Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058

First Year END SEM/~~RE~~-EXAM EXAMINATION DEC/~~JAN~~ 2025-26

Program: M. Tech. Construction Management Civil Duration: 3 hr

Course code: PC-MTCM-101 Sem - I Maximum Points: 100

Name of the Course Construction Organization and Safety Management

Semester: I

29/12/25

Instructions:

1. **Question no 1 is compulsory.**
2. **Attempt any 4 questions out of remaining 6 questions.**
3. **Neat diagrams must be drawn wherever necessary.**
4. **Figures to the right side indicate full points.**
5. **Assume Suitable data if necessary and state it clearly**

Q. No.	Questions	Points	CO	BL	Modul
1a	Discuss the process of planning in the context of High-rise Building (G+20) construction project.	05	CO1	BL3	2
1b	Draw site organisation structure for the same.	04	CO1	BL2	2
1c	List the safety gears required on the site for High-rise Building (G+20) construction project.	03	CO2	BL2	5 &6
1d	Identify the hazards involved in the High-rise Building (G+20) construction project.	04	CO2	BL3	5
1e	Discuss the mitigation measures for the hazard identified.	04	CO2	BL3	5 &6
2a	Explain the planning process in construction management and highlight strategies and policies for effective planning.	10	CO2	BL2	2
2b	Describe the contributions of Frederick Taylor and Henry Fayol to the development of management thought.	10	CO1	BL2	1
3a	It is proposed to carry out time and motion study for national highway construction project discuss the procedure for the same.	10	CO2	BL3	3
3b	You have visited to Versova Wastewater Treatment Plant discuss the work permit format for Height work more than 1.8m	10	CO3	BL3	5&6
4a	Discuss the different work measurement techniques along with examples.	10	CO2	BL2	3

4b	For a (G+20) high-rise building construction project a worker fall down from 17th floor while working on scaffolding. Discuss the accident investigation reporting procedure.	10	CO3	BL3	5
5a	Prepare a safety checklist for • Excavation work • Fall protection	10	CO3	BL2	4
5b	Explain: McGregor's Theory 'X' and Theory 'Y' about the nature of people.	05	CO1	BL1	1
5c	Discuss the safety precautions to be taken while using electrical appliances	05	CO3	BL2	4
6a	Discuss in detail the cost of accident.	10	CO3	BL2	5
6b	Discuss the roles and responsibilities of top management, site managers, supervisors and safety officer from the safety point in the construction Bridge construction project.	10	CO2	BL2	3
7a	It is proposed to carry out safety audit in case of (G+20) high-rise building construction project, discuss in detail procedure for the same.	10	CO1	BL1	7
7a	Discuss the safety precautions to be taken while using i) Vehicles during Highway construction project ii) Crane and lift in case of high-rise construction project.	10	CO2	BL2	5

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END ~~M~~-Examinations, ~~January/February~~ 2025

Sem Dec

First Year M. tech Civil Construction Mangt. 31/12/25

Total points: 100

Duration: *Total Time allotted will be 3 Hr.*

Class: M.TECH(CM) Semester: I Program: Civil

Name of the Course: **Applied Statistics and Quantitative Techniques** Course Code : PC-MTCM102

Instructions:

1. Solve any 5 questions.
2. Assume suitable data if necessary and state the clearly.

Que. No		Points	CO	BL	Module No
Q1	A. A company is considering drilling four oil wells. The probability of success for each well is 0.40, independent of the results for any other well. The cost of each well is $200,000. Each well that is successful will be worth $600,000. a) What is the probability that one or more wells will be successful? b) What is the expected number of successes? c) What is the expected gain? d) What will be the gain if only one well is successful? e) Considering all possible results, what is the probability of a loss rather than a gain? f) What is the standard deviation of the number of successes?	10	1	3	1
	B. The number of flaws in a fibre optic cable follows a Poisson distribution. The average number of flaws in 50m of cable is 1.2. What is the probability of exactly three flaws in 150m of cable? What is the probability of at least two flaws in 100m of cable?	10	1	3	1

	What is the probability of exactly one flaw in the first 50m of cable and exactly one flaw in the second 50m of cable.				
Q2	A. it is to be determined whether there is less variability in the treatment efficiency of waste water through process A than that in process B. If the residual pollutant concentration of 8 random samples of the treated waste water through process A and 9 random samples of the treated waste water through process B are tested, it is found that s1=0.15 mg/L and s2=0.35 mg/L. Test the null hypothesis using F distribution. α =0.05 B. The following contingency table shows a random sample of 321 fatally injured passenger vehicle drivers by age and gender. The expected frequencies are displayed in parentheses. At significance level = 0.05, can you conclude that the drivers' ages are related to gender in such accidents?	05 15	2 2	2 2	2 2
3	A. The following table gives the scores (out of 15) of two batches of students in an examination. Test at 1% level of significance the average performance of the students in Batch I and Batch II are equal. B. The average monthly sales based on past experience of a particular brand of tooth paste in departmental stores is ₹ 200. An	10 10	4 4	3 3	3 3

	age						
gender	16-20	21-30	31-40	41-50	51-60	60 & above	total
male	32	51	52	43	28	10	216
female	13	22	33	21	10	6	105
total	45	73	85	64	38	16	321

