

# AR16

**CODE: 16CE4027**

**SET-1**

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

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**ESTIMATION AND QUANTITY SURVEYING  
(Civil 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

**Answer any Three questions Part-A**

**[3 X 14 = 42 M]**

## Part-A

1. a) Write a short note on Mid Sectional area method? 4M
- b) Estimate the quantity of earth work for a portion of a proposed road from the following data. Proposed formation width of road is 10m, side slope 1 ½:1 in cutting and 2:1 in banking. 10M

Distance(m)	R.L of ground	R.L of Formation
0	73.12	72.42
30	72.44	Downward gradient of 1 in 100
60	71.86	
90	72.08	
120	71.30	
150	70.08	
180	70.54	
210	70.82	
240	71.50	

2. a) Perform the rate analysis for 12 mm plastering work in superstructure with the proportion as 1:4 for 1 sqm. Take 100 sqm 7M
- b) Perform the rate analysis for cement concrete work with the proportion of the cement concrete as 1:2:4 for 1 Cu. m, in foundation., Take 15 cu. M 7M
3. a) Discuss briefly about Bar bending schedule? 4M
- b) Prepare a detailed estimate of a R.C.C Beam as shown in **fig 3** 10M
4. a) How to find out the weight per meter of a bar of any diameter? 4M
- b) Prepare a detailed estimate of a R.C.C Beam with 10 mm stirrups @ 150 mm C/C throughout the length as shown in **fig 2** 10M
5. a) What is contract? Name the types of contracts 4M
- b) A colonizer intends to purchase a land of 500,000 sqm area to develop it in to plots of 950 sqm each after providing necessary road, parks and amenities. The current sale price of small plots is 60/- per sqm. colonizer wants a net profit of 25%. Cost of improving land, levelling and dressing is at a rate of Rs. 0.25per square meter. Cost of providing metalled roads, drainage, water supply and electrification is Rs. 3.00 per square meter for whole land. Work out the maximum price of land at which the colonizer may purchase the land. 10M

## Part-B

Answer one question in Part-B

[1 X 28 = 28 M]

6. Calculate below quantities in **fig-1**
- Estimate the earth work exaction
  - Quantity of the PCC (1:4:8) per flooring.
  - Calculate the brick work of the super structure.
  - Calculate the concrete for roofs slab. (100mm thick)
7. Calculate below quantities in **fig-1**
- Calculate quantity of R-R masonry for footing.
  - Calculate the quantity of line concrete under the footings.
  - Calculate the RCC for lintels.
  - Calculate the brick work of the super structure.

