaving float type wave energy technology.
- b) What are the merits of oscillating water-column type wave energy technology?
- c) What are the limitations of tidal energy? [6+2+2]

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: M.Tech.

Stream: ME

PAPER TITLE: Advanced Fluid Mechanics (Elective -II)

Maximum Marks: 40

Total No of questions: 9

Semester: I

PAPER CODE: EME61109

Time duration: 3 hours

Total No of Pages:

Answer all the Groups

Group A

(Answer all the questions)

$$5 \times 1 = 5$$

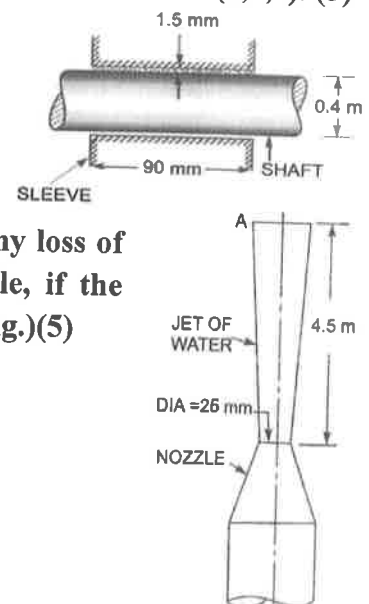
1. a) For a two-dimension flow field the equation of a stream line is given by.....
- b) What is the dimension of Kinematic Viscosity? (In terms of MLT)
- c) What is the relation between the C_d , C_c and C_v ?
- d) The continuity equation of 3-D is..... valid for steady and incompressible fluid.
- e) What is stream function and velocity potential function?

Group B

(Answer any three questions)

$$5 \times 3 = 15$$

2. The velocity field in a fluid flow is given by,
 $V = x^2 y i - y^2 z j + (2xyz + yz^2) k$. Determine the magnitudes of velocity and acceleration at (1,1,2). (5)
3. The dynamic viscosity of an oil used for lubrication between a shaft and sleeve is 6poise. The shaft is of $\phi = 0.4m$ and rotate at 190r.p.m calculate power lost in the bearing for a sleeve length of 90mm. the thickness of the oil film is 1.5mm. (As shown in Fig.)(5)
4. A jet of water from a 25mm diameter nozzle is directed vertically upwards. Assuming that the jet remains circulated and neglecting any loss of energy, what will be the diameter at a point 4.5m above the nozzle, if the velocity with which the jet leaves the nozzle is 12m/s. (As shown in Fig.)(5)
5. The velocity potential function is given
 by
$$\phi = -\frac{xy^3}{3} - x^2 + \frac{x^3 y}{3} + y^2$$
 - i) Find the velocity components in x and y direction. (3)
 - ii) Show that ϕ represents a possible case of flow. (2)
6. Describe Stream line, Strike Line and Path Line of fluid flow and also derive the equation of stream line flow for 3-D Cartesian coordinate system. (5)



Group C

(Answer any two questions)

$2 \times 10 = 20$

7. Derive the Navier-Stokes equation for compressible flow. (10)
8. i) Derive the expression of continuity equation for 2-D cylindrical Polar coordinate system. (5)
ii) Describe the Lagrangian and Eulerian approach in fluid motion. (5)
9. i) Two large parallel circular plates the gap between the plates is $h(t)$. The bottom plate is fixed to the base but the top plate is going down with uniform velocity V_0 . Now this is typically squishing type of flow, so the top plate is going down then the fluid is going radially outward. So, the velocity profile in radial direction is uniform in transvers direction. Find out the acceleration at the given r assuming the density of the fluid is constant
(As shown in Fig.)
- ii) Describe the types of fluid particle motion with proper diagram. 6)