Batch I	6	7	9	2	13	3	4	8	7	11
Batch II	5	6	5	7	1	7	2	7		

	advertisement campaign was made by the company and then a sample of 26 departmental stores was taken at random and found that the average sales of the particular brand of toothpaste is ₹ 216 with a standard deviation of ₹8. Does the campaign have helped in promoting the sales of a particular brand of toothpaste?				
4	A. Find optimum solution for following transportation model-	10	3	4	6
	B. Solve following assignment model-	10	3	4	6
5.	Weekly demand of a product is assumed to be normally distributed. Usegoodness of fit and following data to test this assumption. Use alpha=0.10, sample mean=24.5 sample std dev=3	20	4	4	5
6	A. Data given indicates ranks between branches of a nationalised bank on basis of their deposit mobilisation and recovery of loans . calculate test statistics and test its significance.	10	4	3	4
	B. Calculate the two regression equations of X on Y and Y on X from the data given below, taking deviations from actual means of X and Y.	10	4	3	4

	1	2	3	4	5	6	Supply
1	9	12	9	6	9	10	5
2	7	3	7	7	5	5	6
3	6	5	9	11	3	11	2
4	6	8	11	2	2	10	9
Requirements	4	4	6	2	4	2	

	I	II	III	IV
1	15	13	14	17
2	11	12	15	13
3	13	12	10	11
4	15	17	14	16

18	20	22	27	22	26	25	25	27	25
25	22	27	25	24	25	28	24	25	26
26	23	20	24	26	31	29	28	19	21

deposit mobilisation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
recovery of loans	4	2	9	1	7	10	8	13	5	3	11	6	12	15	14

x	12	14	15	14	18	17
y	42	40	45	47	39	45

7.	A. A factory manufactures two products A and B. To manufacture one unit of A, 1.5 machine hours and 2.5 labour hours are required. To manufacture product B, 2.5 machine hours and 1.5 labour hours are required. In a month, 300 machine hours and 240 labour hours are available. Profit per unit for A is Rs. 50 and for B is Rs. 40. Formulate as LPP.	10	3	4	7
	B. Solve by Simplex method- Maximize Z= 2X1 + 5X2 subject to constraints, X1+4X2 <=24 3X1+X2 <= 21 X1 +X2 <=9 All X1…. X2 greater than or equal to 0	10	3	4	7

Products		
	Machine	Labour
A	1.5	2.5
B	2.5	1.5
Availability	300 hrs	240 hrs

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END SEMESTER EXAMINATION ~~DEC 2025~~ / JAN2026

First Year M. tech Civil - Construction Management

Sem - I

02/01/26

MTech	MTech Civil-Structural Engineering	MTech Civil-Construction Management	MTech Electrical - Power Electronics and Power System	MTech Mech-Machine Design	Duration : 3 hours Max Points 100 Semester –I Course Name : RMIPR
Course Code	PC-MTSE103	PC-MTCM103	PC-MTPX103	PC-MTMD103	

Instructions:

- Question 1 is compulsory
- Attempt any four questions out of remaining six
- Draw neat diagrams
- Assume suitable data if necessary
- Standard data tables are permitted

Q.No.	Questions	Points	CO	BL	Module No.
Q1A	When to write a research paper? Why to write a research paper? With respect to a research paper writing provide specific guidelines based on following. (Consider Research of your own interest) : • Title and Abstract • Introduction • Literature Review • Methodology • Results • Discussion • Conclusion • References	10	CO1, CO2, CO3	5	M4
Q1B	Define what a research problem is and explain why its careful selection is crucial in the research process. Differentiate between a research topic, a research problem, and a research question. Give an example to illustrate your answer.	10	CO3	5	M1

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END SEMESTER EXAMINATION ~~DEC 2025~~ / JAN2026

