

Enroll No

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Autonomous Institute, affiliated to SUK)
End Semester Examination (Winter 2019)
First Yr. M.Tech. Civil Construction Management Sem-I

Q.P.Code
E13 1848

Course Code: CCM1014

Course Name: Construction Project Management

Day & Date: Thursday, 26/12/2019

Time : 02.30 pm to 05.30 pm

Max Marks: 100

- Instructions:** 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

- Q.1 (a) Discuss importance of project management with suitable example. 08 CO1
(b) Discuss organizational influence on project management. 07 CO1

OR

- (c) Discuss phases of project management. 07 CO1
Q.2 (a) Discuss how one can estimate activity duration for construction project. 07 CO2
(b) What actions would you take if a project is falling behind schedule or exceeding the project's budget? 08 CO2

OR

- (c) Discuss importance of Work Breakdown Structure (WBS). 08 CO2
Q.3 (a) Draw precedence network diagram for following information and find critical path and total float for each activity. 10 CO2

Activity	Duration (Days)	Preceding Activity	Succeeding Activity	Parallel Activity
A	6	--	D(Finish to Start)	B (Start to Start)
B	2	--	C(Finish to Start)	
C	7	B	D (Finish to Start)	--
D	5	A, C	E (Finish to Start)	--
E	6	D (Finish to Start)	F, G (Finish to Start)	--
F	5	E (Finish to Start)	H (Finish to Start)	
G	4	E (Finish to Start)	H (Finish to Start)	
H	5	F, G (Finish to Start)	--	

- (b) Discuss advantages and disadvantages of Activity on Arrow (AOA). 05 CO2

OR

- (c) Discuss advantages and disadvantages of Activity on Node (AON). 05 CO2



- Q.4 (a) Larson & Toubro Ltd is planning to execute a building project. Project Manager 10 CO3 identified no. of activities involved in the project also he has calculated normal and crash cost for each of the activity. Project Manager wishes to complete the project as early as possible with available resources. Overhead cost of the project is Rs. 3000 per week. Calculate optimum time and optimum cost within which project can be completed.

Activity (i-j)	Duration(Weeks)		Cost(Rs.)	
	Normal	Crash	Normal	Crash
1-2	6	3	7000	14500
1-3	8	5	4000	8500
2-3	4	1	6000	9000
2-4	5	3	8000	15000
3-4	5	3	5000	11000

- (b) Discuss the points to be considered to estimate cost of project. 05 CO3

OR

- (c) Discuss importance of cost estimation for the successful completion of the project. 05 CO3

Q.5 Attempt any **TWO**

- (a) How do you structure a team for a project? What do you consider various factors? 10 CO3
- (b) Discuss the inputs that are required for planning of human resource management 10 CO3
- (c) Discuss plan, acquire and develop phases of human resource management. 10 CO3

Q.6 Attempt any **TWO**

- (a) Discuss importance of information in project context. 10 CO4
- (b) Discuss factors influencing Project Management Information System (PMIS) success. 10 CO4
- (c) Discuss in details project documents managements with reference to construction projects. 10 CO4



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 End Semester Examination
 F.Y.M.Tech. Civil-CM.Sem- I

Q.P. Code
EB 1857

Course Code: CCM1024 Course Name: Construction Equipments and Techniques

Day & Date: Sat, 28/12/2019
 Time: 2:30 - 5:30 pm

Max Marks: 100

- Instructions:**
- 1) All questions are compulsory
 - 2) Figures to the right indicate maximum marks
 - 3) Assume suitable data if not given
 - 4) Use of non-programmable calculator is allowed

Q.1

COs

- (a) A crawler hoe having a 4 cy bucket and whose cost, including the wages to the operator is \$85 per hour, will excavate and load haul units under the stated condition. The maximum digging depth of the machine is 30 feet. Determine the cost per bank cubic yard (bcy) for the condition shown below. Note that the depth of cut falls within the range of the equipments optimum depth of cut; therefore, no adjustment to the cycle time is required.

10 1/2

Condition	(1)
Material	Hard, tough clay
Depth of excavation (ft)	18
Angle of swing (degree)	120
Percent swell	35
Efficiency factor (min/hr)	45

TABLE 9.4 Fill factors for hydraulic hoe buckets.

