MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech.VII Semester End Examinations
(Civil Engineering)
(Model Question Paper)

MR-21

Course Title: Transportation Engineering **Course Code: CE701PC**

Time: 3 hours Max. Marks: 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Write any two recommendations of Jayakar Committee.	2	5,6	1	1,2,5
1. b)	What are obligatory points? Explain.	2	3,4	1	1,2,5
	Unit-II				
1. c)	List out the different types of design controls to be adopted for geometric design.	2	1,2	2	1,2,3
1. d)	Explain PIEV theory?	2	3,4	2	1,2,3
	Unit-III				
1. e)	Distinguish between the traffic engineering variables Spot speed and Space Mean Speed?	2	1,2	3	1,2,3
1. f)	Distinguish between collision and condition diagram in traffic engineering.	2	1,2	3	1,2,3
	Unit-IV				
1. g)	Draw a neat sketch of trumpet interchange and show movements in it.	2	1,2	4	1,2,6
1. h)	Draw a neat sketch of cross intersection and show the traffic islands.	2	1,2	4	1,2,6
	Unit-V				
1. i)	Draw a neat phase diagram showing the components of bituminous concrete mix.	2	1,2	5	1,2,3
1. j)	Define the term vehicle damage factor.	2	1,2	5	1,2,3

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain the necessity for Highway Planning.	5	3,4	1	1,2,5
2. b)	Explain the factors controlling the alignment of a highway.	5	3,4	1	1,2,5
	OR				
2. c)	Describe the Engineering Surveys to be organized for the construction of a Highway.	5	1,2	1	1,2,5
2. d)	Determine the order of priority of construction of the routes P,Q and R for phasing of the implementation programme, using the maximum utility principle. Assume the utility units for the population ranges of 1000, 1001–2000, and 2001–5000 as 1.5, 2.0 and 3.0 respectively. The utility efficient for thousand tones of agricultural products is 2.0 and for industrial products it is 15.	5	3,4	1	1,2,5

Route	Length (km)	No of villages served with population range			Productivity in 10^3 Tonnes	
		<1000	1001-2000	2001-5000	Agricultural	Industrial
P	12	8	6	2	12	1.5
Q	15	12	3	3	10	1.0
R	18	20	8	1	15	2.0

	Unit-II				

		M	L	CO	PO
3. a)	Formulate the expression for overtaking sight distance from the undamentals.	5	3,4	2	1,2,3
3. b)	Calculate stopping sight distance for the design speeds of 80kmph for the following categories of gradients. Take coefficient of friction as 0.35 and reaction time as 2.5 sec. (a) Level Road (b) Upward gradient of 2% (c) Downward gradient of 3%.	5	3,4	2	1,2,3
OR					
3. c)	A two-lane highway with a design speed of 80 km/h is aligned with a horizontal curve of radius 180 m. Calculate the superelevation required to maintain this speed? If the maximum superelevation rate of 0.07 is not to be exceeded, and the radius cannot be increased beyond this, what is the allowable speed? The transverse friction coefficient cannot exceed 0.15.	5	3,4	2	1,2,3
3. d)	A vertical summit curve on a highway is to be designed for a speed of 65 kmph and for the safe-stopping sight distance of 130 m. The curve connects an upgrade of 2% and a down grade of 3%. Assume the height of the driver's eye to be 1.50 m and the height of the object above the roadway as 0.15 m, calculate the length of the vertical curve.	5	3,4	2	1,2,3
Unit-III					
4. a)	Explain the relationship between traffic stream variables flow, speed and density with the help of neat diagrams.	5	1,2	3	1,2,3
4. b)	Explain the factors affecting the capacity of highway?	5	1,2	3	1,2,3
OR					
4. c)	Define the term spot speed. Explain the method of data collection and analysis. Where will you use the information in traffic engineering?	5	1,2	3	1,2,3
4. d)	Explain the causes of road accidents and preventive measures to reduce the traffic accidents.	5	1,2	3	1,2,3
Unit-IV					
5. a)	What are Traffic signs? Explain different types with neat sketches.	5	1,2	4	1,2,6
5. b)	Draw a neat sketch of Cross intersection and show conflicting movements. Suggest suitable traffic islands and draw to reduce the conflicts.	5	1,2	4	1,2,6
OR					
5. c)	Explain the Webster method of signal design.	5	5,6	4	1,2,6
5. d)	Explain the design parameters of a Rotary Intersection.	5	1,2	4	1,2,6
Unit-V					
6. a)	Explain the method of conducting Plate load test. How will you use the results in pavement design?	5	1,2	5	1,2,3, 12
6. b)	Explain the design procedure of pavement design as per IRC 37-2012.	5	1,2	5	1,2,3, 12
OR					
6. c)	What tests are to be conducted on road aggregates? How will you judge their suitability for use in different layers of pavement?	5	3,4	5	1,2,3, 12
6. d)	Explain the Benkelmen Beam deflection technique for assessment of strength of existing pavement. How will you design flexible overlay over flexible pavement.	5	5,6	5	1,2,3, 12

