AR18

CODE: 18CEE421 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, February-2023

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)	What are the advantages of railways in transportation?	6M
	b)	Explain the different types of rail joints	6M
		(OR)	
2.	a)	Explain the advantages and disadvantages of wooden sleepers	6M
	b)	Explain each component of a permanent way in detail	6M

UNIT-II

3.	a)	Draw a typical left-hand turnout and explain its various components	6M
	b)	What are the different types of gradients used in railways	6M
		(OR)	
4.	a)	Explain the different uses of railway signals	6M
	b)	What are the different factors to be considered for selection of railway alignment?	6M

UNIT-III

5.		Explain in detail the different signals used in railways	12M
		(OR)	
6.	a)	Explain the process involved in track circuiting	6M
	b)	Briefly explain the concept of railway interlocking and its features	6M

UNIT-IV

7.	a)	What are the factors to be kept in view in site selection of a commercial airport?	6M
	b)	What are the different aircraft characteristics?	6M
		(OR)	
8.	a)	What are the different corrections applied when designing for runway length	6M
	b)	The length of the runway under the Standard condition is 1600 m. The airport site has an Elevation of 320m. And the reference temperature of the airport is 33.60^0 C. It is decided to construct the runway with can effective Gradient of 0.25 %. Determine the corrections for gradient and temperature	6M

UNIT-V

9.	a)	What is a dry dock? Explain its functions and uses	6M
	b)	Classify the different types of harbors	6M
		(OR)	
10.	a)	Write short notes on pier, wharf and berth	6M
	b)	Explain the various types of breakwaters	6M

AR18

CODE: 18EEE441 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, February-2023

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics 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 in detail the terms production costs, total efficiency, incremental efficiency and incremental rates with respect to thermalpower plant. **6M**

   b) A power System consists of two, 125 MW units whose input cost dataare represented by the equations : **6M**

   $C_1 = 0.04\ P_1^2 + 22\ P_1 + 800$ Rs/hr

   $C_2 = 0.045\ P_2^2 + 15\ P_2 + 1000$ Rs/hr

   If the total received power P_R = 200 MW. Determine the load sharing between units for most economic operation.

(OR)

2. a) Give various uses of general loss formula and state the assumptions made for calculating B_{mn} coefficients. **6M**

   b) 100 MW, 150 MW and 280 MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations: **6M**

   $$\frac{dC_1}{dP_1} = \text{Rs}\ (0.15\ P_1 + 12)$$

   $$\frac{dC_2}{dP_2} = \text{Rs}\ (0.05\ P_2 + 14)$$

   $$\frac{dC_3}{dP_3} = \text{Rs}\ (0.21\ P_3 + 13)$$

   Where P_1, P_2 and P_3 are the loads in MW. Determine the economical load allocation between the three units, when the total load on the station is 500 MW.

UNIT-II

3. a) Explain clearly the mathematical formulation of optimal scheduling of hydrothermal system with a typical example. **6M**

   b) In a two plant operation system, the Hydro plant is operate for 12 hrs. During each day and the hydro plant is operate all over the day. The characteristics ofthe steam and hydro plants are **6M**

   $C_T = 0.3\ P_{GT}^2 + 20\ P_{GT} + 5$ Rs/hr

   $W_H = 0.4\ P_{GH}^2 + 20\ P_{GH}$ m^3/sec

   When both plants are running, the power own from steam plant to load is 300 MW and the total quantity of water is used for the hydro plant operation during 12 hrs is 180×10^6 m^3. Determine the generation of hydro plant and cost of water used.

(OR)

4. a) Using dynamic programming method, how do you find the most economical combination of the units to meet a particular load demand? **6M**

   b) Explain the need for unit commitment and also explain constraints in unit commitment. **6M**

UNIT-III

5. a) Draw and explain complete block diagram representation of single area having a turbo-generator supplying an isolated load for load frequency problem. Discuss the response of the system for a sudden change in load demand. **6M**

   b) Explain proportional plus integral control for load frequency control for a single area system. **6M**

(OR)

6. a) Explain the necessity of maintaining frequency constant. **6M**

   b) Explain different parts of speed governing system with neat diagram. **6M**

UNIT-IV

7. Give a typical block diagram for a two area system interconnected by a tie line and explain each block. Also deduce relations to determine the frequency of oscillations of the tie line power and static frequency drop. List out assumptions made. **12M**

(OR)