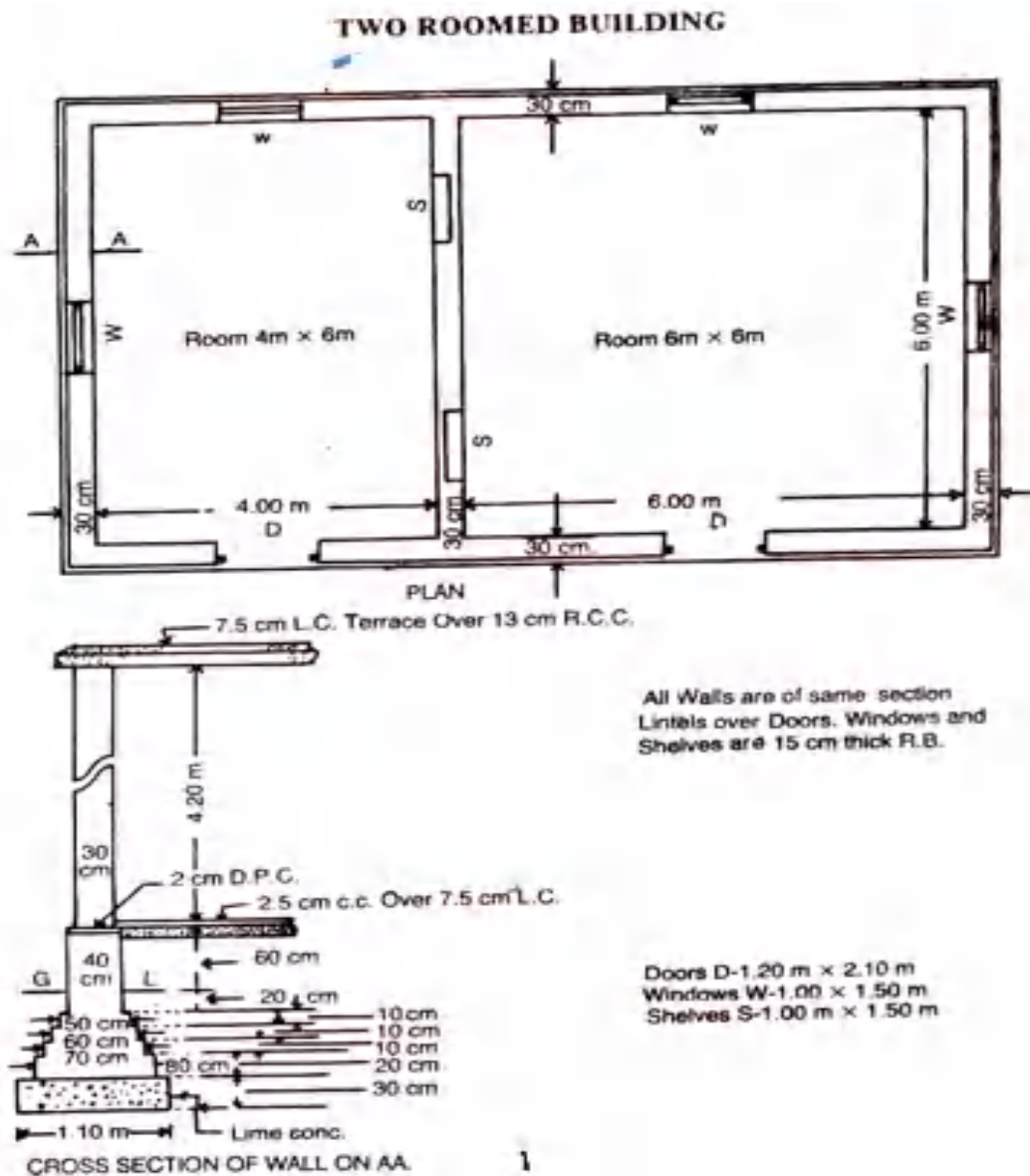


Fig.1

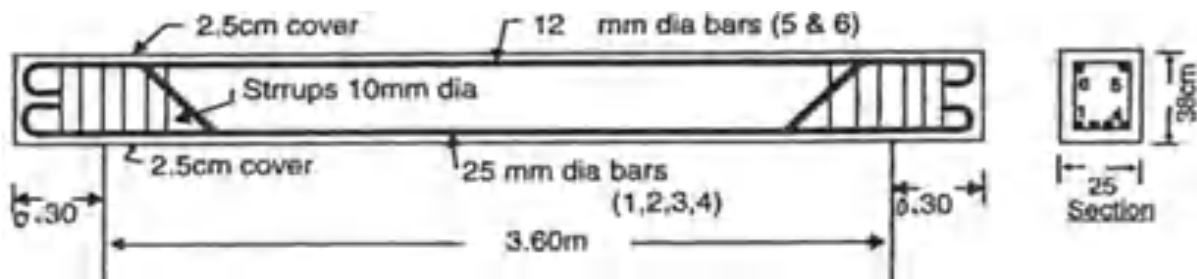


Fig.2

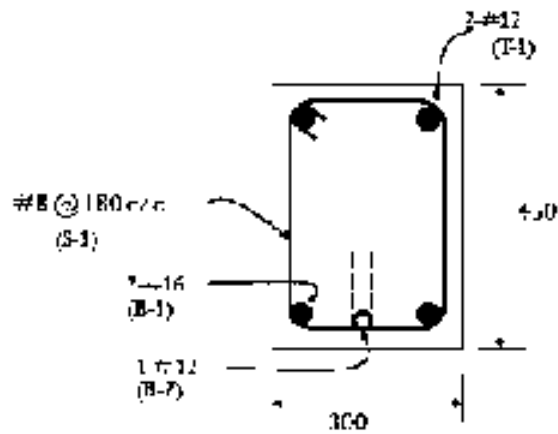
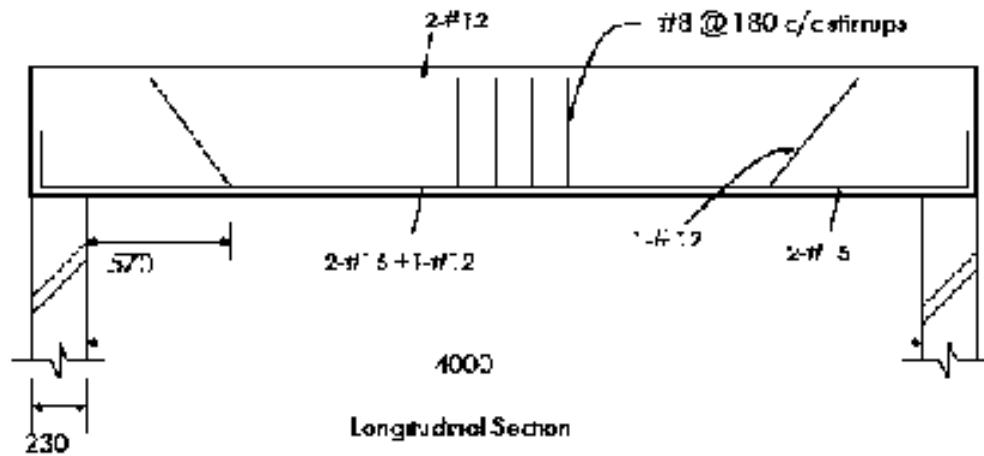