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. VII Semester End Examinations
**(Civil Engineering)**
(Model Question Paper)

Course Title: Estimation, Costing and Project Management **Course Code: CE702PC**
Time: 3 hours Max. Marks: 70

Note: Answer ALL Questions
Part-A (1 x 30 = 30 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				

1. a)	Solve for the estimated quantities of the following items of a two roomed building from the given plan and section
	  (i) Earthwork in excavation in foundation
	  (ii) Lime concrete in foundation
	  (iii) First class brickwork in cement mortar 1:6 in foundation
	  (iv) 2.5 cm cc damp proof course
	  (v) First class brickwork in lime mortar in superstructure
	
		20	3	1	1,2,6

1. b)	Summarize about the center line method of estimate.	10	2	1	1,2,6
	OR				

2. a)	Solve to find the estimated quantities of the following items of a two roomed building from the given plan and section
	  (i) Earthwork in excavation in foundation
	  (ii) Lime concrete in foundation
		20	3	1	1,2,6

(iii) First class brickwork in cement mortar 1:6 in foundation and plinth

(iv) 2.5 cm cc damp proof course

(v) First class brickwork in 1:6 cement mortar in superstructure

D = 1×2.1m
W = 1.2×1.5m

SEC·AA   SEC·BB   SEC·CC
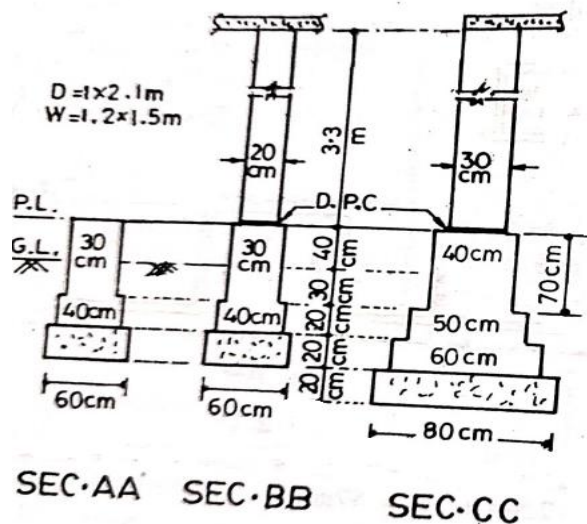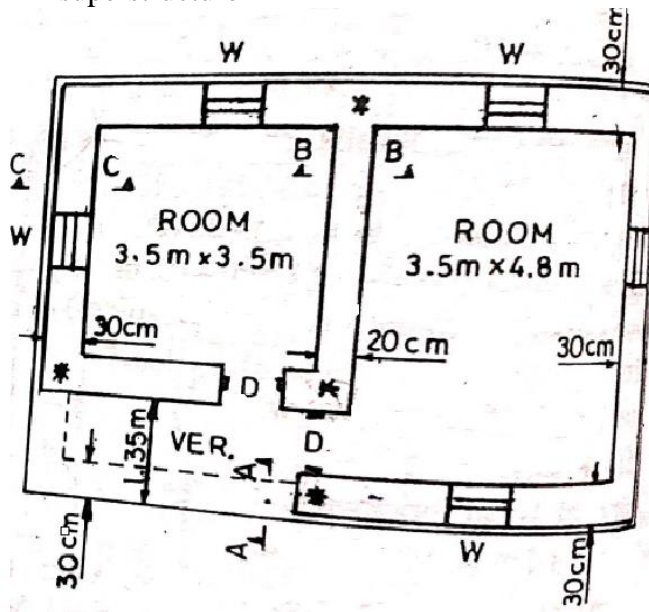
| 2. b) | Develop a preliminary estimate for a framed four storied office building having a carpet area of 400 sq m for each floor. Assume areas occupied by corridor, verandah, lavatories, staircase etc as 25% of built up area and that occupied by walls and columns as 8.5% of the same. The following details may be used for estimation
(a) Built-up area rate for ground floor (excluding foundation) = Rs1,500/- per sq m
(b) Built-up area rate for 1st and 2nd floor = Rs1,650/- per sq m
(c) Built-up area rate for 3rd floor = Rs1,800/- per sq m
(d) Extra for foundation = 20% of superstructure cost
(e) Extra for special architectural treatment = 1% of building cost
(f) Extra for water supply and sanitary = 7% of building cost
(g) Extra for electrical installation = 8% of building cost