Material	Fill factor* (%)
Moist loam/sandy clay	100-110
Sand and gravel	95-110
Rock—poorly blasted	40-50
Rock—well blasted	60-75
Hard, tough clay	80-90

TABLE 9.5 Excavation cycle times for hydraulic crawler hoes under average conditions.*

Bucket size (cy)	Load bucket (sec)	Swing loaded (sec)	Dump bucket (sec)	Swing empty (sec)	Total cycle (sec)
<1	5	4	2	3	14
1-1½	6	4	2	3	15
2-2½	6	4	3	4	17
3	7	5	4	4	20
3½	7	6	4	5	22
4	7	6	4	5	22
5	7	7	4	6	24

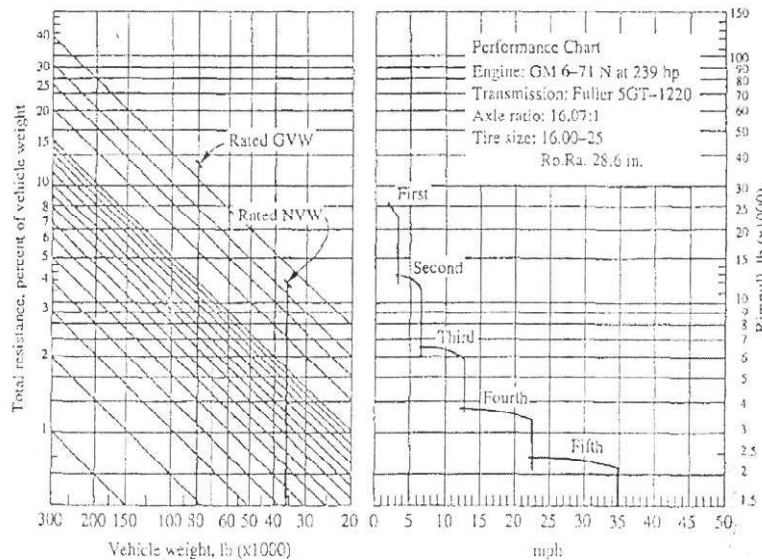
- (b) State the methods of applying energy to the soil and tabulate appropriate compactors to it. Also state advantages of using appropriate compactors based on material type.

10 1



Q.2

- (a) Prepare a table showing 8 step "production", using a 4cy shovel loading well blasted rock (3200 lb per lcy). Consider loading 25 cy size trucks. Assume that the truck can handle the gravimetric load and that the shovel bucket swing cycle time is 30 seconds. Use the fill, factor of 92.5%. The net empty weight of the 25cy truck is 44000 lb. dump time is approximately 1.30 min. The haul distance is 6 miles from excavation area to the fill up a 2% grade. The rolling resistance of the haul road is maintained at 60lb per ton, (3%). 20 1



Q.3

- (a) Produce labeled sketch of all the three plants. 10 3

OR

- (a) On Roller compacted concrete dam project, RMC plant and Crusher unit needs to be aligned together to provide continuous flow of raw and finished products, so as to provide concrete directly to site. Develop a feasible layout to establish both the plants and explain the operation. 10 3

Q.4

- (a) Following tasks are to be performed: 10 4/5
- Laying of new OFC line,
 - Replacing deteriorated sewage pipe of small diameter,
 - Maintain existing main sewer line,
 - Laying new large diameter water supply metal pipes.

Tabulate method you will choose to perform each task and develop method statement for any one of above task.

- (b) Describe the operations of HDD and Guided HDD 05 4

OR

- (b) Describe advantages and disadvantages of trenchless technology over open trenching. 05 4



Q.5

- (a) A raft foundation is to be constructed for river faced resort near to river bank, available strata is permeable. List feasible methods of dewatering or ground water control and choose one best and justify your selection. **10** 4/5

OR

- (a) Develop method statement and explain the operations for the tasks given below: **10** 4/5
1. Dewatering of shallow bridge abutment foundation in a less permeable strata.
 2. Dewatering or control for a construction of bridge pier in water.
- (b) Bring out methods of dewatering and explain one (*not listed above*) in depth. **05** 4

Q.6

- (a) Non-Displacement pile foundation is to be constructed in black cotton soil to the depth of 20 meters. Develop method statement for the task. **10** 4/5
- If the same is to be done using displacement method, list methods you will can apply; Choose one best you think and justify your selection.

