Bharatiya Vidya Bhavan's

Sardar Patel College of Engineerin

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

END SEM Examinations, December 2023

Total points:100 M.Tech (Const. Mgt) Sem I 28/12/23

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

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

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

Instructions:

1. **Questions 1 & 2 are compulsory**

2. Assume suitable data if necessary and state the clearly.

Question No		Points	CO	BL	Module No
1 A	Formulate and Solve using Simplex Method A manufacturer specializing in manufactures of gears intend to add two more gear to his existing production line. Both the types of gears will be worked in the blanking shape and in gear shop. Each gear of type A requires 20 minutes in blanking shop and 40 minutes in gear shop. Similarly each gear type B requires 10 minutes in blanking shop and 10 minutes in gear shop. Blanking shop and gear shop have 1200 minutes and 1600 minutes available per week respectively. The marginal profit for each gear of type A is Rs. 10/- and for each gear of type B is Rs. 4/-The manufacturer is in the market upswing and can sell as he can produce. How many units of gear to be produced to maximise profits?	10	1,3	5	7
1 B	Solve By Big M Method Minimize cost= 25 X + 20 Y Subject to, 4X +3Y >=60 2X + 3Y >= 36 X, Y >= 0.	10	1,3	5	7

Q 2A	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	1,2	2	1
Q2 B	A city installs 2000 electric lamps for street lighting. These lamps have a mean burning life of 1000 hours with a standard deviation of 200 hours. The normal distribution is a close approximation to this case. a) What is the probability that a lamp will fail in the first 700 burning hours? b) What is the probability that a lamp will fail between 900 and 1300 burning hours? c) How many lamps are expected to fail between 900 and 1300 burning hours? d) What is the probability that a lamp will burn for exactly 900 hours? e) What is the probability that a lamp will burn between 899 hours and 901 hours before it fails? f) After how many burning hours would we expect 10% of the lamps tc be left? g) After how many burning hours would we expect 90% of the lamps to be left?	10	1,2	3	1
Q.3 A	1) 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 $\sigma1^2=\sigma2^2$ against the alternative hypothesis $\sigma1^2 < \sigma2^2$ at the 0.05 level of significance. 2) A random sample of size 10 from a normal population gives a sample mean of 22 and sample SD 6. Test if the population mean is 24?	5 5	1,2	3	3
Q 3 B	1) What are Probability and non-probability samples? 2) What are, sampling and non-sampling errors?	10	2	2	3
Q 4 A	A potential buyer of fluorescent lamp brought 50 lamps of each of two bands e.g. national lamp and Indian lamp. after testing lamps, he found that national had mean life of 1282 hrs with population std dev 80 hrs whereas Indian brand lamp has mean life 1208 hrs and std dev 94 hrs.at 5% can buyer conclude that both brands have same mean life?	10	2	2	4

Q 4 B	You send your salespeople to a customer service training workshop. Has training made differences in no of complaints at 1% ?use following data salesperson / No of complaints BEFORE / AFTER A: 6 / 4 B: 20 / 6 C: 3 / 2 D: 0 / 0 E: 4 / 0	10	2	2	4
Q 5 A	Weekly demand of a product is assumed to be normally distributed. Use goodness of fit and following data to test this assumption. Use alpha=0.10, sample mean=24.5 sample std dev=3 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	10	2	3	5
Q 5 B	Following table gives monthly sales of certain firm in three states by its four salesmen. Set up ANOVA States / salesman A B C D X: 5 4 4 7 Y: 7 8 5 4 Z: 6 6 7	10	1,2	3	5
Q 6 A	Following is the scores of seven students in Accounting and ASQT. Calculate coefficient of correlation. Student: 1 2 3 4 5 6 7 Accounting Score: 40 70 84 74 26 78 48 ASQT Score: 64 74 100 60 50 48 80	10	2	3	4
Q 6 B	Determine the regression equation of production (in thousand units) as a function of capacity utilisation (in %) using following data. Correlation coefficient between X on Y =0.68. Estimate the production when capacity utilisation is 75% avg / Std dev capacity utilisation: 84.2 / 12.5 production: 35.6 / 6.8	10	2	3	4
Q 7 A	Find cost of all methods and use MODI method for optimality of following	10	1,3	3	6

transportation model

Plants	warehouses		
A	13	11	8
B	14	16	13
C	12	10	12

Q7 B	A company manufactures around 200 mopeds. Depending upon the availability of raw materials and other condition, the daily production has been varying from 196 mopeds to 204 mopeds, whose probability distribution is given as follows	10	1,3	3	5