(h) Extra for work charge establishment = 10% of overall cost
(i) Extra for other source = 5% of building cost | 10 | 3 | 1 | 1,2,6 |

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-II				
3. a)	Construct a detailed estimate of earthwork for a portion of road from the following data. The formation level at starting point is 119m. Formation width of road is 7.5m and side slopes of banking are 2:1. The road is in downward gradient of 1 in 160 up to 180m and then the gradient changes to 1 in 120 downward. 	Distance in m	R.L of ground
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0	115.5
30	116.75
60	117.25
90	118.20
120	116.10
150	116.25
180	117.25
210	118.30
240	118.10
270	117.80
300	117.25		10	6	2	1,2,6
	OR				
3. b)	What is meant by Bar Bending Schedule and explain about the general principles to be followed and advantages of bar bending schedule to estimate the quantity of steel.	10	1	2	1,2,6

Answer any THREE Questions from Part-C
Part-C (3 x 10 = 30 Marks)

Q. No	Stem of the Question	M	L	CO	PO
	Unit-III				
4. a)	Interpret the procedure for the calculation of rate per unit sq.m of 6 mm thickness plastering	5	2	3	1,2,6
4. b)	Find the rate analysis of 10 m^3 of Cement concrete 1:2:4 with stone ballast 40 mm. Assume the rates.	5	1	3	1,2,6
	Unit - IV				
5. a)	Explain in detail what a contract document must contain.	5	2	4	1,2,6
5. b)	Explain the following: (i) Years purchase method. (ii) Sinking fund method.	5	2	4	1,2,6
	Unit- V				
6. a)	What are the different stages of construction project planning	5	1	5	1,2,4,11
6. b)	Outline the concept of PERT	5	2	5	1,2,4,11
	Unit-III and Unit- IV				
7. a)	Find the rate analysis for the following item of work I-class Brick work in super structure with cement sand mortar 1:6	5	1	3	1,2,6
7. b)	Explain the following clauses used in conditions of contract. (a) Security deposit. (b) Retention money.	5	2	4	1,2,6
	Unit-IV and Unit- V				
8. a)	Summarize the detailed specifications of Earthwork in excavation.	5	2	4	1,2,6
8. b)	What is meant by i) Optimistic time ii) Pessimistic time iii) Most likely time estimate.	5	1	5	1,2,4,11

