

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****IV B.Tech I Semester Supplementary Examinations, May-2022****TRANSPORTATION ENGINEERING-II****(Civil Engineering)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) List out different types of ballast used in a railway track and specify the ballast size used in different conditions 7M
- b) Find out number of sleepers required for 6.0 km long broad-gauge railway track having a sleeper density of $(n + 7)$. 5M

(OR)

2. a) Draw a typical cross section of permanent way. Discuss in brief basic functions of various components of a railway track? 8M
- b) Discuss merits and limitations of railway Transportation? 4M

UNIT-II

3. a) Discuss different types of rail joints with help of neat sketches and give their merits and limitations? 8M
- b) What do understand by 'cant deficiency' Explain in Detail? 4M

(OR)

4. With usual notations, derive an expression for super elevation(e) for B.G, M.G and N.G track and specify the limitations of super elevation for the respective gauges. 12M

UNIT-III

5. a) What is a turnout? Explain briefly the different components associated with the turnout with a neat figure 8M
- b) Explain i) V crossing, ii) Diamond crossing, iii) Square crossing 4M

(OR)

6. a) Write down the objects of signaling and Classification of signals based on different characteristics? 4M
- b) Explain the working principle of the turnout? Draw a neat diagram of simple Right hand turnout and show its various component parts? 8M

UNIT-IV

7. a) List out the merits & demerits of Air transportation? 4M
- b) Determine the Turning radius of a taxiway for subsonic aircraft for a design turning radius speed of 45 km/h . Assume the Coefficient of Friction Between the Tyre and the Pavement is 0.13 Wheel Base 17.70 m, Tread of Main Loading Gear 6.62 m 8M

(OR)

8. a) Explain shortly about Visual Flight Rules & Instrumental Flight Rules. 5M
- b) An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperature for the hottest month at the site are 40° C and 28° C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m. 7M

UNIT-V

9. a) Differentiate Dry and Wet Dock in detail 5M
- b) Government is planning a Good Port at one Sea Shore. What are the requirements of good Port explain it to Port In-charge? 7M

(OR)

10. a) Explain about the different types of break waters with the sketches? 6M
- b) Explain the Consideration in the Design of Break Waters? 6M

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the following characteristics of a thermal generating unit 6 M
- i) Input-output curve
 - ii) Heat-rate curve
 - iii) Incremental fuel cost curve
- b) Determine the operating schedule of two-generator case of 100MW each whose incremental characteristics are given by 6 M

$$\frac{dc_1}{dp_{g1}} = 0.012P_{G1} + 2Rs / MWh$$

$$\frac{dc_2}{dp_{g2}} = 0.015P_{G2} + 1.5Rs / MWh$$

The minimum load on each unit is 10MW .The total load to be supplied is 150MW

(OR)

2. a) Derive coordination equation of economic dispatch without considering transmission loss. 6 M
- b) In a two bus system 100MW power is transmitted from plant1 to plant 2 and the load is Concentrated at plant 2, a transmission loss of 10MW incurred. Find the required generation for each plant the power received by load when the system λ is RS 25 / MWh the incremental fuel costs of the two plants are given below: 6 M

$$\frac{dc_1}{dp_{g1}} = 0.02P_{G1} + 16.0Rs / MWh$$

$$\frac{dc_2}{dp_{g2}} = 0.04P_{G2} + 20.0Rs / MWh$$

UNIT-II

3. a) Explain the need of hydro –thermal coordination. 4 M
b) Explain problem formation of short term Hydro Thermal scheduling 8 M

(OR)

4. a) Explain the constraints in unit commitment. 6 M
b) Explain the dynamic programming method of solving unit commitment. 6 M

UNIT-III

5. a) Explain the operation of turbine speed governing system with a neat sketch 6 M
b) A 100 MVA synchronous generator operates on full load at a frequency of 50Hz .The load is suddenly reduced to 50MW .Due to time lag in the governor system ,the steam valve begins to close after 0.4sec .Determine the change in frequency that occurs in this time. Given $H=5\text{KW- sec/kVA}$ of generator capacity 6 M

(OR)

6. Derive steady state response of a load frequency control of an isolated power system 12 M

UNIT-IV

7. Explain two area control load frequency system with block diagram and derive the expression for $ACE_1(s)$ and $ACE_2(s)$ 12 M

(OR)

8. a) Derive an expression for dynamic response of two area for change in frequency. 6 M
b) Derive the expression for tie-line power transfer of a two area power system. 6 M

UNIT-V

9. a) Explain the reason for variation of voltage in a power systems and suggest methods to improve voltage profile 6 M
b) Classify different methods of reactive power control in transmission line and explain any one method 6 M

(OR)

