

Enroll. No.

K. E. Society's
Rajarambapu Institute of Technology,
Rajaramnagar
 (An Autonomous Institute)

QP No.
EM633

End Semester Examination, May 2016
 F.Y.M. Tech. Construction Management SEMESTER – II
ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENTS, CCM 5021

Day & Date: **Saturday, 7th May, 2016**
 Max Marks : **100**

Time: **3 Hrs.**

- Instructions:
1. All questions are compulsory
 2. Figures to the right indicate full marks
 3. Assume suitable data if necessary and mention it.

Que	Description	CO	Max. Marks
Que.1 a)	Explain in detail various types of mechanical dredgers.	CO1	08
	<i>OR</i>		
Que.1 a)	Illustrate various purposes of dredging with suitable example.	CO1	08
Que.1 b)	Recommend the type of dredger need to be used when dredging is to be done on i) Soft Soil ii) Hard Rock	CO1	12
Que.2 a)	Distinguish various dewatering methods according to their adoptability	CO2	10
	<i>OR</i>		
Que.2 a)	Elaborate the factors on which dewatering system is selected.	CO2	10
Que.2 b)	Explain the factors that should be known prior to designing a dewatering project as per IS 9759:1981.	CO2	10
Que.3 a)	Laying work of underground telecommunication cables is about to carry at a site with following details- i. River and road crossing ii. Sandy Soil iii. Depth of GWT – 4 mt. Recommend the type of trenchless technology that can be adopted. Justify your answer.	CO3	12
Que.3 b)	Explain with sketch the working of Micro-tunneling	CO3	08
	<i>OR</i>		
Que.3 b)	Explain with sketch the working of Pipe Bursting.	CO3	08
Que.4 a)	Explain the type of bridges and its suitability. Also explain the factors on which selection of bridge type depends.	CO4	12
Que.4 b)	Discuss in detail about steps involved in Accelerated Bridge	CO4	08

		Construction (ABC)		
		<i>OR</i>		
Que.4	b)	Explain the stages of construction involved in construction of Millau Viaduct.	CO4	08
Que.5	a)	Illustrate the steps involved in construction of bridge by Balanced Cantilever Method.	CO4/ CO5	10
Que.5	b)	Explain the working of track laying Machine (Harsco NTC). Also compare the efficiency of the same with conventional method.	CO4/ CO5	10
		<i>OR</i>		
Que.5	b)	i) Elaborate the principle on which Maglev Train Works	CO4/ CO5	05
		ii) Elaborate the principle on which Sky Bus Works	CO4/ CO5	05

Q. 3 Attempt any two.

a) Find out breakeven point analytically for following data:

1. Sale Rs. 1 lakh, 2. Direct material Rs. 20000/- 3. Direct labour Rs.10000/- 4. Variable overhead Rs. 10000/- 5. Fixed overhead Rs. 15000/- 6. Unit sale Rs.1.

Also indicate from breakeven point the effect of 10% rise in fixed cost. (9) CO3

b) The Ford Foundation expects to award 15 million in grants to public high schools to develop new ways to teach the fundamentals of engineering that prepare students for university level material. The grants will extend over a 10 years period and will create an estimated savings of 1.5 million per year in faculty salaries and student related expenses. The foundation uses a discount rate of 6% per year. This grants program will share foundation funding with ongoing activities, so an estimated 200000 per year will be removed from other program funding. To make the program successful, a 500000 per year operating cost will be incurred from the regular M&O budget. Use the benefit cost method to determine if the grant program is economically justified. (9) CO3

c) Discuss the fundamentals and terms used for replacement study. (9) CO3

Q.4 Following is the Balance Sheet of Atharv & Co. as on 31st March 2016.

Liabilities	Rs.	Asset	Rs.
Equity Share Capital	1,50,000	Goodwill	50,000
6% pref. shares	75,000	Land Building	1,50,000
General Reserve	75,000	Machinery	1,75,000
Dividend equalization fund	25,000	Stock in trade	1,00,000
5% Debentures	2,00,000	Debtors	75,000
Current liabilities	50,000	Cash at bank	17,500
		O/s income	7,500
	575000		5,75,000

Calculate:

- a) Solvency ratio
- b) Debt equity ratio
- c) Current Asset to Net worth ratio
- d) Proprietary ratio
- e) Fixed assets to shareholders fund ratio.