Q2A	• Mr X flies quite often from town A to Town B. • He can use the Airport Bus which cost Rs25 But if he takes it there is a 0.08 Chance that he will miss the flight . • The stay in hotel costs Rs270 with a 0.96 chance of being in time for the flight. • For Rs 350 he can use taxi which will make 99 percent chance of being on time for the flight. • If Mr X catches the plane on time he will conclude the business transaction that will produce the profit of Rs 10000/- , otherwise he will lose it . • Which mode of transport should Mr X use ?	10	CO2, CO3	5	M5
Q2B	Imagine you are working on a research problem in your field (e.g., "Assessing the impact of Drone technology on Effectiveness on Construction Project Monitoring " *or* "Developing a sustainable concrete mix using industrial waste"*)*. a) Develop a detailed flowchart depicting the step-by-step research methodology for your chosen problem. Your flowchart should include stages from problem identification to data analysis and reporting. b) Label each step clearly and provide a brief justification for why each step is included in the sequence.	10	CO2	3	M1
Q3A	• A population is divided into three strata so that N1 = 6500, N2 = 2500 and N3 = 3500. • Respective standard deviations are: s1=16, s2=17 and s3=6. • Respective Cost associated with strata Ci for Strata Ni ○ C1=4500, C2=1500, C3=1000 • How should a sample of size n = 89 be allocated to the three strata, if we want optimum allocation using disproportionate sampling design? • Explain Interview techniques in detail.	10	CO2 CO3	4, 5	M2, M3
Q3B	Provide two real-world scenarios where 100% Inspection is essential. Justify why sampling would not be appropriate in these cases. Define 100% Inspection and Sampling Inspection. Explain the primary objectives of each inspection method. Why would an organization choose one over the other?	10	CO2	3	M3

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END SEMESTER EXAMINATION ~~DEC 2025~~ / JAN2026

Q4A	Weight of 10 products are given in the table. Can we declare the variance of distribution of all wts. of all products from which the sample of 10 products was drawn is equal to 20 kgs? Test this at 5% and 1 % level of significance Explain Chi Square Test.	10	CO4	4	M3
Q4B	A maker of golf shirts has been tracking the relationship between sales and advertising dollars. Use linear regression to find out what sales might be if the company invested $65,000 in advertising next year. What do you mean by scatter Plot? What is the purpose of the same.	10	CO2 CO3	4	M3
Q5A	Briefly define a patent in your own words. What is its fundamental purpose from both the inventor's and society's perspective? What are the universal criteria an invention must meet to be considered patentable? Briefly explain what each criterion means. For each of the following, state which patentability criterion it most likely fails to meet and why: • A new kind of wooden chair made from a common, well-known joint technique. • A "perpetual motion machine" that claims to create energy from nothing. • A mathematical formula or a discovered law of nature.	10	CO4	4	M6
Q5B	Numerical on Hypothesis Test – Z Test We want to test on the basis of sample size 35 determinations and at 0.05 level of significance whether the thermal conductivity of a certain kind of plate is 0.34 units, as has been claimed. The mean of sample is 0.343. From the information gathered in similar studies ,	10	CO2, CO3	4	M3

Sr No	1	2	3	4	5	6	7	8	9	10
Wt of Product	30	40	45	53	47	43	55	48	52	49

Sr No.	Sales $ (Y) '000 $	Adv.$ (X) 000'
1	140	31
2	161	48
3	170	56
4	178	61
5	?	65

	we can expect that the variability of such determinations is given by $\sigma = 0.01$				
Q6A	Prepare the guidelines for Case Study method of Research based on following 1. Definition & Nature. 2. When to Use 3. Research Questions 4. Case Selection 5. Design Types 6. Unit of Analysis 7. Data Collection Methods 8. Ethical Considerations 9. Data Analysis Process 10. Validity Strategies	10	CO3	4	M1, M2
Q6B	Points To Prepare Guidelines For Experimental Research 1. Research Question & Hypothesis 2. Variables Definition 3. Experimental Design 4. Population & Sampling 5. Control Groups 6. Randomization 7. Materials & Apparatus 8. Standardized Procedure 9. Data Collection Analysis 10. Ethical Approval & Consent	10	CO3, CO4	5	M3
Q7A	Define Copyright in your own words. How does copyright differ from patents and trademarks? What is the typical duration of copyright protection for literary, artistic, and musical works in India?	10	CO4	4	M6
Q7B	Define Trademark in your own words. How does a trademark differ from other forms of intellectual property like patents and copyrights? Provide three examples of well-known trademarks and explain what they protect (e.g., brand name, logo, slogan).	10	CO4	4	M6

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First Year **END SEM ~~RE~~-EXAMINATION January/~~February~~ 2026**

Program: MTECH (Construction Management) Civil **Duration: 3 Hrs.**

Course Code: PE-MTCM112 Sem - I **Maximum Points: ~~100~~**

Course Name: Construction materials **Semester: I** 05/01/26

Notes: 1. Solve any 5 questions.