10. a) Explain the uncompensated and compensated transmission lines. 6 M
b) Explain the need of FACTS devices in power system and mention different types of it. 6 M

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, May-2022
PROJECT MANAGEMENT AND OPERATIONS RESEARCH
(Mechanical Engineering)

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) List out the essential considerations of project management philosophy with a short note. 6M
- b) Describe the role of project planning and scheduling. 6M

(OR)

2. a) Describe the various styles of leadership. 6M
- b) How on-going costs should be monitored to try to keep the project within budget? 6M

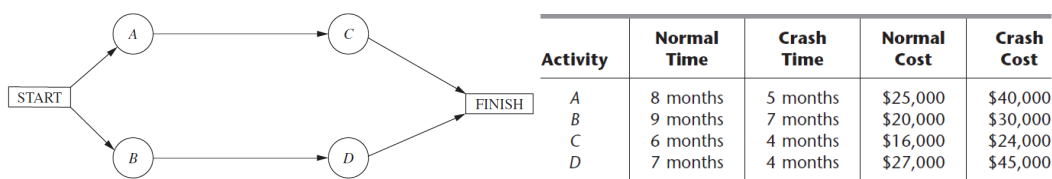
UNIT-II

3. Construct the project network for a project which consists of following six activities. 12M
Further, find the earliest times, latest times, and slack for each activity. Also determine which of the path is a critical path

Activity	Immediate Predecessors	Estimated Duration
A	—	5 months
B	—	1 month
C	B	2 months
D	A, C	4 months
E	A	6 months
F	D, E	3 months

(OR)

4. A Company is ready to begin a project that must be completed in 12 months. However, the project manager concluded that he cannot meet the deadline by performing all these activities in the normal way. Therefore, he has decided to use the CPM method of time-cost trade-offs to determine the most economical way of crashing the project to meet the deadline. Use marginal cost analysis to solve the problem. 12M
Assume this project has four activities (A, B, C, D) with the project network shown below:

**UNIT-III**

5. A textile industry is producing five products with operations viz, cutting, sewing and pressing. Processing time for the operations is given in the following table: 12M
Determine an order in which these items should be processed so as to minimize the total processing time.

Product	Cutting	Sewing	Pressing
1	3	3	5
2	8	4	8
3	7	2	10
4	5	1	7
5	2	5	6

(OR)

6. Solve the following problem with Simplex method 12M
Minimize $Z = 2x_1 + 3x_2 + 2x_3$,
Subject to
 $x_1 + 4x_2 + 2x_3 = 8$
 $3x_1 + 2x_2 + 2x_3 = 6$
and
 $x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$.

UNIT-IV

7. Find the optimum solution given transportation problem 12M

Factory	warehouse				capacities
	W ₁	W ₂	W ₃	W ₄	
F ₁	19	30	50	10	7
F ₂	70	30	40	60	9
F ₃	40	8	70	20	18
Demand	5	8	7	14	

(OR)

8. Consider the assignment problem having the following cost table and find the optimal solution. 12M

		Job		
		1	2	3
Person	A	5	7	4
	B	3	6	5
	C	2	3	4

UNIT-V

9. Consider the general $m \times n$, two-person, zero-sum game. Let p_{ij} denote the payoff to player 1 if he plays his strategy i ($i = 1, \dots, m$) and player 2 plays her strategy j ($j = 1, \dots, n$). Strategy 1 (say) for player 1 is said to be weakly dominated by strategy 2 (say) if $p_{1j} \leq p_{2j}$ for $j = 1, \dots, n$ and $p_{1j} = p_{2j}$ for one or more values of j . Assume that the payoff table does not possess any saddle points, so that the optimal strategies under the minimax criterion are mixed strategies. Prove that eliminating weakly dominated pure strategies from the payoff table cannot eliminate all optimal mixed strategies and cannot produce any new ones. 12M

(OR)

10. A firm is considering the replacement of a machine, whose cost price is Rs. 12,200, and its scrap value is Rs 200. From experience the running (maintenance and operating) cost are found to be as following 12M

Year	1	2	3	4	5	6	7	8
Running cost (Rs)	200	500	800	1200	1800	2500	3200	4000

When should the machine be replaced

AR18

CODE: 18ECT418

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech I Semester Supplementary Examinations, May-2022

VLSI DESIGN

(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the nMOS enhancement mode process for different conditions of V_{ds} . [6M]
b) Compare CMOS and bipolar technologies. [6M]

(OR)

2. a) Explain the Twin tub CMOS fabrication process with neat sketches. [6M]
b) Explain the MOS transistor operation in Depletion mode with the help of neat sketch. [6M]

