

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-IMarks CO Blooms
Level

1. a) Explain about different project organization structures
b) List out the different stages of project management

5M 1 2
5M 1 1

(OR)

2. a) What are their main responsibilities of a project manager?
b) Explain the importance of project initiation.

5M 1 1
5M 1 2

UNIT-II

3. a) Define project cost estimation. Why is it important in project management?
b) Distinguish between direct costs and indirect costs in a project.

5M 2 1
5M 2 4

(OR)

4. Explain in detail the sources of finance for a project.

10M 2 2

UNIT-III

5. A project schedule has the following characteristics

10M 3 4

Activity	Time (Weeks)	Activity	Time (Weeks)
1 – 2	4	5 – 6	4
1 – 3	1	5 – 7	8
2 – 4	1	6 – 8	1
3 – 4	1	7 – 8	2
3 – 5	6	8 – 10	5
4 – 9	5	9 – 10	7

Construct the network, find out the earliest start time (T_E) and latest finish time (T_L) for each event and find the critical path.

(OR)

6. The data related to a small project consisting of different activities are given below

10M 3 4

	Normal Duration(days)	Normal cost (Rs.)	Crash Duration (days)	Crash cost (Rs.)
(1,2)	8	1000	6	2000
(1,3)	4	1500	2	3500
(2,4)	2	500	1	900
(2,5)	10	1000	5	4000
(3,4)	5	1000	1	2000
(4,5)	3	800	1	1000

Indirect cost = Rs.1000 per day. For the above given data draw the network and find the optimum duration and cost.

UNIT-IV

7. Solve the given LPP by simplex method

10M 4 3

$$\text{Maximize } Z = 3x_1 + 2x_2 + 5x_3$$

Subjected to constraints $x_1 + 2x_2 + x_3 \leq 430$, $3x_1 + 2x_3 \leq 460$, $x_1 + 4x_2 \leq 420$ and $x_1, x_2, x_3 \geq 0$

(OR)

8. There are five jobs, each of which is to be processed on three machines A, B and C in the order ABC. Processing times in hours are given in the following table. 10M 4 5

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

Determine the optimum sequence, total elapsed time and idle time for each machine.

UNIT-V

9. Determine the optimum transportation schedule and the corresponding transportation cost in the following transportation problem. 10M 5 5

Factories		Stores				Availabilities
		1	2	3	4	
	A	15	10	17	18	2
	B	16	13	12	13	6
	C	12	17	20	11	7
Requirements		3	3	4	5	

(OR)

10. There are four engineers and four projects. Costs of assigning different projects to different engineers in hundreds of rupees are given in the following table. Here engineer E2 cannot work on project P2. Solve the problem for optimum assignment schedule. 10M 5 3

	P1	P2	P3	P4
E1	12	10	10	8
E2	14	∞	15	11
E3	6	10	16	4
E4	8	10	9	7

UNIT-VI

11. Assume that present value of one rupee to be spent in a year's time is Re.0.90 and the purchase price of the machine is Rs. 3000. The running cost of the equipment is given in the table below. 10M 6 5

Year	1	2	3	4	5	6	7
Running cost in Rs	500	600	800	1000	1300	1600	2000

Determine the time of replacement of the machine

(OR)