2. Start every question on new page

Q no	Questions	Points	CO	BL	Module no
1	A. Explain the broad classification of water reducers used in concrete technology.	10	1,4	2	1
	B. Explain suitability of all types of chemical admixtures.	10	1,4	2	1
2	A. Explain the impact of mineral admixtures in terms of sustainability view.	10	1	2	2
	B. Rank the coal according to its carbon content and give their properties.	05	2	3	2
	C. Explain the different causes of segregations in self healing concrete(SCC).	05	3,4	2	3
3	A. Differentiate between type C fly ash and type F fly ash along with the ternary diagram.	05	2	3	3
	B. Explain cenospheres and Plerospheres in structure of fly ash	05	1,4	2	3
	C. Give the suitability of all lab tests in detail on self healing concrete(SCC) in detail.	10	3	3	3

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END SEM RE-EXAMINATION January/February 2025

4	A. Explain how the formation of ettringite can be overcome when gypsum react with aluminate in concrete. B. What are the hurdles in handling of silica fume and how the solutions can be provided to overcome them.	10 10	1,3 2	2 3	5 2
5	A. Explain the different characteristics of high strength concrete (HSC). B. Give the attributes of high strength concrete for different grades.	10 10	2 2	2 3	4 4
6	A. Write a note on ultra high performance concrete(UHPC). B. Why is SCC preferred over conventional concrete in heavily reinforced structures?	15 05	2,4 2,4	3 3	7 4
7	A. explain the role of manufacturing techniques in improving the effectiveness of bacterial healing, encapsulated healing agents, and autogenous healing in self-healing concrete. B. Explain how the chemical and physical properties of Glenium admixture contribute to the advantages and key features of Glenium concrete. C.Explain- a) The various characteristic features of Glazed Bricks b) The different types/grades of Glazed Bricks as per ASTM standards	05 05 10	3 3,4 3,4	2 2 2	6 6 6

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END SEMESTER ~~December~~ January 2026 / ~~RE- EXAM February~~ 2026

Program: M.Tech Construction Management First Year M.Tech Civil Construction

Course Code: PE-MTCM122

Course Name: Advanced Construction Techniques Sem-I

Duration: 3 Hrs.

Maximum Points: 100

Semester: I

07/1/26

Notes:

1. Attempt any 5 question out of 7 questions.
2. Answers to all sub questions should be grouped together.
3. Neat diagrams must be drawn wherever necessary.
4. Assume Suitable data if necessary and state it clearly.

Q.No.	Questions	Points	CO	BL	Module No.
1.	a. Write a note on i) Seismic refraction method of soil exploration ii) Electrical Resistivity method of soil exploration.	10	1	2	1
	b. What is micro Tunneling? Discuss the main stages involved in micro tunneling process.	10	1	2	2
2.	a. A highway section experiences frequent cracking and low fatigue life under heavy truck traffic. As an engineer, suggest the use of fiber reinforced pavement and justify your recommendation. Explain the construction process, material selection and expected performance improvements.	10	3	2,3	5
	b. Explain in detail about Drilling and Blasting method.	10	1	2	2
3.	a. Explain the concept of sprayed concrete. Discuss the different application methods (dry-mix and wet-mix), equipment used, mix requirements, advantages, limitations, and typical applications in modern construction projects.	10	2	2,3	4
	b. A high-traffic industrial corridor is proposed to be developed using rigid pavement. As a Project Engineer, explain the step-by-step procedure for construction of a concrete road and Justify why rigid pavement is more suitable than flexible pavement for this project.	10	3	3	5

END SEMESTER December 2025 / ~~RE - EXAM February 2026~~

4.	a. Explain in detail about for soil stabilization, its application and benefits.	10	1	1,2	1
	b. Explain the concept of 3D printing in construction with a suitable example of a villa. Discuss the construction process, advantages, limitations, and construction management issues associated with 3D concrete printing.	10	4	2,3	7
5.	a. Discuss how Rice Husk Ash can be used as supplementary cementitious material in concrete.	10	3	2,3	6
	b. Explain with neat sketches the different types of shoring used for supporting structures.	10	1	2	3
6.	a. What is Pre-engineered Buildings? Explain its types advantages and disadvantages.	10	3	1,2	6
	b. Define Roller Compacted Concrete. State its main characteristics and list any four typical applications. Explain the composition and working principle of RCC. How does it differ from conventional concrete in terms of consistency, placement, and compaction?	10	2	1,2	4
7.	a. Apply the concept of pneumatic caisson to describe how it can be used for a bridge pier in a river with bouldery strata.	10	1	3	3
	b. Explain with neat sketch Earth Pressure Tunnel Boring Machine.	10	1	2	2

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January 26

First Year **END SEM/~~RE-EXAM~~ EXAMINATION ~~DEC/FEB~~ 2025-~~26~~**

Program: Civil Engineering with specialization of Construction Management

Duration: 3 hr. **Course Code: MTCM PEC 122**

Maximum Points: 100 **Semester: I**

Course Name: Appraisal & Implementation of Infrastructure Projects 09/01/26

Notes:

