

VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK



VII SEMESTER

EN6501-MUNICIPAL SOLID WASTE MANAGEMENT

Regulation – 2013

Academic Year 2018 – 19

Prepared by

Ms.S.MohanaSundari, Assistant Professor/CIVIL

Ms.S.K.Divya, Assistant Professor/CIVIL

Ms.R.Thenmozhi, Assistant Professor/CIVIL



VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING



QUESTION BANK

SUBJECT :EN6501- MUNICIPAL SOLID WASTE MANAGEMENT

SEM/YEAR: VII/IV

UNIT I - SOURCES AND TYPES			
Sources and types of municipal solid wastes - waste generation rates - factors affecting generation, characteristics-methods of sampling and characterization; Effects of improper disposal of solid wastes - Public health and environmental effects. Elements of solid waste management - Social and Financial aspects - Municipal solid waste (M&H) rules - integrated management - Public awareness; Role of NGO's.			
PART- A			
	Questions	BT Level	Competence
1.	What is "3R"?	BT-1	Remembering
2.	What are the effects of improper disposal of solid waste on environment?	BT-1	Remembering
3.	List out the composition of Municipal solid waste.	BT-1	Remembering
4.	What is integrated solid waste management?	BT-1	Remembering
5.	List out any two factors affecting solid waste generation.	BT-1	Remembering
6.	What are the physical characteristics of Municipal Solid Wastes?	BT-1	Remembering
7.	Summarize how solids wastes are classified based on sources.	BT2	Understanding
8.	Explain the role of NGO's.	BT2	Understanding
9.	Explain hazardous waste.	BT2	Understanding
10.	Classify the various improper methods of solid waste disposal.	BT2	Understanding
11.	Identify and brief the vital principle of Municipal Solid Waste Management (MSWM).	BT3	Applying
12.	Identify whether glass pieces and paper wastes comes under which categories of Municipal Solid Waste (MSW)?	BT3	Applying
13.	Define solid waste. How do you utilize it?	BT3	Applying
14.	Classify the various functional elements of MSWM.	BT4	Analyzing
15.	Distinguish garbage and trash.	BT4	Analyzing
16.	Classify the different types of Municipal Solid waste.	BT4	Analyzing
17.	Assess any two legislation rules for Municipal Solid Waste Management.	BT5	Evaluating
18.	Show the importance of solid waste management.	BT5	Evaluating
19.	Discuss the biological and thermal processes of waste	BT6	Creating

	treatment.		
20.	Elaborate the physical composition of Municipal Solid Waste.	BT6	Creating

PART - B

1.	<p>i. What is the role of NGO's in solid waste management? (7)</p> <p>ii. How do public awareness programs contribute to solid wastemanagement? (6)</p>	BT1	Remembering																											
2.	What are the different factors influencing solid waste generation rate? Explain them.	BT1	Remembering																											
3.	List any ten features that affect the generation of MSW. Also, briefly discuss about any three of them.	BT1	Remembering																											
4.	List out the various sources of municipal solid waste and compositions of solid waste from each source.	BT1	Remembering																											
5.	Show the effects and improper disposal of solid waste on human health and environment.	BT2	Understanding																											
6.	Summarize the salient features of Indian legislation pertaining to municipal solid waste management.	BT2	Understanding																											
7.	Explain the properties of MSW.	BT2	Understanding																											
8.	<p>Using the data for a MSW sample provided below, identify the average moisture content of the sample. Base your calculations on a 100 kg sample size.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Component</th> <th>Moisture content (%)</th> <th>Weight (%)</th> </tr> </thead> <tbody> <tr> <td>Paper waste</td> <td>7</td> <td>25</td> </tr> <tr> <td>Yard waste</td> <td>55</td> <td>18</td> </tr> <tr> <td>Food waste</td> <td>65</td> <td>20</td> </tr> <tr> <td>Plastic</td> <td>2</td> <td>5</td> </tr> <tr> <td>Wood</td> <td>20</td> <td>8</td> </tr> <tr> <td>Glass</td> <td>3</td> <td>7</td> </tr> <tr> <td>Metals</td> <td>3</td> <td>9</td> </tr> <tr> <td>Textiles</td> <td>12</td> <td>8</td> </tr> </tbody> </table>	Component	Moisture content (%)	Weight (%)	Paper waste	7	25	Yard waste	55	18	Food waste	65	20	Plastic	2	5	Wood	20	8	Glass	3	7	Metals	3	9	Textiles	12	8	BT3	Applying
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9.	Show the various components of MSW.	BT3	Applying																											
10.	Classify the various sampling techniques for characterization of solid waste.	BT4	Analyzing																											
11.	List out the environmental legislation acts on management and handling of solid waste in detail.	BT4	Analyzing																											
12.	Classify the various types of solid waste in detail.	BT4	Analyzing																											