Fig.3

Cross section

# AR16

**CODE: 16ME4029**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**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) Define Operations Research. Write down the applications of OR. 7M  
b) Solve graphically 7M

$$\text{Max. } Z = 10x_1 + 20x_2$$

Sub. to

$$2x_1 + 4x_2 \geq 16$$

$$x_1 + 5x_2 \geq 15$$

$$x_1, x_2 \geq 0$$

**(OR)**

2. Maximize  $P = 3x + 4y + z$  subject to: 14M

Subjected to  $x + 2y + z \leq 6$   
 $2x + 2z \leq 4$   
 $3x + y + z \leq 9$   
where  $x, y, z \geq 0$

## UNIT-II

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

		to					
		D1	D2	D3	D4	D5	availability
from	A	5	8	6	6	3	800
	B	4	3	7	6	6	500
	C	8	4	6	6	4	900
requirements		400	400	500	400	800	

**(OR)**

4. A company has five jobs V, W, X, Y and Z and five machines A, B, C, D and E. The given matrix shows the costs in Rs. of assigning a job to a machine. Assign the jobs to machines so as to minimize the total cost. 14M

**Machines.**  
**Costs in Rs.**

Jobs	A	B	C	D	E
V	5	11	10	12	4
W	2	4	6	3	5
X	3	12	5	14	6
Y	6	14	4	11	7
Z	7	9	8	12	5

### UNIT-III

5. A manufacturing company processes 6 different jobs on two machines A and B in the order AB. Its processing times in minutes on A and B are given below. Find the optimal sequence and total elapsed time and idle time for each machine. 14M

Job Number	Processing Time on Machine A	Processing Time on Machine B
1	5	8
2	16	7
3	6	11
4	3	5
5	9	8
6	6	14

**(OR)**

6. a) A mechanic repairs 4 machines. The mean time between service requirements is 5 hours for each machine and forms an exponential distribution. The mean repair time is 1 hour and also follows the same distribution pattern. Machine down time costs Rs. 25/- per hour and the mechanic costs Rs. 55/- per day. Find 10M
- (a) Expected number of operating machines,  
 (b) the expected down time cost per day,  
 (c) Would it be economical to engage two mechanics, each repairing only two machines?
- b) A barbershop has space to accommodate only 10 customers. He can serve only one person at a time. If a customer comes to his shop and finds it is full he goes to the next shop. Customers randomly arrive at an average rate  $\lambda = 10$  per hour and the barber service time is negative exponential with an average of  $\mu = 5$  minute. 4M
- Find  $p_0$  and  $p_n$

### UNIT-IV

7. A firm is using a machine whose purchase price is Rs 13,000/-. The installation charges amount to Rs. 3600/- and the machine has a scrap value of only Rs. 1600/- because the firm has a monopoly of this type of work. The maintenance cost in various years is given in the following table. 14M

Year	1	2	3	4	5	6	7	8	9
Cost (Rs.)	250	750	1000	1500	2100	2900	4000	4800	6000

The firm wants to determine after how many years the machine should be replaced on economic considerations, assuming that the machine replacement can be done only at the year ends.