1. Q.1 is compulsory & attempt any four out of remaining six
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

Q.No.	Questions	Points	BL	CO	Module No.
1.	**Attempt any Four** 1. Challenges faced by Urban Infrastructure in India. 2. BOT Model. 3. Objectives of Social Appraisal 4. Make a list of issues of infrastructure finance in India. 5. What are success attributes/factors require in Infrastructure audit? 6. Characteristics of Infrastructure Project.	20	L1	1-3	1-7
2	A. Define: Infrastructure. Explain any five government schemes sponsored to development of rural infrastructure in India. B. What is an Infrastructure Project Audit? Explain the importance of Infrastructure project audit. Also discuss the components that should and should not be part of a project audit.	10+10	L1	1-3	1,5
3	A. What is meant by Technical Appraisal? Explain its objectives and aspects. B. Discuss the major types of Infrastructures project with suitable examples. Also discuss how it play important role in economic development of Developing country like India.	10+10	L1	1,2	1,3
4	A. Define: Project Implementation. Discuss the elements of project implementation in detail. B. What do you mean by Public–Private Partnership (PPP)? Discuss any five types of PPP with suitable explanation.	10+10	L2	1,2	2
5	A. Define: Infrastructure financing. Discuss any five types of financing along with their advantages and	10+10	L3	2,3	6

	disadvantages. B. Write short notes on the role of Planning Commission and NITI Aayog in Infrastructure Development of India.				
6	A. Define: Net Present Value & Internal Rate of Return. A project with a 4 year life and a cost of Rs. 225,000 generates revenue of Rs. 48,000 in year 1, Rs. 67,000 in year 2, Rs. 95, 000 in year 3 and Rs. 110,000 in year 4. If the discount rate is 15%, Can be accepted the project? Find the IRR of an investment having initial cash outflow of Rs. 250,000. The cash inflows during the first, second, third and fourth years are expected to be Rs. 66,000, Rs. 78,000, Rs. 92,000 and Rs. 105,000 respectively. B. Write a short note on Breakeven point analysis. A product currently sells for Rs.12 per unit. The variable costs are Rs.4 per unit, and 10,000 units are sold annually and a profit of Rs.30,000 is realized per year. A new design will increase the variable costs by %20 and Fixed Costs by %10 but sales will increase to 12,000 units per year. (a) At what selling price do we break even, and (b) If the selling price is to be kept same (Rs.12/unit) what will the annual profit be? Company is considering two potential projects: building a new factory, or expanding an existing one. The factory expansion project is expected to cost Rs.1 million and generate cash flows of Rs.200,000 per year for the next 5 years, with a discount rate of 10%. The new factory project is expected to cost Rs.2 million and generate cash flows of Rs.300,000 per year for the next 5 years, also with a discount rate of 10%. Decide which of the above seems fore feasible investment decision on the basis of Profitability Index method.	10+10	L3	2,3	4
7	A. Define a decision tree. Write the steps involved in constructing a decision tree. A company may invest in Project P at a cost of ₹3,00,000. If the project succeeds (0.6 probability), company will get	10+10	L3	2,3	4

additional profit ₹7,00,000. If the project fails (0.4 probability), company face a Loss ₹1,00,000. The company also has the option to conduct a market survey costing ₹50,000 which can give signals a Positive signal (0.8 probability of success) & Negative signal (0.3 probability of success) Draw the decision tree including the survey option, calculate EMVs, and suggest the optimal strategy.

B. Write a short note on : Market Appraisal.

1. A company records the monthly sales of a product (in units) for 6 months as follows, Forecast the sales for July using a 3-month moving average method and weighted average method.

Month	Sales (Units)
Jan	120
Feb	135
Mar	150
Apr	145
May	160
Jun	170

2. A firm wants to forecast the market demand (Y) for its product based on advertising expenditure (X). The following data is available:

Advertising Expenditure (₹ lakh) (X)	Demand (Units in 000s) (Y)
2	20
4	40
6	50
8	70
10	80

Estimate the regression equation of demand on advertising and forecast demand when advertising expenditure is ₹12 lakh.

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END SEMESTER ~~December~~ January 2026 / ~~RE - EXAM~~ February 2026

Program: M.Tech Construction Management First Year **Duration: 3 Hrs.**

Course Code: PE-MTCM133 Sem - I **Maximum Points:100**

Course Name: Management of Housing Projects **Semester: I**

09/01/26

Notes:

1. Attempt any 5 question out of 7 questions.
2. Answers to all sub questions should be grouped together.
3. Assume Suitable data if necessary and state it clearly.