Production/day	196	197	198	199	200	201	202	203	204
Probability	0.05	0.09	0.12	0.14	0.20	0.15	0.11	0.08	0.06

The finished mopeds are transported in specially designed three-storeyed lorry that can accommodate only 200 mopeds. Using the following 15 random numbers 82,89,78,24,53,61,18,45,04,23,50,77,27,54 and 10.
Simulate the process to find out

1) What will be average number of mopeds waiting in the factory?
2) What will be number of empty spaces in the lorry?

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END SEMESTER EXAMINATION DECEMBER 2023

Program: Civil Engineering **Duration:3 Hrs**

Course Code: PE-MTCM102 **Maximum Points:100**

Course Name: Construction Materials **Semester: I**

Instructions:

1. Attempt any **FIVE**.
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly.

Q.No.	Questions	Points	CO	BL	Module No.
1	What are the various types of construction chemicals and admixtures used for various purposes? Explain any 4 in detail.	20	CO1	BL1	1
2	It is proposed to carry out construction of High rise building, Describe sustainable construction material Flyash and Silica fume Concrete along with its manufacturing, composition and properties.	20	CO2	BL2	2
3	a. Explain the details of FRP applications in Civil Engineering.	5	CO2	BL1	3
	b. What are smart materials? Explain different types and application areas for each material (Any 5).	15	CO2	BL1	3
4	a. Which are the tests performed on Self Compacting Concrete (SCC). Explain with sketches any 2 tests conducted on SCC. Also discuss about their expected results.	10	CO1 CO3	BL2	4
	b. What is High Performance Concrete and write down its composition? Explain use of HPC for any 2 construction applications.	5	CO1 CO2	BL3	4
	c. Explain the concept of Hollow Core Slab w.r.t. its composition, structure, properties and applications in modern civil engineering.	5	CO1 CO2	BL2	4
5.	a. With a neat labeled sketch, explain the experimental procedure of testing suitability of serpentine marble aggregate as a radiation shield material.	8	CO1 CO3	BL3	5

END SEMESTER EXAMINATION DECEMBER 2023

5	b. Explain the details of Nuclear radiation shielding and its types.	6	CO1 CO3	BL2	5
	c. Write down the note on Nuclear radiation shielding Concrete (RSC)	6	CO1 CO3	BL3	5
6.	With respect to Crumb Rubber Modified Bitumen (CMRB), explain the following: a) Manufacturing process. b) Advantages & its applications c) Installation and Maintenance d) Transportation and Storage	20	CO3	BL2	7
7	a. Write down common types of Glenium concrete admixtures available in market and its working phenomenon with the help of case study.	15	CO2	BL3	6
	b. How is Composite decking suitable for modern construction industry? How to evaluate its performance over traditional materials?	5	CO2	BL1	4

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END SEMESTER EXAMINATION DECEMBER 2023

Program: M. Tech. Construction Management Sem I **Duration:** 3 Hrs

Course Code: PE-MTCM112 **Maximum Points:** 100

Course Name: Advanced Construction Techniques **Semester: I**

Instructions:

3/11/23

1. Attempt any 5 questions.
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly

Q.No.	Questions	Points	CO	BL	Module No.
1a	Explain in detail soil exploration for bridge construction site	10	CO1	BL2	1
1b	Discuss issues and challenges faced during the construction of coastal road project.	05	CO2	BL2	1
1c	Explain in detail Liquefaction of soil.	05	CO2	BL1	1
2a	Compare the different methods of by passing alternatives such as tunnel, open-cut, bridge and highway.	06	CO1	BL1	2
2b	Explain different methods of dewatering.	06	CO2	BL2	2
2c	Discuss ventilation in tunneling and requirements of good tunnel ventilation systems.	08	CO2	BL2	2
3a	Discuss in detail different methods of drilled shaft constructions	07	CO1	BL2	3
3b	Explain in detail the various types of cofferdams and caissons.	07	CO1	BL1	3
3c	Explain about low cost roads.	06	CO2	BL1	5