13.	Explain the functional elements of an effective solid waste management system.	BT5	Evaluating																																																																								
14.	<p>Predict the impact of waste recycling on the percentage distribution of the components found in the collected residential municipal solid waste as shown in the below table 1, using the recycled waste composition data in table 2. If 11% of the waste generated is recycled, Discuss and invent the various composition of the generated waste? The following Tables were used:-</p> <p style="text-align: center;">Table 1</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>S.No</th> <th>Components</th> <th>Collected waste(% weight)</th> </tr> </thead> <tbody> <tr><td>1.</td><td>Food</td><td>8</td></tr> <tr><td>2.</td><td>Paper</td><td>28</td></tr> <tr><td>3.</td><td>Cardboard</td><td>8</td></tr> <tr><td>4.</td><td>Plastics</td><td>9</td></tr> <tr><td>5.</td><td>Textiles</td><td>1</td></tr> <tr><td>6.</td><td>Rubber</td><td>0.8</td></tr> <tr><td>7.</td><td>Leather</td><td>0.8</td></tr> <tr><td>8.</td><td>Yard waste</td><td>22</td></tr> <tr><td>9.</td><td>Wood</td><td>3</td></tr> <tr><td>10.</td><td>Glass</td><td>8</td></tr> <tr><td>11.</td><td>Ferrous metal</td><td>11.4</td></tr> </tbody> </table> <p style="text-align: center;">Table 2</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>S.No</th> <th>Components</th> <th>Recycled (% weight)</th> </tr> </thead> <tbody> <tr><td>1.</td><td>Food</td><td>0</td></tr> <tr><td>2.</td><td>Paper</td><td>50</td></tr> <tr><td>3.</td><td>Cardboard</td><td>10</td></tr> <tr><td>4.</td><td>Plastics</td><td>6</td></tr> <tr><td>5.</td><td>Textiles</td><td>0</td></tr> <tr><td>6.</td><td>Rubber</td><td>0</td></tr> <tr><td>7.</td><td>Leather</td><td>0</td></tr> <tr><td>8.</td><td>Yard waste</td><td>8</td></tr> <tr><td>9.</td><td>Wood</td><td>0</td></tr> <tr><td>10.</td><td>Glass</td><td>18</td></tr> <tr><td>11.</td><td>Ferrous metal</td><td>8</td></tr> </tbody> </table>	S.No	Components	Collected waste(% weight)	1.	Food	8	2.	Paper	28	3.	Cardboard	8	4.	Plastics	9	5.	Textiles	1	6.	Rubber	0.8	7.	Leather	0.8	8.	Yard waste	22	9.	Wood	3	10.	Glass	8	11.	Ferrous metal	11.4	S.No	Components	Recycled (% weight)	1.	Food	0	2.	Paper	50	3.	Cardboard	10	4.	Plastics	6	5.	Textiles	0	6.	Rubber	0	7.	Leather	0	8.	Yard waste	8	9.	Wood	0	10.	Glass	18	11.	Ferrous metal	8	BT6	Creating
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PART - C

1.	List out the various methods to determine the generation rates of solid waste and explain the factors affecting the generation rates.	BT1	Remembering
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2.	Show the possibilities in solid waste management with respect to reduction, reuse and recovery.	BT2	Understanding
3.	Discuss how and why the generation rate of waste has increased over a period of 10 years.	BT6	Creating
4.	Classify the various essential physio-chemical, biological and biochemical characteristics of MSW. Also, briefly explain the significance of proximate analysis of MSW.	BT4	Analyzing

UNIT II - ON SITE STORAGE & PROCESSING

On-site storage methods – Effect of storage, materials used for containers – segregation of solid wastes – Public health and economic aspects of open storage – waste segregation and storage – case studies under Indian conditions – source reduction of waste – Reduction, Reuse and Recycling.