Q.No.	Questions	Points	CO	BL	Module No.
1.	a. Define and explain the following : i. Affordable housing ii. Slums iii. Public Private Partnership iv. MIG (Middle income Group) v. LIG (Lower Income Group)	10	1	1,2	1
	b. Explain the Beneficiary-Led Individual House Construction (BLC/IH) vertical and its benefits.	10	1	2	1
2.	a. Specify the documents promoter shall enclose along with application for registration of real estate project.	10	4	2	7
	b. As a Facility Manager of a large institutional building, discuss the need and importance of building maintenance. Explain how organization and systematic management of maintenance activities can improve safety, service life, and cost efficiency.	10	4	2,3	5
3.	a. Give significance of following according to RERA- Real Estate Regulatory Authority. i. Allottee ii. Advertisement iii. Completion certificate iv. Occupancy certificate v. Local authority.	10	4	2	7

END SEMESTER December 2025 / ~~RE - EXAM~~ February 2026

	b. Explain the planning stages involved in the management of a housing project, covering the pre-execution, execution and post execution stages of housing project.	10	3	2	3
4.	a. Define industrialized housing. Explain the role of industrialized housing in low-cost and affordable housing projects.	10	2	1,2	2
	b. Compare the roles and responsibilities of project managers in the pre-execution, Project execution and post execution stages of housing project. Provide suitable examples.	10	3	2,3	3
5.	a. A 20-year-old residential complex is facing frequent complaints related to leakage, electrical failures. As a Construction Management professional, analyze the causes and propose a maintenance organization structure and management plan to address these issues.	10	4	3,4	5
	b. In a high-rise residential or commercial building, efficient lift service is critical. Discuss how lift services are managed throughout the building life cycle, highlighting maintenance practices, safety provisions, and user comfort.	10	3	2,3	4
6.	a. Discuss in detail Heat ventilation and Air conditioning system with reference to functions and types of HVAC systems.	10	4	2	4
	b. Explain Estate management in detail.	10	4	2	6
7.	a. List the key objectives of mass housing projects. Suggest methods to reduce construction time and cost in a large-scale mass housing project using modern construction technologies.	10	2	1,2	2
	b. Discuss MHADA- Maharashtra Housing and Area Development Authority policy in detail in context with estate management.	10	4	2	6

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~~END~~ SEM/RE-EXAM EXAMINATION ~~DEC~~/FEB 2025-26

Program: Civil Engineering with specialization of Construction Management

Duration: 3 hr. First Year M.Tech **Course Code: MTCM PEC 132**

Maximum Points: 100 Civil (CM). **Semester: I**

Course Name: Appraisal & Implementation of Infrastructure Projects

13/02/26

Notes:

1. Q.1 is compulsory & attempt any four out of remaining six
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

Q.No.	Questions	Points	BL	CO	Module No.
1.	Attempt any Four 1. Challenges faced by Urban Infrastructure in India. 2. Importance of SWOT analysis of Infrastructure Project. 3. Objectives of Environmental Appraisal 4. Make a list of sources of Infrastructure finance in India. 5. Make a list of reasons for conducting an infrastructure audit. 6. Hybrid Annuity Model in Infrastructure Project.	20	L1	1-3	1-7
2	A. Define: Infrastructure. Explain any five government schemes sponsored to development of urban infrastructure in India. B. Explain the various phases of a project audit. Discuss the success attributes (factors) required for an effective project audit. Also explain the various items required to form a project audit checklist.	10 +10	L1	1-3	1,5
3	A. Distinguish between Financial Appraisal and Economic Appraisal of a project. Also discuss tools used in Economic appraisal. B. Discuss the various phases of infrastructure projects.	10 +10	L1	1,2	1,3,4
4	A. What do you mean by Public–Private Partnership (PPP)? Discuss any five types of PPP with suitable explanation. B. What is meant by Project Implementation? Discuss the process of project implementation.	10 +10	L2/2	1,2	2

5

A. Define a decision tree. Write the steps involved in constructing a decision tree. Mr. Santosh is a writer of history novels. A movie company and a TV channel both want exclusive rights to one of his popular work. If he signs with TV channel, he will receive a single lump sum, but if he sign with Movie Company, the amount he will receive depends upon the market response to his movie. What should he do?

Box office (prob.)	Movie Company Payout	TV channel payout (lump sum)
Small box office (0.3)	2,00,000	900000
Medium box office(0.6)	10,00,000	900000
Large box office (0.1)	30,00,000	900000

B. Discuss the word Inflation along with its types. For a project with the given data, calculate the real rate of return by assuming rate of inflation 10% on a compound basis every year,

Yr	Cash Outflow (in lac)	Cash Inflow (in lac) (Without considering inflation)
0	10	0
1	-	4.0
2	-	2.5
3	-	2.5
4	-	2.0
5	-	2.0
6	-	1.5

10 +10 | L1/2 | 2,3 | 3,4

6

A. Discuss the various types of financing available for infrastructure projects in India. Explain each with suitable examples

B. What do understand by Infrastructure Project Finance & SPV & its necessity? Critically compare NITI Aayog and the Planning Commission in terms of composition, powers, and approach to development planning in India.