**(OR)**

8. a) Define: (a) Pure Strategy; (b) Mixed strategy; (c) Zero sum Game; (d) Non-Zero sum Game; (e) Pay-off; (f) Saddle Point 6M
- b) The matrix given below illustrates a game, where competitors A and B are assumed to be equal in ability and intelligence. A has a choice of strategy 1 or strategy 2, while B can select strategy 3 or strategy 4. Find the value of the game. 8M

		B	
		3	4
A	1	+4	+6
	2	+3	+5

### UNIT-V

9. Construct the network diagram for the following data. Calculate total float, free float, independent float, total project duration and the critical path? 14M

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-7	5-8	6-8	7-9	8-9	9-10
Duration (days)	2	2	2	4	5	8	4	2	4	5	3	4

(OR)

10. The following details pertain to a job, which is to be scheduled to optimal cost. 14M

Jobs	Predecessor	Normal		Crash		$\Delta C$	$\Delta t$	$\frac{\Delta C}{\Delta t}$
		Time in hrs	Cost in Rs./-	Time in hrs	Cost in Rs./-			
A	-	3	1,400	2	2,100	700	1	700
B	C	6	2,150	5	2,750	600	1	600
C	-	2	1,600	1	2,400	800	1	800
D	A, B	4	1,300	3	1,800	500	1	500
E	C	2	1,700	1	2,500	800	1	800
F	D	7	1,650	4	2,850	400	3	133
G	E, F	4	2,100	3	2,900	800	1	800
H	D	3	1,100	2	1,800	500	1	500
		TOTAL	13,000		18,900			

# AR16

**CODE: 16EC4030**

**SET-2**

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

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**SATELLITE COMMUNICATIONS  
(Electronics and Communication 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) Enumerate briefly the satellite applications. 7M  
b) Explain the functions of space segment and ground segment of a satellite system. 7M  
(OR)
2. a) List and explain various frequency band allocations used for satellite services. 7M  
b) Explain the brief history of Satellite communications. 7M

**UNIT-II**

3. a) What are different orbital perturbations in satellite communications? 7M  
b) Define and explain different Kepler's laws with expressions. 7M  
(OR)
4. a) Define and derive the expression for elevation angle. 7M  
b) Explain about satellite launchers and launch vehicles. 7M

**UNIT-III**

5. a) With a neat diagram, explain Telemetry, Tracking, Command and Monitoring system. 7M  
b) How the power is generated in satellites? 7M  
(OR)
6. a) Draw the diagram to show different forces on a synchronous satellite and explain about attitude control system. 7M  
b) List and explain any two satellite antennas. 7M

**UNIT-IV**

7. Summarize the steps to design an uplink of satellite with an example. 14M  
(OR)
8. a) Define and explain G/T ratio and system noise temperature. 7M  
b) Explain the principle involved in satellite switched TDMA. 7M

**UNIT-V**

9. a) Discuss in detail coverage and frequency considerations for Geostationary satellites. 7M  
b) Draw and explain receiver subsystem for multicarrier earth station. 7M  
(OR)
10. a) Explain about earth station tracking system. 7M  
b) Discuss in detail the delay and throughput considerations of satellite communication link. 7M

# AR13

**CODE: 13CE4025**

**SET-2**

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

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**ESTIMATION AND QUANTITY SURVEYING**

**(Civil Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1. a) What are stages for preparation of an estimate?  
b) List the various methods of calculating earthwork?  
c) What is lead and lift?  
d) Write the unit of measurements for DPC, Plastering and Painting.  
e) Give the relation between year's purchase and capitalized value.  
f) Define the Scrap value.  
g) Write the difference between general and detailed specification.  
h) When a revised estimate is prepared?  
i) What are the important factors influencing the value of building?  
j) Define detailed estimate.

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Explain the general rules to be followed for measurement. 4M  
b) The plinth area of an apartment is 500 sqm. Determine the total cost of building from the following data:  
i) Rate of construction = Rs.1230/-per m<sup>3</sup>.  
ii) The height of apartment = 16.25 m  
iii) Water Supply, Sanitary and Electrical installations each at 6M  
6% of building cost.  
iv) Architectural appearance @ 1% of building cost.  
v) Unforeseen item @2% of Building cost.  
vi) P.S. and contingencies @4% of building.

**(OR)**

3. Calculate the quantities for the following items for the building shown in figure 1 12M  
using any method:  
i). Earthwork in excavation ii). Cement Concrete in foundation iii). Brickwork in foundation and plinth.