12. Solve the following game by algebraic method 10M 6 3

Player B	Player A		
		I	II
	I	2	- 1
	II	- 1	0

**Data Science with Python
(INFORMATION TECHNOLOGY)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Differentiate between the roles of Data Analyst, Data Scientist with respect to responsibilities, required skills, and deliverables.	5	CO1	K3
	b) Explain the terms “Data Wrangling,” “Data Lake,” and “Feature Engineering” in detail and show how they fit into a Data Science workflow.	5	CO1	K2
(OR)				
2.	Describe the major stages of the Data Science Life Cycle. Using an example map each stage to a real-world activity.	10	CO1	K2
<u>UNIT-II</u>				
3.	a) Create a 3×4 array and demonstrate reshaping, flattening, transposing operations.	5	CO2	K2
	b) Write a Python program to create ndarrays from (a) a Python list, (b) arange, and (c) linspace	5	CO2	K2
(OR)				
4.	Define universal functions in NumPy. Write code to apply at least three different ufuncs (one unary, one binary, one for aggregation) and explain their outputs.	10	CO2	K3
<u>UNIT-III</u>				
5.	a) Difference between grouping and filtering operations.	5	CO3	K3
	b) Explain the purpose of reindexing in Pandas with an example.	5	CO3	K2
(OR)				
6.	Create a Series from a Python list and a Data Frame from a dictionary. Compare their structure, indexing, and operations with examples.	10	CO3	K4
<u>UNIT-IV</u>				
7.	a) Explain the use of fillna() with an example.	5	CO4	K2
	b) Difference between filtering out missing data and filling in missing data in pandas?	5	CO4	K3
(OR)				
8.	Using a sample Data Frame, show how to detect and remove duplicates in one or more columns. Explain the parameters keep='first' and keep='last'	10	CO4	K4
<u>UNIT-V</u>				
9.	Explain factorized string functions in pandas	10	CO5	K2
(OR)				
10.	a) Differentiate between merge() and join() in pandas.	5	CO5	K3
	b) State two advantages of using MultiIndex in pandas.	5	CO5	K2
<u>UNIT-VI</u>				
11.	Given a CSV file containing student marks for multiple subjects, read it into a Data Frame	10	CO6	K4
	a) Plot a histogram of marks for one subject			
	b) Plot a density plot for the same data			
	c) Plot a scatter plot of two subjects' marks to explore correlation			
	d) Explain how each plot helps analyze the data differently.			
(OR)				
12.	a) Write a short notes on how pandas DataFrame.plot() acts as a wrapper over Matplotlib.	5	CO6	K2
	b) Mention two differences between plotting directly with Matplotlib and plotting using pandas built-in plotting functions.	5	CO6	K3

Time: 3 Hours**Max Marks: 60**

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	<u>UNIT-I</u>	Marks	CO	BTL
1. a)	Explain various types of electric drives that are used for selecting a motor?	5	1	L1
b)	Explain about Energy Star rating of equipment?	5	1	L1
	(OR)			
2. a)	Explain about the starting and running characteristics of shunt motor?	5	1	L1
b)	Derive an expression for Heating time constant of a motor?	5	1	L2
	<u>UNIT-II</u>			
3. a)	Define Electric heating? Explain Resistance Heating with any one example method?	5	2	L1
b)	Explain about induction heating?	5	2	L1
	(OR)			
4. a)	What are the advantages of electrical heating?	5	2	L1
b)	Explain about Dielectric Heating with neat diagram?	5	2	L2
	<u>UNIT-III</u>			
5. a)	What is welding? What are the different types of welding?	5	3	L2
b)	Explain about resistance welding?	5	3	L1
	(OR)			
6. a)	Explain about arc welding?	5	3	L1
b)	Compare AC and DC welding?	5	3	L2
	<u>UNIT-IV</u>			
7. a)	Define illumination. Explain the laws of illumination?	5	4	L1
b)	Explain the basic principles of light control?	5	4	L2
	(OR)			
8. a)	Define Utilization factor, maintenance factor and Absorption factor?	5	4	L1
b)	Explain the types of design of lighting?	5	4	L2

UNIT-V

9. a) What is the traction voltage used in India? 5 5 L2
Explain the advantages of the traction system?
b) The speed-time curve of train carries of the 5 5 L3
following parameters: i) Free running for 12
min. ii) Uniform acceleration of 6.5 Kmphps
for 20 s. iii) Uniform deceleration of 6.5
Kmphps to stop the train iv) A stop of 7 min.
Then determine the Distance between two
stations, the average and the Schedule speeds?

(OR)

10. a) Explain about the special features that traction 5 5 L2
motor should possess.
b) Explain the Analysis and Calculations are 5 5 L2
involved in trapezoidal Speed time curve?

UNIT-VI

11. a) Define and explain specific energy 5 6 L2
consumption with neat derivation?
b) Define and explain tractive power output from 5 6 L1
the driving axle in electric traction?

(OR)

12. a) Explain about coefficient of adhesion? 5 6 L1
b) An EV operates between two stations 1 km 5 6 L3
apart. The maximum speed is 72 km/h. The
acceleration is 1.2 m/s^2 and the braking
retardation is 1.8 m/s^2 . Find the distance
covered during acceleration and braking?