(16) CO5

OR

Q.4. What is meant by analysis of financial statements? Briefly explain the various techniques of analyzing financial statements. (16) CO5

Enrollment No	
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Q.P. Code	EM 601
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K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar.
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End Semester Examination- May 2016
 First Year M. Tech. Construction Management SEMESTER – II
 Operations Research in Construction (CCM 5061)

Day and Date: Wednesday, 10/05/2016

Time: 02:30 to 05:30

Max Marks-100

Instructions:

- 1) All questions are compulsory
- 2) Figures to the right indicate full marks
- 3) Use of non-programmable calculator is allowed.

Q.1 Solve Any TWO

- | | | |
|--|----|-----|
| a) Discuss in detail various phases of Operations Research. | 9M | CO1 |
| b) Discuss the concept of Sensitivity analysis. | 9M | |
| c) Justify how managerial problems are solved through operations research. | 9M | CO1 |

Q.2 a) Minimize $Z = x_1 - 3x_2 + 3x_3$ 12M CO4

Subject to

$$\begin{aligned} 3x_1 - x_2 + 2x_3 &\leq 7 \\ 2x_1 + 4x_2 &\geq -12 \\ -4x_1 + 3x_2 + 8x_3 &\leq 10 \end{aligned}$$

With $x_1, x_2, x_3 \geq 0$

b) Convert the following LPP into its dual. 6M CO4

Maximize $Z = 40x_1 + 80x_2$

Subject to

$$\begin{aligned} 5x_1 + 20x_2 &\leq 400 \\ 10x_1 + 15x_2 &\leq 450 \end{aligned}$$

With $x_1, x_2 \geq 0$

OR

- | | | |
|--|-----|-----|
| c) Discuss the significance of Linear Programming Problem in civil engineering. | 6M | CO1 |
| Q.3 a) Five cement wagons are available at stations 1,2,3,4 and 5. These are required at five construction sites I, II, III, IV and V. Mileages between stations are given by the table below. How should the cement wagons be transported so as to minimize the total mileage covered? | 12M | CO2 |

	I	I	III	IV	V
1	10	5	9	18	11
2	13	9	6	12	14
3	3	2	4	4	5
4	18	9	12	17	15
5	11	6	14	19	10

b) Discuss variants in transportation model. 4M CO2

OR

c) Discuss variants in assignment model. 4M CO2

Q.4 a) A manager is faced with problem of choosing one of the three products for 10M CO3

manufacturing. The demand for each product may turn out to be good, moderate or poor. The probability for each state of nature is estimated as follows:

Product	Demand		
	Good	Moderate	Poor
OPC 43 Grade	0.7	0.2	0.1
OPC 53 Grade	0.5	0.3	0.2
PPC 43 Grade	0.4	0.5	0.1

The estimated profit or loss under these states is

	Payoff for Demand (Rs.)		
	Good	Moderate	Poor
OPC 43 Grade	30000	20000	10000
OPC 53 Grade	60000	30000	20000
PPC 43 Grade	40000	10000	-15000

Advise the manager about the choice of the product (Use EMV Criterion)

b) Discuss decision making under conditions of conflict.

6M CO3

OR

c) Discuss with example decision making under conditions of risk.

6M CO3

Q.5 a) Two construction firms expert in Groundwater Exploration are competing for business under the conditions that one firm's gain is another firm's loss. Firm A's payoff matrix is given below. Suggest optimal strategies for the two firms and net outcome thereof.

10M CO5

		FIRM B(Figures are in lakh)		
		No Advertising	Medium Advertising	Heavy Advertising
FIRM A	No Advertising	10	5	-2
	Medium Advertising	13	12	15
	Heavy Advertising	16	14	10

b) Discuss in details graphical method to solve game

6M CO5

OR

c) Discuss in detail concept of decision theory.

6M CO5

Q.6 a) A network consists of following activities and their duration of a small project. Draw the network, mark critical path and calculate all types of floats.

10M CO4

Activity	1-2	1-3	2-8	3-4	4-5	4-7	4-8	5-6	6-7	7-8	7-9	8-9	9-10
Duration in days	36	4	2	2	15	9	10	4	9	9	8	20	20

b) Discuss the characteristics of dynamic programming.

6M CO6

OR

c) Discuss in detail applications of Queuing theory in civil engineering.

6M CO7

b Justify the need to use "selective approach" in materials management. 06 7

Q 6 a The Hunicut and Hallock Corporation makes two versions of the same basic file cabinet, the TOL (Top-of-the-line) five drawer file cabinet and the HQ (High-quality) five drawer filing cabinet. 10 6

The TOL and HQ use the same cabinet frame and locking mechanism. The drawer assemblies are different although both use the same drawer frame assembly. The drawer assemblies for the TOL cabinet use a sliding assembly that requires *four* bearings per side whereas the HQ sliding assembly requires *only two* bearings per side. (These bearings are identical for both cabinet types.) 100 TOL and 300 HQ file cabinets need to be assembled in week #10. No current stock exists.