OR

- (a) List different types of hammers used for pile driving. State advantages and disadvantages of each **10** 4/5
- (b) To allow for ships to berth properly dock area needs to be deepened by 3 Meters. Geological Survey shows one meter layer of sand below which soft to hard strata is present. It was decided to excavate hard strata using underwater drilling method. Select a method you will apply to excavate sand and remove blasted rock fragments to complete the project. Justify your Selection. **10** 4/5



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End Semester Examination
F.Y.M.Tech. Civil-CM.Sem- I

Q.P. Code
EB 1868

Course Code: CCM1034 Course Name: Ground Improvement Techniques

Day & Date: **Mon. 30/12/2019**

Time: **2:30 - 5:30 pm**

Max Marks: 100

- Instructions:** 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

- | | | | COs |
|-----|---|---|-----|
| Q.1 | (a) Describe different types of engineering problems with soils. | 6 | 1 |
| | OR | | |
| | (a) Describe the strategies for ground improvement. | 6 | 1 |
| | (b) Describe the emerging trends in GI. Explain how: | 8 | 2 |
| | i) A dump yard can be stabilized? | | |
| | ii) How waste materials can be reused | | |
| | iii) How geosynthetics help in geotechnical construction | | |
| | iv) What are the uses of biotechnical stabilization | | |
| Q.2 | (a) Explain various equipments used for shallow compaction. State their characteristics. | 8 | 2 |
| | (b) Discuss different types of tests conducted for compaction control. | 6 | 3 |
| | OR | | |
| | (b) Explain non-destructive methods in compaction control. | 6 | 3 |
| Q.3 | (a) Describe the principles and procedures in dynamic compaction. For which types of soils, dynamic compaction is preferable? | 7 | 4 |
| | (b) Construct a suitable design example to stabilize loose sand deposit of 10m. Make all the necessary assumptions. | 7 | 4 |
| | (c) Explain the factors that influence stone –column foundation response. | 8 | 4 |
| | OR | | |
| | (c) Describe aggregate piers and differentiate between stone columns and aggregate piers. | 8 | 5 |
| Q.4 | (a) Explain the design of PVDs (Prefabricated Vertical Drains) for soft ground improvement. | 8 | 5 |
| | OR | | |
| | (a) Explain the construction sequence of vacuum consolidation. | 8 | 5 |



- (b) Write short notes on different types of tests that need to be conducted for evaluation of permeability. 6 3
- OR
- (b) Describe the electro-kinetic geosynthetics. Explain the applications. 6 6
- Q.5
- (a) List various types of chemical grouts. Comment on the penetrability of various grouts. State the characteristics of chemical grouts. 8 6
- OR
- (a) Discuss geotechnical considerations for use of compaction grouting. List various steps in compaction grouting. State the applications of compaction grouting? 8 6
- (b) Define a micropile and discuss the classification of different types of micropiles. 8 5
- Q.6
- (a) Explain Geogrid, Geofoam, GCL and Geopipe. Give application for each product. 8 6
- OR
- (a) Describe the use of geosynthetics in dam engineering and water resources. 8 6
- (b) Describe different types of creep tests on geosynthetics. Explain importance of creep properties. 6 6
- (c) Describe the methods of heating the soil in-situ. 6 5



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End Semester Examination **Dec. 2019**

First Year M. Tech. Construction Management

Semester- I

Course: Operation Research

Course Code: CCM1044

Q.P.Code

EB 1870

Enroll No

Day & Date : **Mon, 30/12/2019**

Time : **2:30 - 5:30 pm**

Max Marks- 100

- Instructions: 1) All questions are compulsory
2) Figures to the right indicate marks
3) Assume suitable data whenever necessary.

Q1 a) Maximize $Z = 60x_1 + 70x_2$ CO1 10
Subject To: $2x_1 + x_2 \leq 300$

$$3x_1 + 4x_2 \leq 509$$

$$4x_1 + 7x_2 \leq 812$$

$$x_1, x_2 \geq 0$$

Use Simplex Method

b) Minimize $C = 25x + 30y$ CO1 5

Subject To: $4x + 3y \geq 60$

$$2x + 3y \geq 36$$

$$x, y \geq 0$$

Use Big M method.

Q2 a) A firm has three plants $F_1, F_2,$ and F_3 and four warehouses A, B, C, and D. CO1 15
The transportation cost per unit dispatched along each route with capacity of each plant and demand of each plant and each warehouse is given in the Table below.