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech.VII Semester End Examinations
(Civil Engineering)
(Model Question Paper)

MR-21

Course Title: Ground Improvement Techniques   **Course Code: CE713PE**
Time: 3 hours   Max. Marks: 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	What is the need for ground modification?	2	1	1	2,3,
1. b)	List out the problematic soils.	2	1	1	2,3
	Unit-II				
1. c)	Define mechanical modification.	2	1	2	2,3
1. d)	Give the importance of blasting technique.	2	3	2	2,3
	Unit-III				
1. e)	Discuss the objectives of hydraulic modification.	2	3	3	2,3
1. f)	Differentiate the terms filter and drainage.	2	4	3	2,3
	Unit-IV				
1. g)	What is Chemical grouting?	2	1	4	2,3
1. h)	Define shotcreting.	2	1	4	2,3
	Unit-V				
1. i)	Enumerate the applications of geosynthetics.	2	1	5	2,3
1. j)	Explain the purpose of soil nailing.	2	1	5	2,3

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain the applications of ground improvement.	5	1	1	2,3
2. b)	Discuss the various methods for improvement of problematic soils.	5	3	1	2,3
	OR				
2. c)	List out the methods of in-situ and laboratory tests to characterize problematic soils.	5	1	1	2,3
2. d)	What are the various soil stabilization techniques?	5	1	1	2,3
	Unit-II				
3. a)	Explain the Compaction Techniques for ground modification.	5	1	2	2,3
3. b)	Describe any one mechanical modification and state its suitability.	5	3	2	2,3
	OR				
3. c)	Discuss the necessity of soil densification.	5	3	2	2,3
3. d)	Write about compaction piles in improving the ground modification.	5	1	2	2,3
	Unit-III				
4. a)	Explain the objectives and techniques in hydraulic modification.	5	1	3	2,3
4. b)	Discuss the application of geosynthetics in seepage control.	5	3	3	2,3
	OR				
4. c)	Describe the Electro-Osmosis technique of dewatering.	5	4	3	2,3
4. d)	Discuss the significance of Prefabricated vertical drains.	5	3	3	2,3
	Unit-IV				
5. a)	Discuss the lime grouting and cement grouting technique application.	5	3	4	2,3
5. b)	Explain the Guinting technology.	5	1	4	2,3
	OR				
5. c)	Discuss various methods of chemical modification.	5	3	4	2,3
5. d)	Explain about the compaction grouting technique in ground modification.	5	1	4	2,3
	Unit-V				
6. a)	Explain the importance of Soil reinforcement by inclusions and	5	1	5	2,3

		M	L	CO	PO
	confinement.				
6. b)	Describe the properties and functions of Geotextiles.	5	3	5	2,3
OR					
6. c)	List out various functions of geosynthetics in soil reinforcement	5	1	5	2,3
6. d)	Discuss the purpose of rock bolting.	5	3	5	2,3

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. VII Semester End Examinations
(Civil Engineering)
(Model Question Paper)

Course Title: Railway and Airport Engineering   Course Code: CE717PE
Time: 3 hours   Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define sleeper density.	2	1	1	1
1. b)	Define Gauge.	2	1	1	1
	Unit-II				
1. c)	Define Gradient.	2	1	2	1,2
1. d)	Define Cant.	2	1	2	1,2
	Unit-III				
1. e)	Define air transportation.	2	1	3	1,3
1. f)	List functions of aviation organization.	2	1	3	1,3
	Unit-IV				
1. g)	Define runway.	2	1	4	1,3
1. h)	List factors controlling taxiway layout.	2	1	4	1,3
	Unit-V				
1. i)	Explain about air traffic control.	2	2	5	1,12
1. j)	List navigational aids required for airways.	2	1	5	1,12