Time: 3 Hours**Max Marks: 60**

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Draw and explain the fabrication steps of NMOS transistor in detail.	5M	CO1	L2
	b) Distinguish between Bipolar and CMOS devices technologies.	5M	CO1	L4
(OR)				
2.	a) Discuss the drain and transfer characteristics of PMOS transistor in depletion mode.	5M	CO1	L2
	b) Write about CMOS fabrication in a p-well process with a diagram.	5M	CO1	L2
<u>UNIT-II</u>				
3.	a) Discuss the transfer characteristics of CMOS Inverter.	5M	CO2	L3
	b) Determine the pull-up to pull-down ratio for an NMOS inverter driven through one or more pass transistors.	5M	CO2	L5
(OR)				
4.	a) Derive the expressions for transconductance and figure of merit	5M	CO2	L3
	b) Derive the relationship between I_{ds} and V_{ds} .	5M	CO2	L3
<u>UNIT-III</u>				
5.	a) Discuss the VLSI design flow from RTL to GDS	5M	CO3	L2
	b) Draw the stick diagram of p-well CMOS inverter and explain the process.	5M	CO3	L2
(OR)				
6.	a) Draw the Layout Diagrams for NAND Gate using NMOS.	5M	CO3	L3
	b) Draw the stick diagram for $Y = (AB + CD)'$	5M	CO3	L6
<u>UNIT-IV</u>				
7.	a) Discuss the pass transistor logic	5M	CO4	L2
	b) Explain about Low power gates with example	5M	CO4	L4
(OR)				
8.	a) What is Dynamic CMOS logic? Write its merits and de merits	5M	CO4	L2
	b) Discuss DCVS logic.	5M	CO4	L2
<u>UNIT-V</u>				
9.	a) Describe about the choice of fan – in and fan – out selection in gate level design.	5M	CO5	L4
	b) Derive the expression for sheet resistance? Calculate R S for NMOS and CMOS inverters.	5M	CO5	L3
(OR)				
10.	a) Derive Scaling factors for device parameters.	5M	CO5	L5
	b) Calculate area capacitance and delay unit	5M	CO5	L3
<u>UNIT-VI</u>				
11.	a) Why is testing necessary in CMOS circuits	5M	CO6	L4
	b) Explain about chip level test techniques.	5M	CO6	L2
(OR)				
12.	a) Discuss design verification tools.	5M	CO6	L2
	b) Discuss any 2 design strategies for testing.	5M	CO6	L4

Answer ONE Question from each Unit

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) Define statistics. Compute the mean, median, and standard deviation for the dataset: $X=[10,12,14,16,18,20]$	5M	CO1	L2
	b) Draw a histogram and boxplot for the dataset: $[5,8,10,12,15,20,22,25]$ and comment on its distribution.	5M	CO1	L2
	(OR)			
2.	a) Perform Z-score normalization on the dataset $[50,55,60,65,70]$	5M	CO1	L2
	b) Differentiate between categorical and numerical data with illustrations.	5M	CO1	L3
	<u>UNIT-II</u>			
3.	a) What are the different methods of handling missing data? Explain with examples.	5M	CO2	L2
	b) Describe Principal Component Analysis (PCA) and its applications in dimensionality reduction.	5M	CO2	L3
	(OR)			
4.	a) Compare Wrapper and Filter methods of feature selection using an example dataset	5M	CO2	L3
	b) Demonstrate binning method for noise removal on dataset $[2,4,5,7,9,10,15]$ bin value =3	5M	CO2	L2
	<u>UNIT-III</u>			
5.	a) For a classification problem, 80 samples were correctly classified out of 100. Compute accuracy, error rate, and misclassification probability.	5M	CO3	L2
	b) Discuss ensemble learning techniques with an example.	5M	CO3	L3

(OR)

6. a) What is reinforcement learning? Explain its components with an example. 5M CO3 L2
- b) Compare supervised and unsupervised learning with case studies. 5M CO3 L3

UNIT-IV

7. a) Construct a Decision Tree using Information Gain for the dataset:
Outlook = {Sunny, Rainy},
Play = {Yes, No}.
Use entropy calculations. 5M CO4 L3
- b) Compute **Simple Linear Regression** line for $X=[1,2,3,4]$, $Y=[2,4,5,4]$ 5M CO4 L3

(OR)

8. a) Apply KNN ($k=3$) to classify the point (7,7) given dataset points:
(6,6,A), (7,8,A), (8,6,B), (5,7,B), (6,8,A). 5M CO4 L3
- b) Describe rule-based classification algorithm approach. 5M CO4 L2