Plant	Warehouse				Capacity
	A	B	C	D	
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Demand	5	8	7	14	

How should the units be transported to minimize transportation cost? Obtain the initial feasible solution by North West Corner method. Obtain optimal solution by Modified Distribution Method.

OR

a) A firm has three plants A, B, and C and three warehouses P, Q, and R. The CO1 15
transportation cost per unit dispatched along each route with capacity of each plant and demand of each plant and each warehouse is given in the Table below.

Plant	Warehouse			Capacity
	P	Q	R	
A	13	11	8	30
B	14	16	13	40
C	12	10	12	30
Demand	45	35	20	



How should the units be transported to minimize transportation cost? Obtain the initial feasible solution by North West Corner method. Obtain optimal

solution by Modified Distribution Method.

- Q3 a) A pharmaceutical company has four branches, one each at city A, B, C, D. A branch manager is to be appointed one at each city, out of four candidates P, Q, R, and S. The monthly business depends upon the city and the effectiveness of the branch manager in that city. CO1 5

Branch Manager	City			
	A	B	C	D
P	11	11	9	9
Q	13	16	11	10
R	12	17	13	8
S	16	14	16	12

Which manager should be appointed at which city so as to get maximum total monthly business?

- b) A department has three subordinates and four tasks for completion. The employees differ in their capabilities and the task differs in their work contents. With the performance matrix given below, which three of the four tasks should be assigned to the subordinates? CO1 5

Tasks	Subordinates		
	I	II	III
A	9	12	11
B	8	13	7
C	20	12	13
D	21	15	17

- c) A company has three plants A, B and C with capacity of 30, 40 and 30 units of a single product per month. It markets its product through three warehouses P, Q and R with requirements of 45, 35 and 20 units per month respectively. The cost of transportation of one unit of the product from any plant A, B, and C to any warehouse P, Q and R is given in the following Table. CO1 5

Plant	Warehouse		
	P	Q	R
	Cost per Unit (Rs.)		
A	13	11	8
B	14	16	13
C	12	10	12

Calculate the total transportation cost by using Vogel's Approximation method.

OR

- c) Maximize $Z = 3x + 2y$
 Subject To: $x + y \leq 4$
 $2x + y \geq 10$
 $x, y \geq 0$

Use Big M method. CO1 5

- Q4 a) A newspaper boy has the following probabilities of selling a magazine CO2 5

No. of Copies Sold	Probability
10	0.10
11	0.15
12	0.20
13	0.25
14	0.30

Cost of copy is 30 paise and sale price is 50 paise. Unsold copies cannot be



returned. How many copies he should order?

- b) A dairy firm wants to determine the quantity of butter it should produce to meet the demand. Demand patterns from the past records are shown in the following Table. CO2 5

Quantity Required (kg)	No. of Days Demand Occurred
15	6
20	14
25	20
30	80
35	40
40	30
50	10

The stock levels are restricted to the range 15 to 50 kg due to inadequate storing facilities. Butter costs Rs. 40 per kg and is sold at Rs. 50 per kg. Construct a conditional profit table.

- c) A milkman buys milk at Rs. 12 per litre and sells for Rs. 15 per litre. Unsold milk has to be thrown away. The daily demand and probability distribution is given in Table. If each day's demand is independent of previous days demand, how many litres should be ordered every day? CO2 5

Demand (Litres)	46	48	50	52	54	56	58	60	62	64
Probability	0.01	0.03	0.06	0.1	0.2	0.25	0.15	0.1	0.05	0.05

OR

- c) A TV dealer find that the cost of a TV in stock for a week is Rs. 30 and the cost of unit shortage is Rs. 70. For one particular model of TV the probability distribution of weekly sales is given in Table. CO2 5

Weekly Sales	0	1	2	3	4	5	6
Probability	0.10	0.10	0.20	0.25	0.15	0.15	0.05

How many units per week should the dealer order?