8. a) Two areas of a power system network are interconnected by a tie-line, whose capacity is 250MW, operating at a power angle of 450. If each area has a capacity of 2000 MW and the equal speed regulation of 3 Hz/Pu MW, determine the frequency of oscillation of the power for step change in load. Assume that both areas have the same inertia constants of H = 4 sec. If a step load change of 100MW occurs in one of the areas determine the change in tie-line power. **6M**

   b) Explain the power frequency characteristics of an interconnected power system. **6M**

UNIT-V

9. a) Explain about the losses occurred due to VAR flow in power system. **6M**

   b) What is load compensation? Discuss its objectives in power systems **6M**

(OR)

10. a) Write short notes on compensated and uncompensated transmission lines. **6M**

    b) Explain clearly what you mean by compensation of line and discuss briefly different methods of compensation. **6M**

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AR18

CODE: 18MEE421 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, February-2023

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) How do you define a project? 4M
   b) What is Project Organization? Explaine any 3 Types of Project Organizational Structures. 8M

(OR)

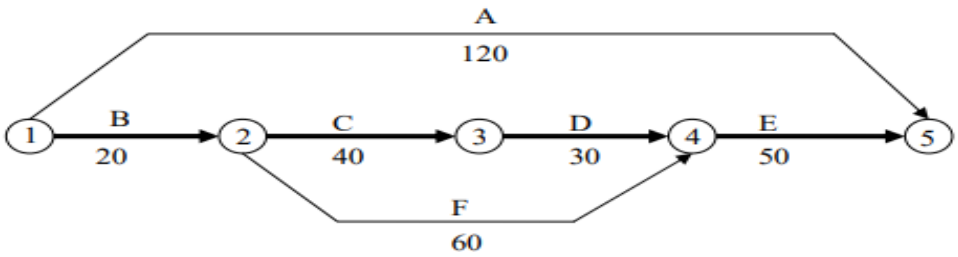
2. a) What is the Difference Between Goals & Objectives in Project Management? 6M
   b) What Are the Roles and Responsibilities of a Project Manager? 6M

UNIT-II

3. a) Discuss the various guidelines for drawing a network. 6M
   b) Write a short notes on critical path method and differentiate between PERT and CPM. 6M

(OR)

4. The network and durations given below shows the normal schedule for a project. You can decrease [crash] the durations at an additional expense. The Table given below summarizes the time-cost information for the activities. The owner wants you to you to finish the project in 110 days. Find the minimum possible cost for the project if you want to finish it on 110 days. [Assume that for each activity there is a single linear, continuous function between the crash duration and normal duration points]. 12M



Activity	Normal duration (days)	Crash Duration (days)	Normal Cost	Crash Cost
A	120	100	12000	14000
B	20	15	1800	2800
C	40	30	16000	22000
D	30	20	1400	2000
E	50	40	3600	4800
F	60	45	13500	18000

UNIT-III

5. Use simplex method to solve: 12M

Maximize: $Z = 6X_1 + 8X_2$

Subject to: $30X_1 + 20X_2 \leq 300$

$5X_1 + 10X_2 \leq 110$

$X_1 , X_2 \geq 0$

(OR)

6. Find the sequence that minimizes the total elapsed time required (T) in completing the following jobs. Each job is processed in the order ABC. Also calculate T. 12M

Job	Machine A	Machine B	Machine C
1	10	6	8
2	8	4	7
3	12	6	5
4	6	5	9
5	9	3	10
6	11	4	6
7	9	2	5

UNIT-IV

7. Determine an initial basic feasible solution to the following transportation problem by using (a) NWCM, (b) LCM, and (c) VAM. 12M

		Destination				
		D_1	D_2	D_3	D_4	Supply
Source	A	11	13	17	14	250
	B	16	18	14	10	300
	C	21	24	13	10	400
	Demand	200	225	275	250	

(OR)

8. To stimulate interest and provide an atmosphere for intellectual discussion, the faculty of mathematical sciences in an institute decides to hold special seminars on four contemporary topics – Statistics, Operations Research, Discrete Mathematics, Matrices. Each such seminar is to be held once a week. However, scheduling these seminars (one for each topic and not more than one seminar per day) has to be done carefully so that the number of students unable to attend is kept to a minimum. A careful study indicates that the number of students who cannot attend a particular seminar on a specific day is as follows: 12M

	Statistics	**Operations Research**	**Discrete Mathematics**	**Matrices**
Monday	50	40	60	20
Tuesday	40	30	4	30
Wednesday	60	20	30	20
Thursday	30	30	20	30
Friday	10	20	10	30

Find an optimal schedule for the above assignment problem.