UNIT-V

9. a) Perform **Polynomial Regression** of degree 2 for dataset:
(1,2),(2,6),(3,12),(4,20) 5M CO5 L3
- b) Explain ROC-AUC Curve as a performance evaluation metric. 5M CO5 L3

(OR)

10. a) Describe Support Vector Regression (SVR) and its applications. 5M CO5 L3
- b) Explain **K-fold Cross Validation ($k=5$)** with a numerical dataset. 5M CO5 L3

UNIT-VI

11. a) Apply **Delta learning rule** for single neuron with input $x=1$, target=1, learning rate=0.1, weight=0.5. 5M CO6 L2
- b) Describe the Perceptron learning model with a neat diagram. 5M CO6 L3

(OR)

12. a) Demonstrate **Feedforward Neural Network** calculation with input [1,0], weights = [0.5, -0.3], bias = 0.2, activation = step function. 5M CO6 L4
- b) Show Backpropagation weight update for a simple 2-layer network with one hidden neuron. 5M CO6 L2

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

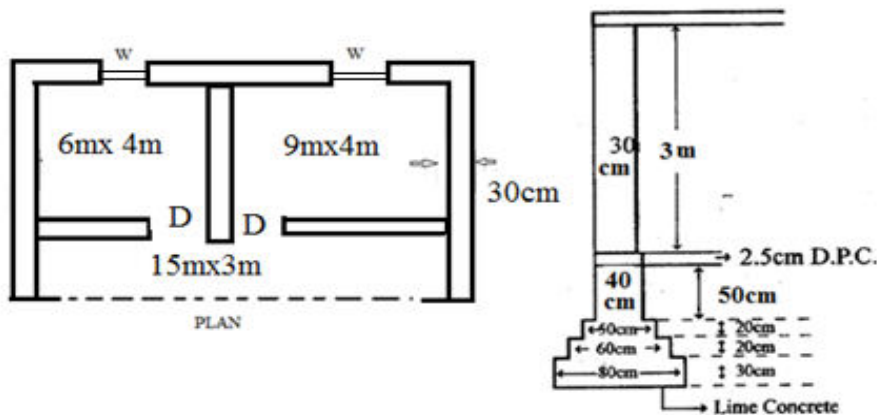
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Note: Assume required data if any necessary.**UNIT-I**

1. For the plan and section shown in the figure, estimate
- Earth work
 - Lime concrete in foundation
 - First class brick work in cement mortar in foundation and plinth

Marks	CO	Blooms Level
10	CO1	4



(OR)

2. Estimate the quantities given below using the figure given in question.1
- Calculate quantity of R-R masonry for footing.
 - brick work in superstructure for two rooms and verandah. size of doors(D) 1.2 x 2.0m and window (W) 1.2m x 1.5m Estimate the earth work exaction
 - Calculate the RCC for lintels.

10	CO1	4
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UNIT-II

3. Estimate the quantity of earth work for an embankment 120m long, 12m wide at crest, side slope is 2;1, the central height from 0 to 100m at every 25m interval re 0.6, 1.2, 1.6 and 2.0

10	CO2	3
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(OR)

4. Discuss about the Mid-Sectional area method and Simpson's rule method for the calculation of the Quantity of earthwork

10	CO2	3
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UNIT-III

5. Discuss briefly about rate Analysis in brief and Prepare a rate analysis for the following items
- 12mm thick plaster 1:6 cement mortar
 - First class brick work in super structure 1:3 lime cement mortar

10	CO3	4
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(OR)

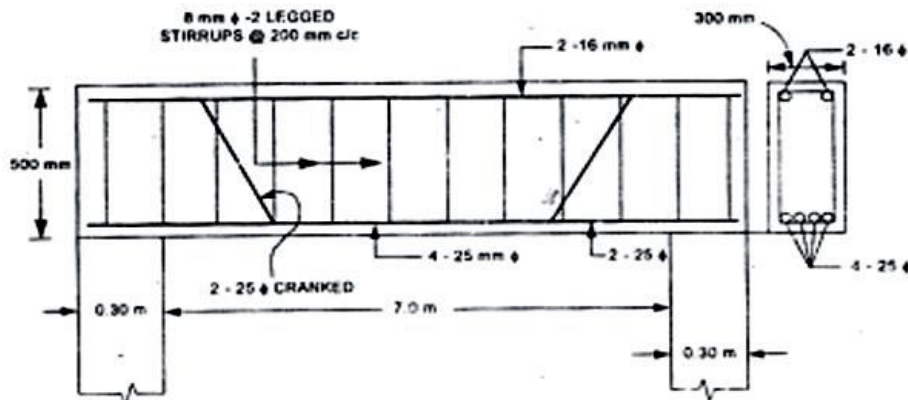
6. a) Calculate the Quantity of Cement required in bags for the following items and Prepare a rate analysis for the same
- i) C.C. (1:4:8) use 40mm HBG metals for 30m³ of work
 - ii) RR masonry in CM(1:5) very 0.34m³ of CM for 1m³ of masonry for 20m of work
- b) Discuss briefly overhead cost and list out different overheads