PART – A

Q.No	Questions	BT Level	Competence
1.	What are the characteristics of materials used for storage containers?	BT1	Remembering
2.	What are the qualities of materials used for the containers?	BT1	Remembering
3.	List out any two diseases transmitted by improper storage of MSW.	BT1	Remembering
4.	What do you mean by on-site storage of MSW?	BT1	Remembering
5.	Classify the different types of containers in Onsite storage of solid wastes.	BT2	Understanding
6.	Classify the different on-site processes on solid wastes.	BT2	Understanding
7.	Discuss the various onsite storage methods for solid wastes.	BT6	Creating
8.	Write down the various factors to be considered in Onsite storage of solid waste.	BT3	Applying
9.	What are the physical components to be segregated from MSW?	BT1	Remembering
10.	Why material characteristics are very essential in storage of MSW?	BT1	Remembering
11.	Show the objectives of waste-sorting.	BT2	Understanding
12.	Explain the segregation of solid waste.	BT5	Evaluating
13.	Summarize the various advantages of waste segregation.	BT2	Understanding
14.	Write any four advantages of source reduction.	BT3	Applying
15.	Write down the purpose of reduction in volume of solid waste.	BT3	Applying
16.	Discover the essential of proper storage of MSW.	BT4	Analyzing
17.	Compare the processing of solid waste at commercial and industrial facilities.	BT4	Analyzing
18.	Compare Recycle and Reuse.	BT4	Analyzing

19.	Justify the four R's in waste hierarchy.	BT5	Evaluating
20.	Invent any two "Reduce Tips" for reducing solid wastes and "Reuse tips" for reusing solid wastes.	BT6	Creating

PART - B

1.	List out some of the onsite storage methods along with the economic aspects of storage.	BT1	Remembering
2.	List out the various onsite handling techniques. Explain it.	BT1	Remembering
3.	List out the various factors that should be considered in evaluating onsite processing equipment.	BT1	Remembering
4.	Explain the effects of storage of waste components.	BT5	Evaluating
5.	Summarize the impacts on public health and economic aspects of solid waste storage.	BT2	Understanding
6.	Classify the materials used for the storage containers.	BT4	Analyzing
7.	Write about the estimation of storage capacity of community basins.	BT3	Applying
8.	Explain the importance of On-site segregation of solid wastes and how can be enforced in Indian cities.	BT2	Understanding
9.	Illustrate the objectives, methods, and merits-cum-demerits of on-site segregation of MSW.	BT3	Applying
10.	How would you segregate the solid waste and write down the requirements and methods of separation of solid waste?	BT1	Remembering
11.	Classify the different types of waste collection systems based on their mode of operation with a neat sketch.	BT4	Analyzing
12.	Discuss briefly the 3R concept. Draw the waste management hierarchy.	BT6	Creating
13.	Classify the various methods of sorting the solid waste. Describe it briefly.	BT4	Analyzing
14.	Summarize the measures to be taken by local bodies towards segregation of recyclable wastes.	BT2	Understanding

PART - C

1.	i. Appropriately list out the utility of synthetic polymers in on-site storage of MSW. (6) ii. As per Indian conditions, list out the three popular methods of on-site storage of MSW. (9)	BT4	Analyzing
2.	Summarize the on-site processing of solid wastes in medium and high rise buildings.	BT2	Understanding
3.	List out the various options available for solid waste storage and processing under Indian conditions.	BT1	Remembering

4.	Define mechanical volume reduction. Discuss its importance and method of carrying out.	BT6	Creating
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UNIT III - COLLECTION AND TRANSFER

Methods of Residential and commercial waste collection – Collection vehicles – Manpower– Collection routes – Analysis of collection systems; Transfer stations – Selection of location, operation & maintenance; options under Indian conditions – Field problems- Solving.