### **UNIT-II**

- 4 a) Calculate the quantity of earthwork for 300m length for a portion of road in a uniform 6M  
ground the heights of banks at the two ends being 1.2m and 1.8m. The formation width is 12m and the side slopes 2:1. Assume that there is no transverse slope.  
b) Explain the mean sectional method of road estimation. 6M

**(OR)**



- 5 Estimate the Quantity of earth work for a portion of road from the following data. The RL of 12M formation at the Chainage 40 is 102.75.  
The slope of embankment is 2 in 1 in banking and 1.5: 1 in cutting. Gradient: Rising  
gradient 1 in 40 Falling gradient 1 in 100

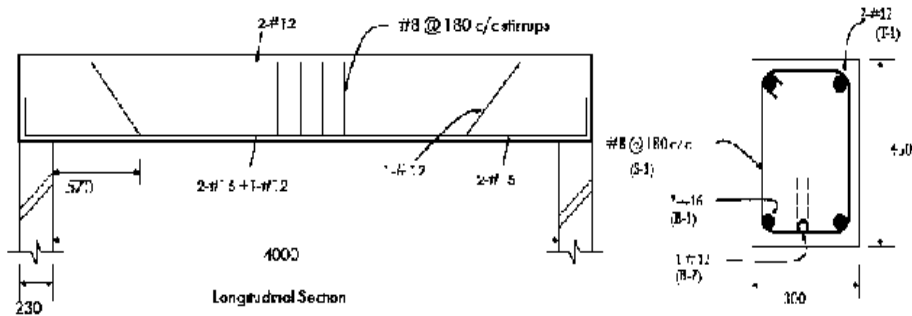
Chainage (m)	0	20	40	60	80	100	120	140	160	180	200
RL of Ground	101.5	100.9	101.5	102.0	102.85	101.65	101.95	100.7	101.25	99.9	100.6
RL of Formation			102.75								

### UNIT-III

6. Find the unit rate for the following by considering 10cu.m 6M  
a) Brick work in cement mortar (1:3) using standard size of bricks.  
b) Damp proof Course of 2.5cm thick 6M
- (OR)**
7. a) Discuss about General overheads and job overheads 6M  
b) Calculate the rate per cu.m of lime concrete in roof terracing with 20mm stone ballast, white lime, sand proportion of 1:2:4. 6M