UNIT-IV

7. Estimate the quantity of steel required for the beam details: beam of clear length of 6m, 350mm wide by 500mm depth. It consists of 2-12 diameter bars at top, and 2-20 diameter and 2 – 16 diameter bars at the bottom. Diameter of stirrup is 8mm spaced at 160mm center to center. Clear cover to reinforcement provided is 30mm

(OR)

8. Prepare a detailed estimate of a R.C.C Beam with 8 mm stirrups @150 mm C/C throughout the length as shown in fig.



UNIT-V

9. Discuss about Contract conditions in a construction project for labour, material, design, and construction

(OR)

10. a) State the important types of contracts and explain in brief any two contracts
- b) What is tender, mention the details of a tender document should contains

UNIT-VI

11. What is the purpose of valuation and explain about the Depreciation Method of Valuation and mention the factors to be considered for the valuation

(OR)

12. A 20 years old office building of plinth area 250 sq.m (25x10m) constructed on a site 350sq.m is to be valued. The prevailing land value is Rs.10,000/-sqm. Construction cost is Rs. 12000/-sqm. Calculate the value after assuming suitable data if needed.

**Snowflake Cloud Analytics
(CSE (DS))****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Explain Snowflake Architecture with neat diagram.	5M	CO-1	L2
	b) Compare local Disk cache and result cache.	5M	CO-1	L3
(OR)				
2.	a) Explain Benefit of Micro Partitioning.	5M	CO-1	L2
	b) Brief explain the steps for getting started with Snowflake Cloud Analytics	5M	CO-1	L3
<u>UNIT-II</u>				
3.	a) How do you connect to Snowflake from external tools? Explain with examples.	5M	CO-2	L2
	b) Explain Types of Snowflake Tools.	5M	CO-2	L2
(OR)				
4.	a) Explain the steps to Creating a Snowflake Account and connecting to snowflake	5M	CO-2	L3
	b) Define how to choose the cloud provider and region of a snowflake .	5M	CO-2	L3
<u>UNIT-III</u>				
5.	a) Illustrate the futures of virtual warehouses.	5M	CO-3	L2
	b) Explain the steps to install and Configuring SnowSQL.	5M	CO-3	L2
(OR)				
6.	a) Explain how to build a snowflake virtual warehouse.	5M	CO-3	L3
	b) Explain any six SnowSQL Commands.	5M	CO-3	L3
<u>UNIT-IV</u>				
7.	a) Explain Bulk Loading with the Snowflake Web Interface.	5M	CO-4	L2
	b) Explain Building a Data Pipeline Using the Snowpipe.	5M	CO-4	L2
(OR)				
8.	a) Explain External Tables and Data Lakes with an example.	5M	CO-4	L2
	b) Explain Bulk Data Loading Recommendations.	5M	CO-4	L3
<u>UNIT-V</u>				
9.	a) Explain Snowflake security reference architecture.	5M	CO-5	L3
	b) Explain Administering Database Objects.	5M	CO-5	L3
(OR)				
10.	a) Explain Snowflake Materialized Views.	5M	CO-5	L2
	b) Explain Security validations.	5M	CO-5	L3
<u>UNIT-VI</u>				
11.	a) Explain Optimizing Warehouse Utilization	5M	CO-6	L3
	b) Explain Data Sharing Using a Secure View.	5M	CO-6	L3
(OR)				
12.	a) Explain Supported File Formats, Advanced Data Types in XML	5M	CO-6	L2
	b) Define High-Performance Queries Optimizing .	5M	CO-6	L2