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	List permanent way components and draw a neat sketch of permanent way.	5	4	1	1
2. b)	List the function of rails and explain about it.	5	4	1	1
	OR				
2. c)	For a sleeper density of (n + 5) find the number of sleepers required for constructing a Broad Gauge (B.G.) railway track of length 650 m.	5	1	1	1
2. d)	List the creep theories and explain about it.	5	4	1	1
	Unit-II				
3. a)	List types of gradients and explain about it.	5	4	2	1,2
3. b)	Explain about negative super elevation.	5	2	2	1,2
	OR				
3. c)	Explain about degree of curve.	5	2	2	1,2
3. d)	On a section of B.G track, the ruling gradient is 1 in 200. If the track is laid in that place at a curve of 5°, determine the allowable ruling gradient on the curve.	5	5	2	1,2
	Unit-III				
4. a)	Explain history of air transport.	5	2	3	1,3
4. b)	Explain about corrections for temperature and elevation in runway length.	5	2	3	1,3
	OR				
4. c)	List aircraft characteristics and explain about it.	5	4	3	1,3
4. d)	Explain about airport site selection.	5	2	3	1,3
	Unit-IV				
5. a)	Explain about wind rose diagram.	5	2	4	1,3
5. b)	List typical airport layouts and explain any one.	5	4	4	1,3
	OR				

		M	L	CO	PO
5. c)	Explain about terminal planning process.	5	2	4	1,3
5. d)	Distinguish between runway and taxiway.	5	4	4	1,3
Unit-V					
6. a)	List air traffic control systems and explain any one.	5	4	5	1,12
6. b)	Explain radar systems used in air traffic management.	5	2	5	1,12
OR					
6. c)	Explain about airport lighting system.	5	2	5	1,12
6. d)	Explain about air safety and regulations issues.	5	2	5	1,12

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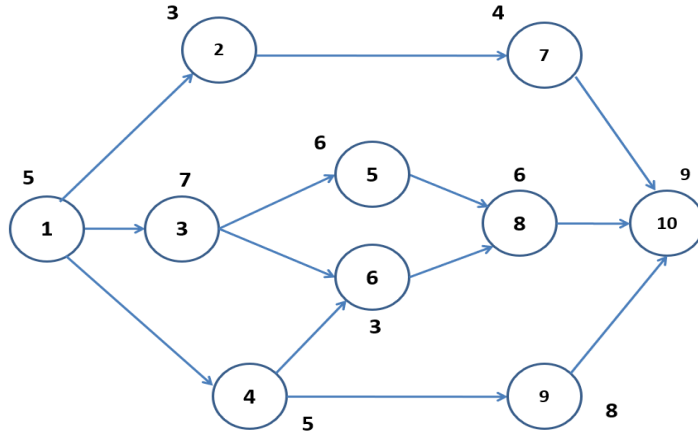
MR-21

Course Title: Industrial Management **Course Code: ME721OE**
Time: 3 hours Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define entrepreneurship	2	1	1	1
1. b)	What are the functions of management?	2	1	1	1
	Unit-II				
1. c)	Distinguish between the lean and flat organization structure	2	2	2	1
1. d)	What do you mean by Virtual organization?	2	2	2	1
	Unit-III				
1. e)	State the factors to be considered for plant location decision.	2	1	3	1
1. f)	Write short notes on FAST diagram	2	1	3	1
	Unit-IV				
1. g)	Distinguish between method study and time study	2	2	4	1
1. h)	What is meant by producer risk and consumer risk with respect to OC curves	2	2	4	1
	Unit-V				
1. i)	Differentiate PERT and CPM	2	2	5	1
1. j)	What do you mean by job evaluation?	2	2	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	List out Fayol's principles of management. Explain any four principles which you consider as very significant.	5	2	1	1
2. b)	Discuss briefly the basic elements of hierarchical need approach.	5	2	1	1
	OR				
2. c)	Explain briefly the McGregor's theory 'X' and theory 'Y'. How do these theories influence the job situation?	5	2	1	1
2. d)	Discuss the salient features of Herzberg's Two-Factor Theory of Motivation	5	2	1	1
	Unit-II				
3. a)	Explain the Line and Staff organization with its merits and demerits	5	2	2	1
3. b)	What are the methods of departmentation? Describe them briefly.	5	2	2	1
	OR				
3. c)	Discuss briefly the salient features of matrix organization structure.	5	2	2	1
3. d)	Discuss briefly the strengths and weaknesses of decentralization.	5	2	2	1
	Unit-III				
4. a)	Compare and Contrast among mass production and job production	5	2	3	1
4. b)	Distinguish between product and process layout with reference to their merits and demerits	5	2	3	1
	OR				
4. c)	Consider the assembly network shown in fig. Which shows precedence relationship and duration for each operation (minutes) in assembling project. The required production volume in 8-hours shift is 24 assembly. Design the assembly line using RPW algorithm.	10	3	3	3