PART – A

Q.No	Questions	BT Level	Competence
1.	What is transfer station? How do you select the most appropriate transfer stations?	BT1	Remembering
2.	What is meant by secondary collection of solid waste?	BT1	Remembering
3.	What are the informations available in a collection route schedule?	BT1	Remembering
4.	When will you recommend a stationary container system?	BT1	Remembering
5.	What are the objectives and role of using transfer stations in MSW management.	BT1	Remembering
6.	What are the factors considered in collection of solid waste?	BT1	Remembering
7.	Classify the collection system based on mode of operation.	BT2	Understanding
8.	Show the two separate components for routing procedure.	BT2	Understanding
9.	Classify the different types of vehicles used for collection of Municipal solid waste management.	BT2	Understanding
10.	Summarize the significance of optimal collection route.	BT2	Understanding
11.	Write down the methods of collection of solid waste.	BT3	Applying
12.	Identify any two factors to be considered while selecting the location for transfer station.	BT3	Applying
13.	Write about “at – site” in solid waste collection.	BT3	Applying
14.	Distinguish stationary and hauled container system.	BT4	Analyzing
15.	Distinguish Primary and Secondary collection	BT4	Analyzing
16.	Distinguish the various collection systems based on area improvement, convenience of people and staff, handling and reliability	BT4	Analyzing
17.	Explain Motion time measurement (MTM).	BT5	Evaluating
18.	Recommend the normal range of tonnage/day capacity of a typical large transfer station.	BT5	Evaluating
19.	Discuss collection routes.	BT6	Creating
20.	Discuss the components of waste collection systems.	BT6	Creating

PART- B

1.	What are the important aspects that should be considered to	BT1	Remembering
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	select the efficient 'Collection route' and 'Collection crew size' in an area?		
2.	Show the procedure of assessing the collection route.	BT1	Remembering
3.	What is the present scenario in collection of MSW with flow diagram under Indian condition? Explain it briefly.	BT1	Remembering
4.	<p>i. List out the operation and maintenance of solid waste collection and transfer stations under Indian conditions. (6)</p> <p>ii. List out the various methods of solid waste transportation. (7)</p>	BT1	Remembering
5.	Show the various components and requirements of a transfer station.	BT2	Understanding
6.	Compare the different solid waste collection system. Mention its merits and demerits.	BT2	Understanding
7.	Summarize the points to be considered in selecting any transfer station. Also, appropriately explain its operation with a neat sketch.	BT2	Understanding
8.	Identify and explain the impacts on public health and economic aspects of solid waste storage.	BT3	Applying
9.	Write down the operational sequence and maintenance of stationary and hauled container system.	BT3	Applying
10.	List out the factors involved in the selection of solid waste under Indian conditions. Explain it briefly.	BT4	Analyzing
11.	List out the types of collection vehicle. Explain it briefly.	BT4	Analyzing
12.	<p>i. List out the benefits of transfer station to a community in terms of economics, time, savings and the environmental quality. (5)</p> <p>ii. List out the various transfer options for solid waste in indian conditions. (8)</p>	BT4	Analyzing
13.	Explain the routing guidelines to formulate a suitable route for collection vehicles.	BT5	Evaluating
14.	Considering small indian town of 1000 population, discuss the inventories of equipments, vehicles and manpower requirements for the collection of MSW.	BT6	Creating

PART - C

1.	What are the different methods adopted in India for collection and disposal of solid waste? What changes would you recommended in these methods, so as to make the process more hygienic and aesthetic particularly for big metropolitan cities like Chennai?	BT1	Remembering
2.	Appropriately, classify the various methods of residential and	BT2	Understanding

	commercial solid waste collection.		
3.	i. Write down the role and usefulness of transfer station.(8) ii. Identify the routing pattern for one way street collection and three block configuration. (7)	BT3	Applying
4.	With a case study, explain the selection of location, operation and maintenance of waste. What are the field problems? Explain.	BT5	Evaluating

UNIT – IV - OFF-SITE PROCESSING

Objectives of waste processing – Physical Processing techniques and Equipments; Resource recovery from solid waste composting and biomethanation; Thermal processing options – case studies under Indian conditions.