10+10 | L3 | 2,3 | 5,6

7	A. Define: Net Present Value & Internal Rate of Return with formulae. A project with a 3 year life and a cost of Rs. 120,000 generates revenue of Rs. 26,000 in year 1, Rs. 48,000 in year 2, and Rs. 69, 000 in year 3. If the discount rate is 9%, what is the NPV of the project? Find the IRR of an investment having initial cash outflow of Rs. 280,000. The cash inflows at first, second, third and fourth years are expected to be Rs. 72,000, Rs. 97,000, Rs.105,000 and Rs, 110,000 respectively. B. Discuss the payback period along with advantages & disadvantages? An opportunity arises for a company which requires an initial investment of Rs. 800,000 now. The management's discount rate is 12%. The amount of cash inflows expected from the new opportunity are: Year-1 cash Inflow: Rs. 250,000 Year-2 cash Inflow: Rs. 400,000 Year-3 cash Inflow: Rs. 300,000 Year-4 cash Inflow: Rs. 450,000 Compute the simple and discounted payback periods of the new investment opportunity. Is this investment opportunity acceptable under two methods if the maximum desired payback period of the management is 3 years?	10+10	L3	2,3	4

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SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058

~~END-SEM~~/RE-EXAM EXAMINATION ~~DEC~~/FEB 2025-26

Program: Civil Engineering with specialization of Construction Management

Duration: 3 hr. First Year M.Tech **Course Code: MTCM PEC 122**

Maximum Points: 100 Civil (CM). **Semester: I**

Course Name: Appraisal & Implementation of Infrastructure Projects

13/02/26

Notes:

1. Q.1 is compulsory & attempt any four out of remaining six
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

Q.No.	Questions	Points	BL	CO	Module No.
1.	Attempt any Four 1. Challenges faced by Urban Infrastructure in India. 2. Importance of SWOT analysis of Infrastructure Project. 3. Objectives of Environmental Appraisal 4. Make a list of sources of Infrastructure finance in India. 5. Make a list of reasons for conducting an infrastructure audit. 6. Hybrid Annuity Model in Infrastructure Project.	20	L1	1-3	1-7
2	A. Define: Infrastructure. Explain any five government schemes sponsored to development of urban infrastructure in India. B. Explain the various phases of a project audit. Discuss the success attributes (factors) required for an effective project audit. Also explain the various items required to form a project audit checklist.	10 +10	L1	1-3	1,5
3	A. Distinguish between Financial Appraisal and Economic Appraisal of a project. Also discuss tools used in Economic appraisal. B. Discuss the various phases of infrastructure projects.	10 +10	L1	1,2	1,3,4
4	A. What do you mean by Public–Private Partnership (PPP)? Discuss any five types of PPP with suitable explanation. B. What is meant by Project Implementation? Discuss the process of project implementation.	10 +10	L2/2	1,2	2

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

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~~END-SEM~~/RE-EXAM EXAMINATION ~~DEC/JAN 2025-26~~ February,26

First Year

Program: M. Tech. Construction Management Civil Duration: 3 hr

Course code: PC-MTCM-101 Maximum Points: 100

Name of the Course: Construction Organization and Safety Management

Semester: I 09/02/26

Instructions:

1. **Question no 1 is compulsory.**
2. **Attempt any 4 questions out of remaining 6 questions.**
3. **Neat diagrams must be drawn wherever necessary.**
4. **Figures to the right side indicate full points.**
5. **Assume Suitable data if necessary and state it clearly**

Q. No.	Questions	Points	CO	BL	Module
1a	Discuss the process of planning in the context of Rigid pavement road construction in area like Andheri (W).	05	CO1	BL3	2
1b	Draw site organisation structure for the same.	04	CO1	BL2	2
1c	List the safety gears required on the site for construction project of Rigid pavement road in area like Andheri (W).	03	CO2	BL2	5 &6
1d	Identify the hazards involved in the construction project of Rigid pavement road in area like Andheri (W).	04	CO2	BL3	5
1e	Discuss the mitigation measures for the hazard identified in construction project of Rigid pavement road in area like Andheri (W)	04	CO2	BL3	5 &6
2a	Discuss the qualities of project manager along with procedure of performance appraisal a of Project manager.	10	CO1	BL2	2
2b	Brief about the contributions of Frederick Taylor, Henry Fayol and Abraham Maslow to the development of management thought.	10	CO1	BL2	1
3a	Write short note on a) Discuss about the emergency preparedness in case of fire/other incidents. b) Safety at confined spaces.	10	CO2	BL3	5 & 6
3b	It is proposed to carry out time and motion study for bridge construction project discuss the procedure for the same.	10	CO2	BL3	3