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4a	Enlist the different types of TBM & discuss working of TBM.	08	CO2	BL1	2
4b	Discuss Causes of landslide and precautionary measures for the same.	06	CO1	BL1	1
4c	Define micro tunneling and discuss its advantages.	06	CO2	BL1	2
5a	Elaborate different type of formwork used in construction industries with their advantages.	05	CO1	BL1	4
5b	What is Pre-engineered building? How it differs from conventional construction work?	10	CO1	BL2	6
5c	Discuss advantages of pre-stress concrete over RC concrete. Differentiate pre-tension and post-tension method.	05	CO1	BL3	4
6a	What is Sustainable construction? Discuss different agricultural wastes that can be utilized for making Sustainable construction.	10	CO1	BL2	6
6b	Discuss sprayed concrete along with its application.	05	CO2	BL1	4
6c	Which are the methods of soil stabilization? Explain it along with need for soil stabilization.	05	CO2	BL1	1
7a	Explain different industrial wastages that act as valuable resource to make economical and durable concrete?	10	CO1	BL2	6
7b	Write down in detailed procedure of pavement construction using bitumen and Hot mix plant. What precautions need to be taken while doing it?	10	CO1	BL2	5

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M.Tech **END SEMSTER EXAM- Dec 2023**

Program: Civil Engineering with specialization of Construction Management Sem I

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

Maximum Points: 100 **Semester: I**

Course Name: Appraisal & Implementation of Infrastructure Projects

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	PO
1.	**Attempt any Four** 1. Make a list of reasons to have an Infrastructure audit. 2. Make a list of success attributes for project audit. 3. Role of Niti Aayog in Infrastructure Finance. 4. Write a short note on Technical Appraisal. 5. Write a short note on SWOT analysis.	20	L1	1-3	1
2	A. Define: Infrastructure. Explain any five challenges faced by urban infrastructure and government schemes sponsored to urban infrastructure. B. Explain characteristics of Infrastructure project. **(Any 8)**	12 +8	L1	1	1
3	A. Explain the various processes involved in phases of infrastructure project life cycle. B Define: Market appraisal. Explain the methods used to forecast demand in market appraisal.	12+8	L1	1,2	1
4	A. Explain the various methods/tools involved in Implementation of Infrastructure project. B. What is project Audit? What is the importance of project audit? What are components should be or should not be a part of project audit?	10+10	L2/4	1,2	1
5	A. Define: Project Finance. Explain any four sources/types of project finances and role of financial institutions exists in India for all infrastructure projects. B. Define: Environmental Appraisal. Compare economic appraisal and finance appraisal in Infrastructure project.	20	L1/4	2,3	11,1
6	A. Define: NPV & IRR 1. 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. 2. A project with a 4 year life and a cost of Rs. 225,000	20	L3	2,3	11,1

	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? B. Define: Breakeven point with graph. 1. The fixed costs at Company X are Rs.10 Lakh annually. The main product has revenue of Rs. 8.30 per unit and Rs. 4.10 variable cost. (a) Determine the breakeven quantity per year, and (b) Annual profit if 300000 units are sold. 2. A Medical contractor has been able to summarize its total annual fixed costs as Rs 100,000 and the total variable cost per unit of production as Rs. 33. (a) If only 5000 units is all that is expected to sell to the government this year what should the per unit selling price be to make a %35 profit this year? (b) If foreign sales of 3500 units per year is to be added to the 5500 units government contract above and a %35 profit is acceptable for this contractor again, what could be the new selling price per unit?				
7	A. Define : Payback Period. 1. 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 these investment opportunity acceptable under two methods if the maximum desired payback period of the management is 3 years? 2. Forecast the demand of VIVO mobiles for all subsequent years beyond 2015 in the table below by moving average method **Year** / **Sales ('ooo)** 2011 / 32 2012 / 34 2013 / 36 2014 / 32 2015 / 33 2016 / 35 2017 / 36 2018 / 37 2019 / 38 2020 / 39 2021 / 41 B. " ***From doles to development: Budget has done well to reorient government spending on subsidies towards rural infrastructure schemes***" – The Indian Express, 6 Feb 2023. Discuss above statement with various challenges & government schemes/policy sponsored Rural infrastructure in India	20	L3	2,3	11,1

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M.Tech Re-Exam-Feb-2024

Program: Civil Engineering with specialization of Construction Management Sem I

Duration: 3 hr.