UNIT-V

9. The following mortality rates have been observed for a special type of light bulbs. There are 1000 such bulbs in the concerned unit of the industry. 12M

Month	**1**	**2**	**3**	**4**	**5**
Month Failures (%)	10	25	50	80	100

It costs USD 10 to replace an individual bulb that has burnt out. If the bulbs were replaced simultaneously, it would cost USD. 2.50 per bulb. It is proposed to replace all the bulbs at fixed interval, whether are not they have burnt out, and to continue replacing the burnt out bulbs as they fail. At what intervals of time should the manager replace all the bulbs? Decide the optimum replacement policy.

(OR)

10. a) State the assumptions for a competitive game. 4M
    b) Explain the following terms: two person game, two person zero sum game, value of a game, 2xn game and mx2 game. 8M

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AR18

CODE: 18ECT418 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, February-2023

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)	Draw the detailed structure of NMOS transistor and explain the enhancement mode transistor action.	[6M]
	b)	With a neat sketch explain CMOS fabrication in n-well process and also explain its operation.	[6M]
		(OR)	
2.	a)	What are the steps involved in the NMOS fabrication? Explain with neat sketches.	[6M]
	b)	Compare CMOS technology with other Technologies.	[6M]

UNIT-II

3.	a)	Derive an equation for Ids of an n-channel Enhancement MOSFET operating in Saturation region.	[6M]
	b)	Derive pull-up to pull-down ration for nMOS inverter driven through one or more pass transistors.	[6M]
		(OR)	
4.	a)	Draw CMOS Inverter circuit and explain different region of operation.	[6M]
	b)	What is threshold voltage of a MOS device? Explain its significance.	[6M]

UNIT-III

5.	a)	Draw the stick diagram of CMOS-NAND gate and explain its operation.	[6M]
	b)	List out the CMOS Lambda based design rules and explain any few in detail.	[6M]
		(OR)	
6.	a)	Draw the nMOS inverter and explain its operation in detail.	[6M]
	b)	Draw the stick diagram of CMOS-NOR gate and explain its operation.	[6M]

UNIT-IV

7.	a)	What is meant by sheet resistance Rs? Explain the concept of Rs applied to MOS transistors.	[6M]
	b)	What are the differences between α and β scaling factors? Give some examples.	[6M]
		(OR)	
8.	a)	Explain Inverter Delays.	[6M]
	b)	What are the limitations on scaling in VLSI designing.	[6M]

UNIT-V

9.	a)	Explain the need for testing in CMOS testing with examples.	[6M]
	b)	Explain about design verification tools	[6M]
		(OR)	
10.	a)	Explain about Design-capture tools	[6M]
	b)	Explain different System level test techniques in CMOS testing with examples	[6M]

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AR18

CODE: 18CSE434 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, February-2023

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 all the fundamental steps in digital image processing?	6M
	b)	Write the applications and advantages of digital image processing with an example?	6M
		(OR)	
2.	a)	Illustrate image sampling and quantization with the aid of necessary diagrams.	12M

UNIT-II

3.	a)	Write the Arithmetic and Logical operations of digital image processing with necessary equations?	6M
	b)	Distinguish between smoothing and sharpening filters in the frequency domain?	6M
		(OR)	
4.	a)	Define histogram? Describe the histogram equalization for effective enhancement of images?	6M
	b)	How to reduce the noise using smoothing spatial filters?	6M

UNIT-III

5.	a)	Define data compression? Discuss the concept of relative data redundancy?	6M
	b)	Write the steps in JPEG compression standard.	6M
		(OR)	
6.	a)	Describe the Source-Encoder-Decoder compression model with a neat block diagram.	6M
	b)	Explain about Huffman coding with an example.	6M

UNIT-IV

7.	a)	Describe in detail about Hit and Miss transformation.	6M
	b)	Explain the boundary extraction algorithm with suitable example.	6M
		(OR)	
8.	a)	Explain about dilation and erosion in detail	6M
	b)	What is meant by Morphological image processing and explain the following: i) Open ii) Closing	6M

UNIT-V

9.	a)	With an example explain the different thresholding methods in image segmentation?	8M
	b)	Write a short note on image region-oriented segmentation	4M
		(OR)	
10.	a)	Define image segmentation and explain the point, line, and edge Discontinuities?	7M
	b)	Differentiate between local, global and adaptive thresholding.	5M

AR16

CODE: 16EE4024 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, February-2023

POWER SYSTEM OPERATION AND CONTROL

(Electrical and Electronics Engineering)