UNIT-II

3. a) Derive the relationship between drain to source current I_{ds} versus drain to source voltage V_{ds} in a non-saturated and a saturated region. [6M]
b) The drain of an n – channel MOSFET is shorted to the gate so that $V_{GS}=V_{DS}$. The threshold voltage (V_T) of MOSFET is 1 V. If the drain current (I_D) is 1 mA for $V_{GS} = 2$ V, then for $V_{GS}=3$ V, calculate I_D . [6M]

(OR)

4. a) Determine the pull up to pull down ratio for an inverter driving by another inverter. [6M]
b) Draw the BiCMOS inverter circuit and explain its working. [6M]

UNIT-III

5. a) Explain CMOS lambda based design rules. [6M]
b) Draw the circuit diagram and layout diagram for CMOS two input NAND gate and explain its working. [6M]

(OR)

6. a) What is a stick diagram? Draw the stick diagram and layout for a CMOS inverter. [6M]
b) Design a stick diagram for nMOS logic $Y = (A.B.C)'$. [6M]

UNIT-IV

7. a) Explain the Area capacitance of layers in Gate level design and also give the standard unit of capacitance. [6M]
b) What are the different scaling factors? How these change the device parameters? [6M]

(OR)

8. a) What are the limitations on scaling? [6M]
b) What is meant by sheet resistance (R_s)? Explain the concept of R_s applied to MOS transistors. [6M]

UNIT-V

9. a) Explain about Design-capture tools. [6M]
b) Briefly explain the Chip level test techniques used in CMOS testing with examples. [6M]

(OR)

10. a) Explain about design verification tools. [6M]
b) Explain different test principles used in CMOS testing with examples. [6M]

AR18

CODE: 18CSE434

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

IV B.Tech I Semester Supplementary Examinations, May-2022

**IMAGE PROCESSING
(Common to CSE & IT)**

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | |
|-------------|---|----|
| 1. a) | Explain the fundamental steps of Digital Image Processing | 6M |
| b) | Discuss different color models. | 6M |
| (OR) | | |
| 2. a) | Discuss briefly about color fundamentals | 6M |
| b) | Discuss the basic relationship between pixels. | 6M |

UNIT-II

- | | | |
|-------------|--|----|
| 3. a) | Discuss any two Gray level Transformations | 6M |
| b) | Discuss Image Arithmetic/ Logical operations. | 6M |
| (OR) | | |
| 4. a) | Discuss in detail Log transformation and Power Law transformation. | 6M |
| b) | Explain Sharpening Spatial filters. | 6M |

UNIT-III

- | | | |
|-------------|---|-----|
| 5. | Discuss in detail about Image compression model and all its stages. | 12M |
| (OR) | | |
| 6. a) | Discuss briefly about compression. | 6M |
| b) | What is Redundancy? Explain different types of Redundancy? | 6M |

UNIT-IV

- | | | |
|-------------|---|----|
| 7. a) | Discuss about the basic concepts of Set theory used for Image Morphology operation. | 6M |
| b) | Explain about | 6M |
| | i) Thinning ii) Skeletons | |
| (OR) | | |
| 8. a) | Explain about | 6M |
| | i) Boundary Extraction ii) Region Filling | |
| b) | Write short notes on Convex Hull with suitable example. | 6M |

UNIT-V

- | | | |
|-------------|---|-----|
| 9. | Discuss | 12M |
| | i) Point Detection ii) Line Detection iii) Edge Detection | |
| (OR) | | |
| 10. a) | Explain Briefly about Region growing. | 6M |
| b) | Discuss Region Splitting & Merging | 6M |

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the significance of artificial variables in the LPP. 4M
 b) Solve the given LPP by graphical method? 10M
 $\text{Max } Z = 3x_1 + 5x_2$
 Subjected to $x_1 + 2x_2 \leq 2000$, $x_1 + x_2 \leq 1500$, $x_2 \leq 600$, and $x_1, x_2 \geq 0$

(OR)

2. Solve the following LP problem by Two – Phase method? 14M
 Maximize $Z = 5x_1 - 4x_2 + 3x_3$
 Subjected to constraints
 $2x_1 + x_2 - 6x_3 = 20$, $6x_1 + 5x_2 + 10x_3 \leq 76$, $8x_1 - 3x_2 + 6x_3 \leq 50$ and $x_1, x_2, x_3 \geq 0$

UNIT-II

3. a) What is the procedure to solve unbalanced transportation problem with an example. 4M
 b) Consider the problem of assignment five jobs to five persons. The assignment costs are given below. Determine the optimal assignment schedule. 10M

	1	2	3	4	5
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

(OR)

4. a) State the assignment problem. Describe a method of drawing the minimum number of lines in the context of assignment problem. 4M
 b) Find the initial basic feasible solution of the following transportation problem using Vogel's approximation method. 10M