PART-A

Q.No	Questions	BT Level	Competence
1.	What is the need for processing solid waste?	BT1	Remembering
2.	What are the objectives of incineration?	BT1	Remembering
3.	How does composting work?	BT1	Remembering
4.	How can an incineration help to reduce pollution?	BT1	Remembering
5.	What is landfill?	BT1	Remembering
6.	Define composting.	BT1	Remembering
7.	Show the significance of moisture content in composting process.	BT2	Understanding
8.	Show the significance of C/N ratio in composting.	BT2	Understanding
9.	Summarize about waste disposal.	BT2	Understanding
10.	Summarize the merits and demerits of incineration.	BT2	Understanding
11.	Write about off-site processes.	BT3	Applying
12.	Write about pyrolysis.	BT3	Applying
13.	Write down the objectives of waste processing.	BT3	Applying
14.	Distinguish between incineration and pyrolysis.	BT4	Analyzing
15.	Distinguish between aerobic and anaerobic composting of MSW.	BT4	Analyzing
16.	Distinguish between 'Hazardous waste' and 'Bio-medical waste'.	BT4	Analyzing
17.	Explain the process parameters of composting.	BT5	Evaluating
18.	List any four recoverable products form off-site processing of a solid waste.	BT5	Evaluating
19.	Discuss 'in-vessel composting'.	BT6	Creating
20.	Discuss the probable composition of gases in the pyrolysis of MSW	BT6	Creating

PART- B

1.	i. List any six solid waste processing technique. (8) ii. What is the role of biological processes in solid waste processing? (5)	BT1	Remembering
2.	What are the various options for resource recovery from solid	BT1	Remembering

	wastes in India?		
3.	i. What is windrow composting? List the factors controlling the process efficiency. (8) ii. Show the application of biomethanation process for resource recovery from solid wastes. (5)	BT1	Remembering
4.	State the various mechanical methods of volume reduction of solid waste.	BT1	Remembering
5.	Classify the various incineration technologies.	BT2	Understanding
6.	Illustrate the facilities needed for air pollution/emission and its control due to incinerator.	BT2	Understanding
7.	Explain the following terms: i. Shredding and pulverizing (4) ii. Vermi-composting (3) iii. Incineration (3) iv. In Vessel composting (3)	BT2	Understanding
8.	Write a note on off-site processing options for solid wastes which are well suited under Indian conditions.	BT3	Applying
9.	Write about composting and its facilities. Identify the various types of composting in use and describe with the aid of sketches, their working.	BT3	Applying
10.	In view of essential aspects, appropriately examine the following: i. Incineration and (7) ii. Pyrolysis processes (6)	BT4	Analyzing
11.	List out and explain the techniques & equipments used for resource recovery from solid wastes.	BT4	Analyzing
12.	Examine briefly the various magnetic separators with neat sketches.	BT4	Analyzing
13.	Draw a neat sketch of a municipal solid waste incinerator and explain the working principle.	BT5	Evaluating
14.	Appropriately discuss the significance, factors to be considered in selecting aerobic or anaerobic-based and economics of composting of MSW.	BT6	Creating

PART - C

1.	Write how does incineration help in the management of solid waste.	BT3	Applying
2.	Assess the factors affecting waste composting and explain it briefly.	BT5	Evaluating
3.	Discuss the major types of gaseous emissions from a mass burn incinerator and how each may be effectively removed from flue.	BT6	Creating
4.	Outline a flow chart showing the steps involved in the aerobic composting process.	BT2	Understanding

UNIT-V-DISPOSAL

Land disposal of solid waste; Sanitary landfills – site selection, design and operation of sanitary landfills – Landfill liners – Management of leachate and landfill gas- Landfill bioreactor– Dumpsite Rehabilitation

PART – A

Q.No	Questions	BT Level	Competence
1.	Define the terms leachate and landfill.	BT1	Remembering
2.	Give the composition of landfill gases.	BT1	Remembering
3.	Name some factors that affect the production of landfill gas and leachate.	BT1	Remembering
4	List out two benefits associated with leachate recirculation in a landfill.	BT1	Remembering
5.	What is the purpose of using landfill for waste disposal?	BT1	Remembering
6.	List the various gases generated in sanitary landfill.	BT1	Remembering
7.	Outline, how to minimize leachate generation in a sanitary landfill.	BT2	Understanding
8.	Discuss the types of municipal solid waste which are permitted for land filing as per Indian regulations.	BT2	Understanding
9.	Discuss the different types of landfills.	BT2	Understanding
10.	Describe about landfarming.	BT2	Understanding
11.	Illustrate the uses of daily cover in a land fill.	BT3	Applying
12.	Classify the various methods of disposal of solid waste.	BT3	Applying
13.	Discover the covering materials used in a sanitary land fill.	BT3	Applying
14.	Explain layer to layer disposal system.	BT4	Analysing
15.	Explain the effects of improper disposal of solid waste.	BT4	Analysing
16.	Differentiate Leachate water and waste water.	BT4	Analysing
17.	What are the impacts occurs if, open dumping of solid waste is carried out?	BT5	Evaluating
18.	Prioritize the factors to be considered before selecting a site for landfill.	BT5	Evaluating
19.	State the two prime health effects of dumping MSW on land.	BT6	Creating
20.	Invent the various parameters to be taken in a disposal yard.	BT6	Creating