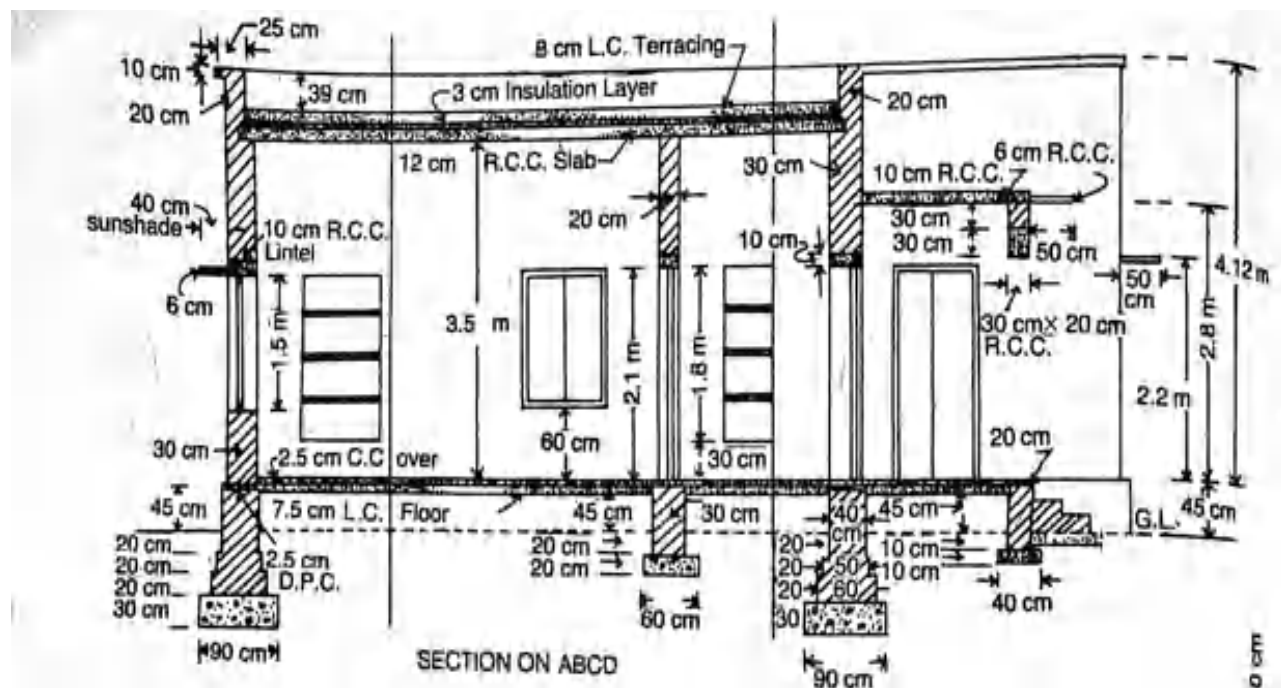
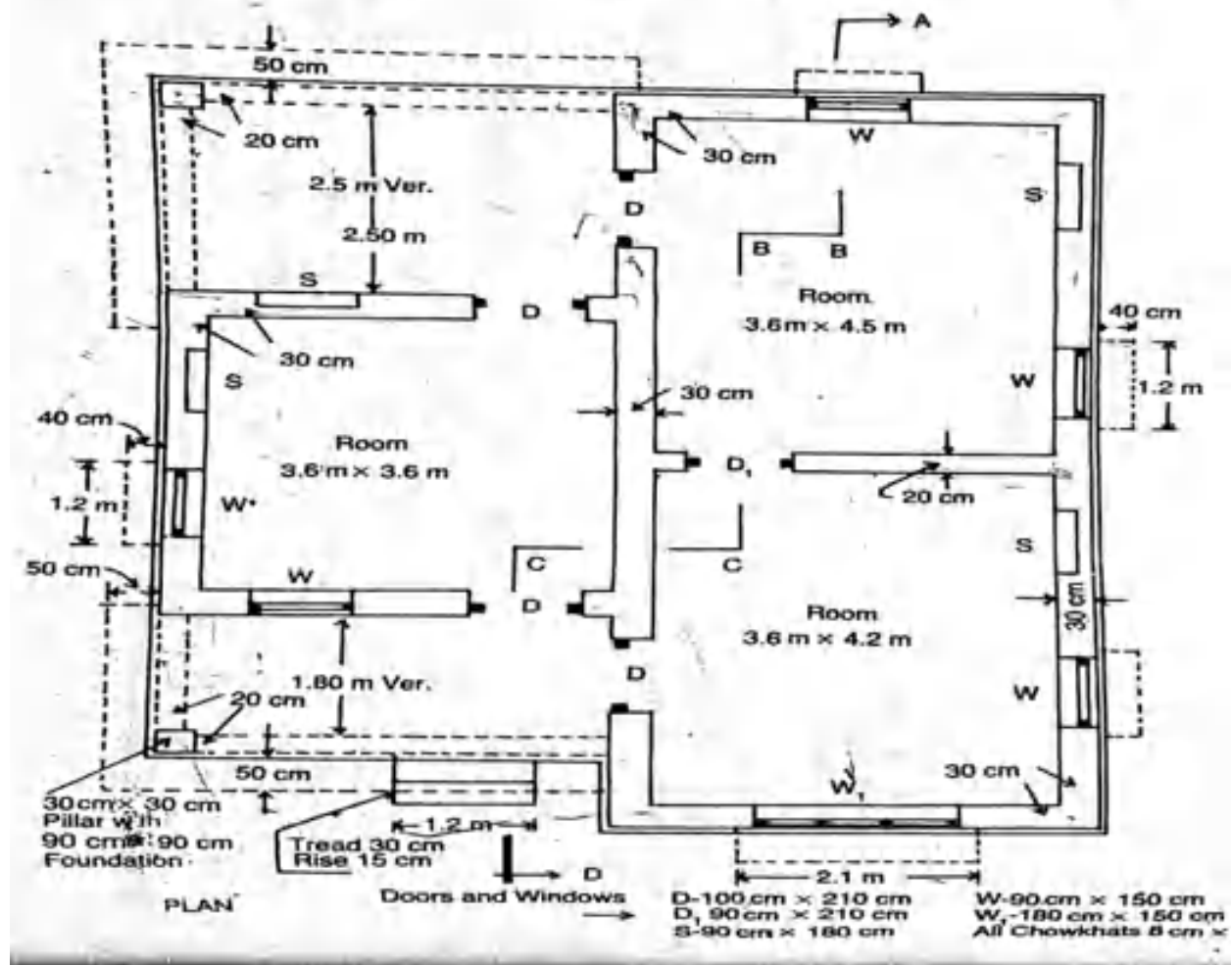
### UNIT-IV

8. a) Explain the procedure for preparing B.B.S for beams 6M  
b) Calculate the weight per meter length for different diameter of bars used in slabs and beams. 6M
- (OR)**
9. Figure shows a beam of clear length of 4m, 300mm wide by 450mm depth. It consists of 2-12 diameter bars at top, and 2-16 diameter and 1 – 12 diameter bars at the bottom. Diameter of stirrup is 8mm spaced at 180mm centre to centre. Clear cover to reinforcement provided is 40mm. Prepare the bar bending schedule.