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)	Derive the expression for optimum load distribution of a power system network with ' N' generating units in operation by neglecting the transmission losses.	8M
	b)	List the equality and inequality constraints considered in economic dispatch problem.	6M

(OR)

2.	a)	Give various advantages of general loss formula and state the assumptions made for calculating B coefficients.	6M
	b)	In a thermal power station, incremental costs are given by the following equations dC_1/dP_1=Rs.(0.15P_1+12); dC_2/dP_2=Rs.(0.05P_2+14); dC_3/dP_3=Rs.(0.21P_3+13); Where P1,P2 and P3 are the loads in MW. Determine the economic load allocation of three units when the total load on the station is 300MW.	8M

UNIT-II

3.	a)	Explain clearly the mathematical formulation of optimal scheduling of hydro thermal system with a typical example.	7M
	b)	Discuss the advantages of operation of power plants with hydrothermal combinations.	7M

(OR)

4.	a)	Explain briefly the constraints on unit commitment problem.	7M
	b)	Using dynamic programming method, how do you find the most economical combination of the units to meet a particular load demand?	7M

UNIT-III

5.	a)	Obtain the steady state response of an isolated power system with a free governor operation.	8M
	b)	Explain the necessity of maintaining frequency constant.	6M
6.	a)	With a block diagram, explain the proportional plus integral control of a single area system.	7M
	b)	A 250MVA synchronous generator is operating at 1500 rpm, 50Hz. A load of 60MW is suddenly applied to the machine and the station valve to the turbine opens only after 0.3 sec due to the time lag in the generator action. Calculate the frequency to which the generated voltage drops before the steam flow commences to increase to meet the new load. Given that the valve of H of the generator is 3.2 kW-sec per kVA of the generator energy.	7M

UNIT-IV

7.		Develop a linear mathematical model of two area system and also explain the tie line bias control of two area system.	14M

(OR)

8.		From the fundamentals obtain the transfer function of a two area controlled power system network and also draw the corresponding block diagram.	14M

UNIT-V

9.	a)	Write a short note on compensated transmission lines.	7M
	b)	What is load compensation? Discuss its objectives in power systems	7M

(OR)

10.	a)	Explain different sources of reactive power generation and absorption of reactive power in power system network.	8M
	b)	List out the advantages of static VAR compensators	6M

AR16

CODE: 16ME4029 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, February-2023
OPERATIONS RESEARCH
(Mechanical Engineering)

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) Briefly explain about the characteristics of operations research 4M

b) A company manufactures two products, X and Y by using three machines A, B, and C. Machine A has 4 hours of capacity available during the coming week. Similarly, the available capacity of machines B and C during the coming week is 24 hours and 35 hours respectively. One unit of product X requires one hour of Machine A, 3 hours of machine B and 10 hours of machine C. Similarly one unit of product Y requires 1 hour, 8 hour and 7 hours of machine A, B and C respectively. When one unit of X is sold in the market, it yields a profit of Rs. 5/- per product and that of Y is Rs. 7/- per unit. Solve the problem by using graphical method to find the optimal product mix 10M

(OR)

2. Solve by simplex method. 14M

$$\text{Min} \quad Z = 2x_1 + x_2$$

Subject to, $3x_1 + x_2 = 3$; $4x_1 + 3x_2 \geq 6$; $x_1 + 2x_2 \leq 4$;

$$x_1, x_2 \geq 0$$

UNIT-II

3. Solve the following transportation problem whose costs are given 14M

		to					
		D1	D2	D3	D4	D5	availability
from	A	4	1	2	6	9	100
	B	6	4	3	5	7	120
	C	5	2	6	4	8	120
	requirements	40	50	70	90	90	

(OR)

4. a) Solve the following Assignment problem whose costs are given 10M

		operator				
		1	2	3	4	5
	1	10	12	15	12	8
	2	7	16	14	14	11
job	3	13	14	7	9	9
	4	12	10	11	13	10
	5	8	13	15	11	15

b) Formulate assignment problem as a mathematical model 4M

UNIT-III

5. Six jobs go first on machine A, then on machine B and lastly on machine C. The order of the completion of jobs has no significance. The following table gives the machine time for the six jobs and the three machines. 14M

	Processing time (In hours)		
Jobs	Machine A	Machine B	Machine C
1	8	3	8
2	3	4	7
3	7	5	6
4	2	2	9
5	5	1	10
6	1	6	9

Find the sequence of the jobs that minimizes elapsed time to complete the jobs.
Find also the idle time of machines A, B, C?