Course Code: MTCM PEC 122 Maximum Points: 100

Course Name: Appraisal & Implementation of Infrastructure Projects

Semester: I

16/2/24

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	PO	PI
1	1. Breakpoint Analysis 2. Define: Project Appraisal & its scope. 3. Write a short note on Social Appraisal 4. List the various stakeholders involved in infrastructure project	20	L1	1-3	1	1.2.1/ 1.3.1
2	A. "Infrastructure development actually contribute economic development of India" explain with examples B. Define: Infrastructure. Explain the importance and technical aspects of Infrastructure project.	20	L1	1	1	1.2.1/ 1.3.1
3	A. Draw & explain the schematic diagram of organization structure of infrastructure project. B. Economic Appraisal Vs Financial Appraisal	20	L1	1,2	1	1.2.1/ 1.3.1
4	A. Explain the Organizational Structure in infrastructure projects. B. What are the essentials of Financial Section of Detailed Project Report?	20	L2/ 4	1,2	1	1.2.1/ 1.3.1
5	A. Define: Project Finance. Explain types and sources of finance plays crucial role in rural infrastructure projects. B. Define: Project Audit. What are the various components of costs of the infrastructure project?	20	L1/ 4	2,3	11,1	1.2.1/ 1.3.1/ 11.1.1
6	A. Write a short note on: a. Pay back periods b. Internal rate of returns B. What are the challenges in rural infrastructure projects?	20	L3	2,3	11,1	1.2.1/ 1.3.1/ 11.1.1
7	A. What do you understand by NPV. A project involve a cash outlay of rupees 8 lacs as an initial investment and	20	L3	2,3	11,1	1.2.1/ 1.3.1/

	generate cash inflow of rupees 1.8 lacs, 1.5 lacs, 2.1 lacs, 3 lacs, 1 lacs and 2 lacs in the 1st year, 2nd year 3rd year, 4th year, 5th year and 6th year respectively. For this project undiscounted payback period will be? B. Write a short note on Sustainable Infrastructure.					11.1.1

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Re- EXAMINATION

February 2024

Program: M. Tech. Construction Management Sem I Duration: 3 hr
Course code: PC-MTCM-101 Maximum Points: 100
Name of the Course: Construction Organization and Safety Management
Semester: I

13/2/24

Instructions:

1. **Attempt any 5 questions.**
2. **Neat diagrams must be drawn wherever necessary.**
3. **Figures to the right side indicate full points.**
4. **Assume Suitable data if necessary and state it clearly**

Q.No.	Questions	Points	CO	BL	Module
1a	How will you ensure safety in case of bridge Construction project? How it is different than the residential project?	10	CO1	BL2	4
1b	Define organization and discuss its purpose. Draw typical organization structure for departmental organization.	10	CO	BL1	2
2a	Discuss contributions of Fredrick Taylor and Henry Fayol in management thought development.	10	CO1	BL1	1
2b	What are the major causes of accidents in highway & bridge construction project? Suggest the preventive measures to minimize the accidents.	10	CO2	BL1	5
3a	Discuss Douglas McGregor's Theory X and Theory Y in the context of motivational aspect. Also brief about the role of Abraham Maslow with reference to need based theory.	10	CO1	BL2	1
3b	Explain the salient features of OSHA act.	10	CO2	BL2	7
4a	How will you carryout incident investigation, analysis & reporting at construction site?	10	CO3	BL3	4
4b	State the duties and responsibilities of Safety officer. Also discuss role of safety committee.	10	CO2	BL1	4,5

5a	Explain in detail different type's hazard in construction site with suitable examples.	10	CO1	BL1	5
5b	Discuss the safety in the context of use of construction equipment cranes, hoists and lifts etc.	10	CO1	BL1	5
6a	Explain in detail work measurement also discuss various techniques for work measurement.	10	CO1	BL3	3
6b	Write short note on a) Discuss about the emergency preparedness in case of fire/other incidents in case of high rise building. b) Safety while using scaffolding and working platforms	10	CO2	BL3	6
7a	Discuss planning in construction project. Explain various types of plans in the case of bridge construction project.	10	CO2	BL3	2
7b	Explain various safety equipment and gear used on the fly over construction site. Discuss about organization structure for safety management.	10	CO2	BL4	6,2