PART – B

1.	What is leachate? Mention the various methods of treatment of leachate and disposal.	BT1	Remembering
2.	Write the adverse effects of a landfill leachate and list appropriate control measures.	BT1	Remembering

3.	List and explain the important factor that must be considered in the site selection, design and operation of sanitary landfill.	BT1	Remembering
4.	<ul style="list-style-type: none"> i. List the issues to be considered before deciding on gas ventilation from a landfill. (6) ii. Describe a typical gas vents used in the surface of a landfill for the control of landfill gas. (7) 	BT1	Remembering
5.	Explain the various phases of municipal solid waste decomposition in a closed landfill cell.	BT2	Understanding
6.	<ul style="list-style-type: none"> i. Outline, how do leachate and gases differ b/w each phase? (6) ii. Discuss the factors which affect production of leachate and landfill gas. (7) 	BT2	Understanding
7.	Discuss the methods adopted for the control of leachate movement.	BT2	Understanding
8.	Describe the sanitary land filling process in detail with a neat sketch.	BT3	Applying
9.	Discover the problems posted by leachate and examine how to overcome it.	BT3	Applying
10.	Describe in detail the different methods of landfilling and the operations involved with neat sketches.	BT4	Analysing
11.	Explain the various methods of leachate treatment.	BT4	Analysing
12.	Write short notes on <ul style="list-style-type: none"> i. Environmental factors in sanitary landfill sites. (6) ii. Methods used for municipal solid waste landfill. (7) 	BT4	Analysing
13.	Explain in detail the collection and treatment of leachate in the landfill.	BT5	Evaluating
14.	Draw a neat sketch of a sanitary landfill and explain the various components of the sanitary landfill.	BT6	Creating

PART - C

1.	Write a detailed report on the site selection, design and operation of sanitary landfills.	BT1	Remembering
2.	<ul style="list-style-type: none"> i. Describe the pathways of decomposition in sanitary landfills. (7) ii. Discuss the operative issues involved in sanitary landfills. (8) 	BT2	Understanding
3.	<ul style="list-style-type: none"> i. Appropriately compare and contrast the sanitary and in sanitary land filling methods of disposing of MSW. (10) ii. Explain the biochemistry of landfil leachate. (5) 	BT4	Analysing
4.	<ul style="list-style-type: none"> i. What do you understand the term leachate? What problems are posed by leachate and how would you 	BT5	Evaluating

	overcome? (7)		
ii.	Determine the area required for a new landfill site with a projected life of 20 yrs for a population of 150000 generating 25kg per household per week. Assume the density of waste is 500kg/m^3 . A planning restriction limits the height of the landfill to 10m. (8)		



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QUESTION BANK

S.no	Unit		BT1	BT2	BT3	BT4	BT5	BT6	Total Questions
1	Unit-1	Part-A	6	4	3	3	2	2	20
		Part-B	4	3	2	3	1	1	14
		Part-C	1	1	-	1	-	1	4
2	Unit-2	Part-A	6	4	3	3	2	2	20
		Part-B	4	3	2	3	1	1	14
		Part-C	1	1	-	1	-	1	4
3	Unit-3	Part-A	6	4	3	3	2	2	20
		Part-B	4	3	2	3	1	1	14
		Part-C	1	1	1	-	1	-	4
4	Unit-4	Part-A	6	4	3	3	2	2	20
		Part-B	4	3	2	3	1	1	14
		Part-C	-	1	1	-	1	1	4
5	Unit-5	Part-A	6	4	3	3	2	2	20
		Part-B	4	3	2	3	1	1	14
		Part-C	1	1	-	1	1	-	4

PART-A	100
PART-B	70
PART-C	20
TOTAL	190