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) What are the principles of modeling? Explain in detail.	5	CO1	K2
	b) Explain the Software Development Life Cycle.	5	CO1	K2
	(OR)			
2.	a) How does the object oriented approach differ from the traditional approach?	5	CO1	K3
	b) List out the UML diagrams. Explain which diagrams are static and dynamic. Why?	5	CO1	K2
	<u>UNIT-II</u>			
3.	What is forward engineering? How to forward engineer a class diagram? Explain with one example	10	CO2	K2
	(OR)			
4.	What are the common modeling techniques of object diagram? Explain in detail.	10	CO2	K2
	<u>UNIT-III</u>			
5.	Draw the complete use case diagram for the library system and explain the relationships and responsibilities of various actors.	10	CO3	K5
	(OR)			
6.	Explain with an example how to model flow of control by time and flow of control by organization.	10	CO3	K2
	<u>UNIT-IV</u>			
7.	a) Define event and signal. What are the four kinds of events modeled by UML?	5	CO4	K2
	b) What is meant by state machine? Discuss about sequential sub states and history states with an example.	5	CO4	K2
	(OR)			
8.	What are the contents, common properties and common uses of component diagrams? Explain briefly.	10	CO4	K2
	<u>UNIT-V</u>			
9.	What is a design pattern? How are design patterns used in the design discipline?	10	CO5	K2
	(OR)			
10.	What is MVC and Explain its architecture.	10	CO5	K2
	<u>UNIT-VI</u>			
11.	What is factory pattern? Explain with an example.	10	CO6	K2
	(OR)			
12.	Differentiate structural design patterns and creational design patterns? Explain both patterns with an example.	10	CO6	K4

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UNIT-I

1. a) Determine the total run off from the district. Assume the surface on which rain falls in a thickly built residential district as follows: 40% of the area consists of roofs and pavements ($i_1 = 0.80$) & 60% of the area consists of lawns and gardens ($i_2 = 0.20$), total area of the district is 2 hectares, and the maximum intensity of rain is taken as 50mm/hr. 6 M
- b) Describe the cycles of decomposition of sewage. 6 M
- (OR)
2. a) Determine the 1day BOD at 25°C, if the 5-day BOD of a wastewater is 250 mg/l at 30°C. Assume deoxygenation constant at 20°C as 0.1/day. 6 M
- b) Write notes on i) Man holes ii) Sewage pumping 6 M

UNIT-II

3. a) What do you understand by preliminary treatment of sewage? Enumerate various unit operations involved in preliminary treatment of sewage. 6 M
- b) What is grit chamber? Describe with the help of neat sketches a horizontal flow grit chamber. 6 M
- (OR)
4. a) The effluent from a primary settling tank is applied to a standard rate filter at the rate of 3 MLD, having a BOD of 175 mg/l. Determine the depth and volume of filter. Adopting surface loading of 2000 l/m²/day and an organic loading of 150 g/m³/day. Also determine the efficiency of such filter unit. 6 M
- b) Discuss the working and biological process in activated sludge process with neat sketch. 6 M

UNIT-III

5. a) What is sewage farming? What are its advantages over the method of disposal of sewage by dilution? 6 M
- b) What is sludge condition and dewatering? Explain the methods of sludge dewatering? 6 M
- (OR)
6. a) Explain the construction and working of septic tank. 6 M
- b) Explain the methods for disposal of septic tank effluent. 6 M

UNIT-IV

7. a) Explain the sources of air pollution. 6 M
- b) What is plume? Explain the plume behavior? 6 M

(OR)

8. a) An industry utilizes 0.5 ml of oil fuel per month. It has also been estimated that for every 1 ml of oil fuel burnt in the factory, per year, the quantities of various pollutants emitted are given as. P.M= 2.9 t/yr, SO₂ = 60 t/yr, NO_x = 8 t/yr, HC = 0.4 t/yr, CO = 0.5 t/yr. Determine the height of chimney required for the safe dispersion of pollutants. 6 M
- b) Explain the working principle of ESP with a neat diagram. What are its advantages and disadvantages? 6 M

UNIT-V

9. a) Explain the causes and effects of noise pollution. 6 M
- b) 50 dB (A) noise lasting for 15 minutes is followed by 90 dB (A) noise lasting for 60 minutes is followed by 60 dB (A) noise lasting for 10 minutes. What is L_{eq} of this noise? 6 M

(OR)

10. a) Discuss the methods for control of noise pollution. 6 M
- b) Describe the Noise levels and their specified Indian standards. 6 M

2 of 2