### UNIT-V

10. a) Briefly explain conditions of contract 6M  
b) Explain the detailed specification for cement concrete 1:2:4 6M
- (OR)**
11. a) A printing machine is to be installed at a cost of 30000/- in a press. Assuming the life of the machine as 20 years. Calculate the amount of annual instalment of sinking fund to be deposited to accumulate the whole amount of 5% compound interest. 6M  
b) Define specification. Explain its necessity in execution of a work 6M



# AR13

**CODE: 13ME4029**

**SET-2**

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

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**POWER PLANT ENGINEERING**

**(Mechanical Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS  
M]**

**[1 x 10 = 10**

1. a) What is meant by Solar constant?  
b) List various types of Solar Collectors.  
c) Name the various methods used for ash handling?  
d) Define thermal efficiency in the terms of indicated horse-power.  
e) Under what conditions diesel generating plants are preferred.  
f) What is hydrograph? Give its importance.  
g) What is run-off?  
h) What is meant by Controlled Chain Reaction?  
i) List the various components of Fixed Cost.  
j) What is the difference between Base Load & Peak Load Power Plants?

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Explain the working of a solar thermal power plant. What are its drawbacks? [6M]  
b) What is the principle of MHD Power Plant? Explain the working of any one type of MHD Plants. [6M]
- (OR)
3. a) With a neat sketch, explain the working of any one type of fuel cell. [6M]  
b) With a neat sketch, explain the working of any one type of Wind Power System. [6M]

### **UNIT-II**

4. a) What is meant by overfeed and underfeed principles of firing coal? [7M]  
b) List the advantages and disadvantages of steam power plants. [5M]
- (OR)
5. a) Sketch layout of Thermal Power Plant and discuss different circuits. [7M]  
b) Explain with the help of a diagram the working of a cyclone separator. [5M]

### **UNIT-III**

6. a) Describe briefly the commonly used starting systems in large and medium size engines. [6M]  
b) Discuss the fuel injection systems used in a Diesel Power Plant. [6M]
- (OR)
7. a) Give a neat line diagram of diesel engine power plant. Explain about various components. [6M]  
b) Why is supercharging necessary in diesel power plant? What methods are used for supercharging the diesel engines? [6M]

#### UNIT-IV

8. a) What is a dam? What are its various types? Explain briefly any two of them. [6M]  
b) With the help of a neat sketch, explain the working of Pressurised Water Reactor. [6M]

(OR)

9. a) Explain with a neat sketch, the working of Breeder Reactor. Give its advantages. [6M]  
b) Explain in detail about the construction and working of Hydro-electric Power Plant with neat sketch. [6M]

#### UNIT-V

10. a) Define the following terms: [6M]  
(i) Connecting load (ii) Diversity factor (iii) Plant capacity factor.  
b) The peak load on a 50 MW power station is 39 MW. It supplies power through four transformers whose connected loads are 17, 12, 9 and 10 MW. The maximum demands as these transformers are 15, 10, 8 and 9 MW respectively. If the annual load factor is 50% and the plant is operating for 65% of the period in a year, find out the following: [6M]  
(i) Demand factor; (ii) Diversity factor; (iii) Use factor

(OR)

11. It is proposed to supply a load with a maximum demand of 100MW and a load L.F of 0.4. choice is to be made from nuclear, hydro & steam power plants. Calculate the overall cost per KWh in each scheme. [12M]

Cost	Nuclear	Hydro	Steam
Capital per kw installed	RS 6000	RS 4320	RS 2160
Interest	10%	10%	12%
Depreciation	10%	8%	12%
Operations cost per KWH	12 paise	6 paise	18 paise
Transmission & distribution cost / KWH	0.24 paise	0.96 paise	0.24 paise