Network diagram (node-arc values):

```
        3                    4
     (2)──────────────────→(7)
    ╱                      ╲  ╲9
  5╱      6                 ╲
 (1)→(3)──→(5)    6      ╲ (10)
   7      ╲   ╲   (8)→────→
           ╲   ╲6 ↗  ╱
            →(6) ╱   8
           3       ╱
     ╲            ╱8
      →(4)──────→(9)
        5
```

Node/arc labels: 1, 2(3), 3(7), 5(6), 6(3), 7(4), 8(6), 9(8), 10(9); arcs 1→2 =5, 1→3 =7, 1→4, 3→5, 3→6, 5→8, 6→8, 4→6, 4→9 =5, 2→7 =4, 7→10, 8→10, 9→10.

5. a)	A job is sub- divided into three elements. The time for each element and respective rating are given below:			5	3	4	3

A job is sub- divided into three elements. The time for each element and respective rating are given below:

Element Number	Observed Time (Minutes)	Rating Factor %
1	8.4	120
2	25.2	125
3	26.4	95

Determine the normal time and standard time for the job if the allowance is 10%.

5. a) — marks: 5, 3, 4, 3

5. b) The following table gives the number of defects in a casting used for making a crank case of a diesel engine

Casting no	1	2	3	4	5	6	7	8	9	10
Number of defects (c)	14	13	26	20	9	25	15	11	14	13

Construct a C-chart with 3 sigma limits and comment on the casting process

5. b) — marks: 5, 3, 4, 2

OR

5. c) Explain the working principle of double sampling plan with help of a flow chart — marks: 10, 2, 4, 1

Unit-V

6. a) Explain factor comparison method of job evaluation in detail — marks: 5, 2, 5, 1

	A project schedule has the following characteristics:				M	L	CO	PO
6. b)	Activity	Estimated duration(days)			5	3	5	1
		Optimistic	Most likely	Pessimistic				
	1-2	2	3	4				
	1-3	3	5	7				
	1-4	5	8	11				
	2-5	5	7	9				
	2-6	8	10	12				
	3-6	7	9	11				
	4-7	9	11	13				
	5-7	3	8	13				
	6-7	6	8	10				

6. b) continued:

Draw the PERT network and determine expected project completion time

OR

	The following is a table showing details of a project:					M	L	CO	PO
6. c)	Activity	Normal		Crash		10	3	5	3
		Time(days)	Cost(Rs)	Time(days)	Cost(Rs)				
	1-2	8	100	6	200				
	1-3	4	150	2	350				
	2-4	2	50	1	90				
	2-5	10	800	5	400				
	3-4	5	100	1	200				
	4-5	3	80	1	100				

Indirect cost is Rs. 70 per day.
(i) Draw the network of the project
(ii) What is the normal duration cost of the project?
(iii) What will be the minimum Project duration and corresponding cost?

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