(OR)

6. a) A tax consulting firm has four service counters in the office to receive people who have problems and complaints about their income, wealth and sales taxes. Arrivals average 80 persons in an 8-hour service day. Each tax adviser spends an irregular amount of time in servicing the arrivals which have been found to have exponential distribution. The average service time is 20 minutes. Calculate: 8M

   (i) The average number of customers in the system.
   (ii) Average number of customers waiting for service.
   (iii) Average waiting time for the customer in the system and in queue.
   (iv) The probability that a customer has to wait for service.
   (v) The expected number of idle tax advisers at any specified time

   b) Arrivals at the telephone booth are considered poisson with an average time of 10min between one arrival and the next. The duration of the phone call is assumed to be exponential with mean 3min. 6M

   i) What is the probability that a person arriving at the booth will have to wait
   ii) The telephone department will install a second booth when convinced that an arrival would expect waiting for at least 3min for phone. By how much should the flow of arrivals increase in order to justify second booth
   iii) Average number of units in the system

UNIT-IV

7. a) The purchase price of a machine is Rs52,000. The installation charges amount to Rs 14,400 and its scrap value is only Rs 6,400. The maintenance cost in various years 10M
Is given below

Year	1	2	3	4	5	6	7	8
Maintenance cost	1000	3000	4000	6000	8400	11600	16000	19000

After how many years should the machine be replaced .Assume that the machine replacement can be done at the year end.

   b) What is replacement? Describe some important replacement situations 4M

(OR)

8. a) What are the characteristics of a game 4M
   b) Using dominance principle solve the pay of matrix, given by 10M

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

UNIT-V

9. A project consists of the following activities. Draw the network.Find the minimum time required to complete the project. Calculate the float values for the activities. 14M

Activity	Predecessor (s)	Duration (days)
A	--	16
B	--	10
C	--	8
D	C	11
E	D,G	11
F	B	7
G	A,F	8
H	A, F	8
I	B	12
J	H, I	18
K	D, G	6
L	J, K	8

(OR)

10. A project consists of the following activities. 14M

Activity	Time Estimates (days)
1-2	2-5-14
1-6	2-5-8
2-3	5-11-29
2-4	1-4-7
3-5	5-11-17
4-5	2-5-14
5-8	2-2-8
6-7	3-9-27
7-8	7-13-31

Calculate
a) expected project duration,
b) What is the total float also find the critical path.

AR13

CODE: 13IT4010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B.Tech I Semester Supplementary Examinations, February-2023

NETWORK SECURITY AND CRYPTOGRAPHY

(Information Technology)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) **what are the prime objectives of modern cryptography**
   b) **What is the difference between Block chippers and Stream Chipers**
   c) What is the key size of Blowfish Algorithm.
   d) What is the key size of RAS algorithm.
   e) What are the limitations of RFC 822.
   f) What is the purpose of a public key infrastructure
   g) What is Security Parameter Index (SPI).
   h) What is dual signature.
   i) What is worm.
   j) What are the two default policies of Packet Filtering Router.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2.	a)	Briefly define the monoalphabetic cipher. What is the difference between a monoalphabetic cipher and a polyalphabetic cipher?	6M
	b)	Explain SQL Injection attack	6M
		(OR)	
3.	a)	Explain about Transposition Technique	6M
	b)	What is Buffer Overflow? What are the tasks in exploiting the overflowable Buffer?	6M

UNIT-II

4.	a)	Give the structure of AES. Explain how Encryption/Decryption is done in AES	10M
	b)	What are the weaknesses of DES	2M
		(OR)	
5.	a)	How is key expansion done in Blowfish?	6M
	b)	Explain Diffie-Hellman key exchange algorithm	6M

UNIT-III

6.	a)	How is an enveloped data MIME entity prepared? Write the steps	6M
	b)	Differentiate between V4 and V5 of Kerberos	6M
		(OR)	
7.	a)	Explain S/MIME functionality	8M
	b)	List the transfer encodings used in S/MIME	4M

UNIT-IV

8.	a)	Explain IP Sec overview	8M
	b)	Explain the four protocols defined by Secure Socket Layer	4M
		(OR)	
9.	a)	Briefly explain Encapsulating IP Security Payload	8M
	b)	Explain about web security considerations	4M

UNIT-V

10.	a)	What are the different types of Viruses	6M
	b)	What are design principles of Firewalls	6M
		(OR)	
11.	a)	Explain about password protection system	6M
	b)	What is IDS? Explain the profile based IDS?	6M