4 a	You have visited to Versova Wastewater Treatment Plant discuss the work permit format for Hot work (welding, Grinding, Cutting, Brazing, Hot Rapping)	10	CO3	BL3	5&6
4 b	For a (G+20) high-rise building construction project, while working on Crane and lift in case of high-rise construction project counter weight has toppled. Discuss the accident investigation reporting procedure.	10	CO3	BL3	5&6
5 a	Explain: McGregor's Theory 'X' and Theory 'Y' about the nature of people in the context of construction activity.	05	CO1	BL1	1
5 b	Differentiate production and productivity.	05	CO1	BL1	3
5 c	Discuss the precautions to be taken while working on a) Scaffolding erection and dismantling b) Hydro/Pneumatic Testing	10	CO3	BL2	4
6 a	Discuss the roles and responsibilities of top management, site managers, supervisors and safety officer from the safety point in the construction Highway construction project.	10	CO2	BL2	3
6 b	What are the major causes of accidents in flyover construction project in place like Mumbai suburban area? Suggest the preventive measures to minimize the accidents.	10	CO2	BL1	4
7 a	It is proposed to carry out safety audit in case of high-way construction project, discuss in detail procedure for the same.	10	CO1	BL1	7
7 b	During a Plastering of High-rise building an accident has happened, 2 works injured and 1 worker died on spot itself. Discuss in detail the cost of accident.	10	CO3	BL2	5&6

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End Semester Exam- Jan.2026

Program: F.Y. M.Tech(SE/CM) First Year M.Tech **Duration: 2 Hrs**
Course Code-IK-MTSE101 Civil Construction **Maximum Points: 50**
Course Name: Constitution of India **Sem-I**
12/01/26

Instructions: 1) Attempt Any Five Questions.
2) Label the answers with suitable articles.

Q2 A	Discuss the Philosophy of preamble to the constitution of India.	05	2	4	5
B	Illustrate the concept "Rule of Law".	05	4	3	1
Q3 A	Explain the Role and Functions of Indian Parliament	05	1	2	3
B	Discuss the provisions and features of Directive principles of state policy.	05	3	1	4
Q4 A	Discuss Fundamentals Duties as referred in article 51 A. and its criticisms.	05	3	4	2
B	Narrate the 'Public Interest Litigation.	05	2	3	5
Q5 A	Trace the Features of Fundamental Rights as provided in Article 12-30.	05	3	1	7
B	Describe the Jurisdiction and Functions of Supreme Court.	05	4	2	6
Q6 A	Narrate the Issue of "Waqf (amendment) Act".	05	2	1	4
B	Explain the Composition and Working of Constituent Assembly.	05	5	3	5
Q7 A	Narrate the provisions in "Waqf (amendment) act 2025"	05	2	1	4
B	Discuss the Impeachment process to President of India.	05	5	3	6
Q8 A	State the Writs as provided in article 32 of Indian Constitution.	05	2	1	3
B	Analyze the Salient features of Indian Constitution.	05	5	2	1

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End Semester Exam- Jan.2026

Program: F.Y. M.Tech(SE/CM) Duration: 2 Hrs

Course Code-IK-MTSE101 Maximum Points: 50

Course Name: Constitution of India Sem-I

Instructions: 1) Attempt Any Five Questions.

2) Label the answers with suitable articles.

Q.No.	Questions	Points	CO	BL	MODUAL NO.
1A	Choose the correct alternatives from the following: 1) The Objective Resolution was put forward by_____. a) Dr Rajendra Prasad b) Jawaharlal Nehru c) Dr B.R Ambedkar d) K.M Munshi. 2) _____ means" by what authority "which can be issued by supreme and high courts. a) Prohibition b) Certiorari c) Habeas Corpus d) Mandamus 3) Right to Equality is provided in article_____. a) 14-18 b) 25-28 c) 29-30 d) 23-24 4) The Provisions of Directive Principles of State Policy in Indian Constitution is Adapted from the Constitution of _____ a) Germany B) USA C) Canada D) Ireland 5) Right to Education is referred in article 21A by _____amendment. a) 42nd b) 44th c) 86th d) 90th.	05	03	05	02
B	Answer the Following: - 1) Explain the term Judicial Review 2) Justify the concept Secular. 3) What is meant by Constitution? 4) Define the term Preventive Detention. 5) What do you mean by welfare State?	05	2	4	1