- Q5 a) Find the value of game and optimal strategies of players for following game by using Dominance method CO3 10

		Player B					
		1	2	3	4	5	6
Player A	1	4	2	0	2	1	1
	2	4	3	1	3	2	2
	3	4	3	7	-5	1	2
	4	4	3	4	-1	2	2
	5	4	3	3	-2	2	2

OR

- a) Find the value of game and optimal strategies of players for following game by graphical method. CO3 10

		Player B		
		1	2	3
Player A	1	1	3	11
	2	8	5	2

- b) Find the value of game and optimal strategies of players for following game by sub-game method CO3 10



			Player B	
		1	2	3
Player A	1	4	1	-7
	2	2	-2	9

- Q6 a) Workers come to tool store room to receive special tools required by them for accomplishing a particular project assigned to them. The average time between two arrivals is 60 seconds and the arrivals are assumed to be in Poisson distribution. The average service time is 40 seconds. Determine
- CO5 5
- i) Average number of workers in the queue
ii) Average number of workers in the system including the worker being attended
iii) Mean waiting time of arrival
- b) A self service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming the Poisson distribution for arrival rate and exponential distribution for service time, find
- CO5 5
- i) Average number of customers waits before being served
ii) Average time a customer spends in the system
iii) Average queue length
- c) A project schedule has the following characteristics.
- CO1 10

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

Find the critical path and all the floats for each activity.



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Q. P. Code
EB 1883

Course Code: CCM1074

Course Name: P.E II Bridge Construction

Day & Date: Wed, 01/01/2020

Time : 2:30 - 5:30 pm

Max. Marks: 100

- Instructions:** 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

	Marks	COs
Q.1 Solve any two		
(a) Mention the way in which Bridges are classified?	07	CO1
(b) Briefly outline the development of bridges?	07	CO1
(c) Enlist the types of surveys and geological investigations required before the actual execution of Bridge?	07	CO1
Q.2 Solve any two		
(a) How you will make identification of bridges, when there are multiple bridges on single route? Give suitable example.	07	CO2
(b) Predict the factors to be considered while selecting the site for a proposed bridge construction?	07	CO2
(c) Discuss how you would compute Seismic forces bridge?	07	CO2
Q.3 Solve any two		
(a) Describe the loads and trusses to be considered while designing highway bridges?	08	CO3
(b) Express the cause for longitudinal forces on bridges	08	CO3
(c) State how the dynamic effect is considered in railway bridge design?	08	CO3
Q.4 Solve any two		
(a) Sketch the typical cross section of box girder highway bridge and also give the advantages of box girder construction?	08	CO3
(b) Discuss IRC standard loadings and indicate the conditions under which each should be used?	08	CO3



(c)	Discuss why most marine piles are circular in cross section?	08	CO3
Q.5 Solve any four			
(a)	Compare the advantages of assigning the central pier over the abutment as fixed piers?	05	CO2
(b)	In bridge widening projects, the method of stitching is normally employed for connecting existing deck to the new deck. What are the problems associated with this method in terms of shrinkage of concrete?	05	CO2
(c)	In designing the lateral resistance of piles, should engineers only use the earth pressure against pile caps only?	05	CO2
(d)	Predict suitable method to tackle negative skin friction?	05	CO2
(e)	Summarize the purpose of conducting load test for piling works?	05	CO2
Q.6 Solve any four			
(a)	Discuss how you will determine the size of elastomeric bearings?	05	CO5
(b)	Explain the consideration in selecting the orientation of wing walls in the design of bridge abutments?	05	CO5
(c)	Polytetrafluoroethylene (PTFE) is commonly used in sliding bearings. Justify the statement?	05	CO5
(d)	Conclude how do engineer determine the number of cells for concrete box girder bridges?	05	CO5
(e)	Are diaphragms necessary in the design of concrete box girder bridges?	05	CO5



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End Semester Examination (Winter 2019)
FYM.Tech. Civil-CM.Sem- I **Course Code:**
CCM1114 **Course Name:** Reserch Methodology & IPR

Q.P.Code
EB1892

Day & Date: ... Fri., 03/01/2020
Time: 2:30 - 4:30 pm

Max Marks: 50

- Instructions:** 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

- Q 1 a) Explain steps involved in formulating a research problem. 08 CO1
b) Justify with live example a good technical research design 08 CO1
OR
b) 'Hypothesis is a key for research'. Justify with example 08 CO2
- Q 2 a) How the ethics in research are maintained. Which provisions are followed during the process of research. 08 CO2
OR
a) Compare primary and secondary data in view of importance, collection and utilization.. 08 CO3
b) Explain important content along with various rules followed during writing a research paper 08 CO3
- Q 3 a) Compare Patent, Copy right and Trade mark with live example considering present market situation. 09 CO4
b) Elaborate rights of patentee and system followed for grants of patents 09 CO4
OR
b) Elaborate new systems and developments in patent world 09 CO4