Ware house/Factory	W1	W2	W3	W4	Factory Capacity
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
W/H requirement	5	8	7	14	

UNIT-III

5. a) Write the kendell's notation. 4M
 b) Use graphical method to minimize the time needed to process the following jobs on the machines shown below i.e., for each machine find the job which should be done first. Also, Calculate the total time needed to complete both the jobs. 10M

Job 1	Sequence of machines	A	B	C	D	E
	Time	2	3	4	6	2
Job 2	Sequence of machines	C	A	D	E	B
	Time	4	5	3	2	6

(OR)

6. a) Mention different types of sequencing problem you come across? 4M
 b) An airlines organisation has one reservation clerk on duty in its local branch at any given time. The clerk handles information regarding passenger reservation and flight timings. Assume that the number of customers arriving during any given period is poisson distributed with an arrival rate of eight per hour and that the reservation clerk can serve a customer in six minutes on an average, with an exponentially distributed service time. 10M
- What is the probability that the system is busy?
 - What is the average time a customer spends in the system?
 - What is the average length of the queue and system?

UNIT-IV

7. a) What are the situations which make the replacement of items necessary? 4M
 b) Solve the game whose payoff matrix to the player A is given in table: 10M

		B		
		I	II	III
A	I	1	7	2
	II	6	2	7
	III	5	2	6

(OR)

8. a) A manufacturer is offered A machine. A is priced at Rs 5000 and running costs are estimated at Rs 800 for each of the first five years, increasing by Rs 200 per year in the sixth and subsequent years. If money worth is 10% per year, at which year machine should be replaced? 10M
 b) Define i) Saddle point ii) Two person zero sum game. 4M

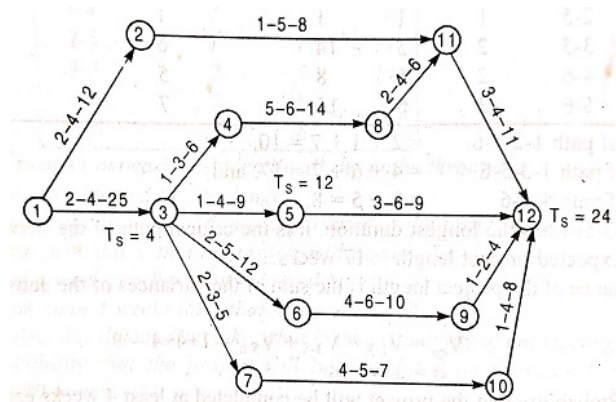
UNIT-V

9. A project consists of a series of tasks labelled A,B...,H,I with the following relationships A<D,E; B,D <F; C<G; B<H; F,G<I
 Find the optimum time of completion of the project, when the time (in days) of completion of each task is as follows:

Task	A	B	C	D	E	F	G	H	I
Time	23	8	20	16	24	18	19	4	10

(OR)

10. A PERT network is as shown in Fig. The activity times in days are given along the arrows. The scheduled times for some important events are given along the nodes. Determine the critical path and probabilities of meeting the scheduled dates for the specified events. Tabulate the results and determine slack for each event. 14M



Time: 3 Hours**Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is difference between stream cipher and block cipher
b) Define Brute force attack
c) What is function of Ticket Granting Server in Kerberos
d) What are the types of authentication in X.509?
e) Mention content types of S/MIME
f) What is SSL record protocol
g) What is ESP?
h) What is SSL handshake protocol
i) What is a worm?
j) What is a trusted system?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) Discuss about security attacks. 6M
b) Explain playfair cipher with a suitable example. 6M

(OR)

3. a) Explain about Triple DES. 6M
b) Explain the model for network security with neat diagram. 6M

UNIT-II

4. a) Compare Public-Key Encryption with Conventional Encryption 6M
b) Explain the RSA algorithm 6M

(OR)

5. a) Explain Diffie-Hellman key Exchange algorithm with its merits and demerits. 6M
b) Write a short notes on Elliptic Curve Cryptography 6M

UNIT-III

6. a) Compare Kerberos version4 and version5 6M
b) Explain the Kerberos Message Exchange criteria 6M

(OR)

7. a) Explain about Pretty Good Privacy 6M
b) Write a short note on S/MIME 6M

UNIT-IV

8. a) Explain IPsec architecture with a neat diagram. 6M
b) Differentiate SSL from SET. 6M

(OR)

9. a) Explain the transport and tunnel modes of encryption 6M
b) Explain Alert protocol. 6M

UNIT-V

10. a) Explain the characteristics, types of firewalls. 6M
b) Write a short note on trusted system. 6M

(OR)

11. a) Write about definition and types of viruses. 6M
b) Explain the techniques of intrusion detection. 6M