# AR13

**CODE: 13CS4021**

**SET-1**

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

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**MOBILE COMPUTING  
(Computer Science & Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1. a) What is mobile communication  
b) What is mobile system  
c) Give reasons for a handover in GSM  
d) What is localization  
e) Discuss ALOHA  
f) What is IMT 2000  
g) What is Goal of mobile IP  
h) What is IP packet delivery  
i) Define Traditional TCP  
j) What are applications of MANETs

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Explain guided transmission 6M  
b) Discuss limitations of mobile computing 6M  
(OR)
3. a) Explain unguided transmission 6M  
b) Write and explain novel applications of Mobile Computing. 6M

### **UNIT-II**

4. a) Discuss radio interface in GSM 6M  
b) Explain protocols in GSM 6M  
(OR)
5. a) Describe the GSM architecture with its constituent elements 12M

### **UNIT-III**

6. a) Describe CDMA data protocol stack. 6M  
b) Give six functional differences between CDMA and GSM. 6M  
(OR)
7. a) What are 3G communication standards 6M  
b) What are various features of 4G networks 6M

### **UNIT-IV**

8. a) Explain the features of tunneling and encapsulation. 6M  
b) How can DHCP be used for mobility and support of mobile IP? 6M  
(OR)
9. a) What is basic purpose of DHCP? Name the entities of DHCP. 6M  
b) Explain about agent advertisement 6M

### **UNIT-V**

10. a) Describe the properties of MANETs. 6M  
b) Explain snooping TCP. What are its advantages and disadvantages? 6M  
(OR)
11. a) Explain destination sequence distance vector routing algorithm in MANETs 6M  
b) Write about Transaction oriented TCP. 6M

# AR13

**CODE: 13EE4025** **SET-2**  
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKEKALI**  
**(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**HIGH VOLTAGE ENGINEERING**

**(Elective – II)**

**(Electrical & Electronics Engineering)**

**Time: 3 Hours**

**Max Marks: 70M**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10M]**

## **PART – A**

1. a) Distinguish between breakdown in uniform field and Non uniform field
- b) What are the physical conditions governing ionization mechanism in gases dielectrics?
- c) List out the High Voltage AC Generation techniques in Laboratory for testing of insulators.
- d) Mention the merits and demerits of Voltage Generator
- e) How Electric stress in the insulators are controlled.
- f) What is the principle of electrostatic voltmeter?
- g) What is the necessity for measurement of RIV?
- h) How are the Testing of insulators classified?
- i) Define Dielectric loss and Loss factor.
- j) Mention two applications of Electro static coating

## **PART-B**

**Answer one Question from each Unit:**

**[5x12=60M]**

### **UNIT – I**

2. Discuss the different numerical methods available for estimation of electric field distribution in dielectric media? [12M]

**(OR)**

3. (a) Discuss briefly the “Finite Element Method”? [6M]
- (b) Discuss Merits and Demerits of various numerical methods for field composition. [6M]

### **UNIT – II**

4. (a). Explain the term 'electron attachment'. Why are electrons attaching gases useful for practical use as **insulants** when compared to non-attaching gases? [6M+6M]
- (b) Briefly explain thermal break down in solids.

**(OR)**

# AR13

**CODE: 13EE4025**

**SET-2**

5. a) Explain the streamer theory of break down. [6M]  
b) Describe the various factors that influence break down in a gas. [6M]

## UNIT – III

6. a). A Cockcroft-Walton type voltage multiplier has 12 stages with capacitances all equal to  $0.5\mu\text{F}$ . The supply transformer secondary voltage is  $150\text{kV}$  at a frequency of  $200\text{Hz}$ . If load current to be supplied is  $7.5\text{mA}$ . Find  
i. Percentage ripple ii) Regulation iii) Optimum number of stages for minimum regulation or voltage drop.  
b). Explain the working of Capacitance Voltage Transformer with the help neat sketch. [8M+4M]

**(OR)**

7. Explain the principle and operation of generating voltmeters for measurement of high DC voltages? Enumerate the advantages and disadvantages of the meters? [12M]

## UNIT – IV

8. Explain various tests on surge arrestors and Power Cables. [12M]

**(OR)**

9. (a) List out various high voltage tests to be carried out on Power Transformer.  
(b) Explain the method of detection and location of fault during impulse testing of power transformers. [4M+8M]

## UNIT – V

10. Explain the principle of electro static coating/painting. Discuss its applications in HV engineering. [12M]

**(OR)**

11. With a neat diagram, explain the electrostatic precipitator used for charging of dust particles in a gas and their subsequent separation under the effect of high electric field. [12M]