Develop a material structure tree for the TOL and the HQ file cabinets.

OR

Develop a gross material requirements plan for the TOL and HQ cabinets in the above example. 6

b Draw the performance measurement process for MRP II system 06 6

Q 3 a Monthly consumption of a particular item belonging to 'B' category and having unit price of Rs. 1 has been estimated to be 300 units. Then inventory carrying cost and procurement cost for the company have been computed at 18% and Rs. 36 per order respectively. Stock records show that this item can normally be procured within a period of one month. If the company adheres to the policy of one month safety stock for all 'A' and 'B' category of items. Calculate,

- Re-order quantity
- Re-order level
- Minimum level
- Maximum level
- Average inventory.

Assuming re-order level system of replenishment.

OR

Table below gives the description, annual consumption and price per unit of 20 items. This information is enlisted in the first three columns of the table. The fourth column gives the annual usage (annual consumption in rupee value) obtained by multiplication of annual consumption and unit cost of each item.

Item description	Annual consumption (Unit)	Price (or Cost per unit in Rs.)	Annual usage (Rs.)	Rank
Nitric Acid	4000	10/lit.	40000	1
Xylene	600	10/Kg	6000	5
Drums	2000	16/No.	32000	3
Paraffin wax	3500	1/Kg	3500	7
Biolac	50	8/Kg	400	13
Methylene Chloride	6000	6/Kg	36000	2
Ethyl A	2400	5/Kg	12000	4
D'Sprit	4200	1/lit.	4200	6
Handrast	50	10/Kg	500	12
Castor oil	100	7/Kg	700	11
Camphor	80	40/Kg	3200	8
Eastergum	50	8/Kg	400	14
Amyl A	20	10/Kg	200	16
Cartons	2000	0.15/pc.	300	15
Linseed oil	30	6/Kg	180	18
Talc powder	80	0.25/Kg	20	20
Red oxide	200	0.50/Kg	100	19
Toluene	750	4/Kg	3000	9
Butyle Acetate	350	6/Kg	2100	10
Alstat	20	10/Kg	200	17

Q 4 a End item P is composed of three subassemblies: K, L, and W. K is assembled using 3 Gs and 4 Hs; L is made of 2 Ms and 2 Ns; and W is made of 3 Zs. Develop a product structure tree.

OR

3. Attempt any two of the following:

[16]

a) The following are the data from the steam table.

CO - IV

Temp. °C	:	140	150	160	170	180
Pressure kg/cm ²	:	3.685	4.854	6.302	8.076	10.225

Using Newton's formula, find the pressure of the steam for a temperature of 142°C.

b) The amount A of a substance remaining in a reacting system after an interval of time 't' in a certain chemical experiment is given below.

CO - IV

t (min.)	:	2	5	8	11
A (gms.)	:	94.8	87.9	81.3	75.1

Find the amount of substance remaining in reacting system after time t = 9.

c) Use Gauss forward interpolation formula to find y (25) for the following data.

CO - IV

x:	20	24	28	32
y:	2854	3162	3544	3992

4. Attempt any two of the following:

[16]

a) Fit a second degree parabolic curve to the following data

CO - I

x:	1	2	3	4	5	6	7	8	9
y:	2	6	7	8	10	11	11	10	9

b) Fit a curve of the form $y = a \cdot b^x$ to the following data.

CO - I

x:	1	2	3	4	5	6
y:	151	100	61	50	20	8

c) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using (i) Trapezoidal rule, (ii) Simpson's 1/3rd rule,

(iii) Simpson's 3/8th rule.

CO - V

5. Attempt any two of the following:

[16]

a) What do you mean by positive and negative correlation? Find coefficient of correlation from the following data.

CO - VI

x:	100	102	108	111	115	116	118	112	117
y:	100	100	104	108	112	119	120	110	112

Enroll. No.

EM677

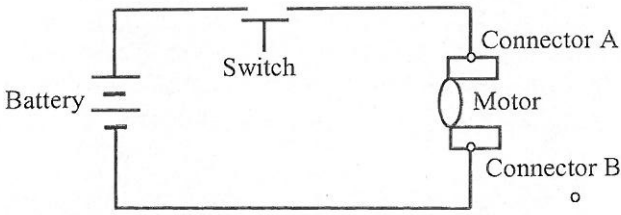
K. E. Society's
Rajarambapu Institute of Technology, Rajaramnagar
 (An Autonomous Institute, affiliated to SUK)
END SEMESTER EXAMINATION, 2016
 First Year M. Tech. Civil Engineering Semester-II
INDUSTRIAL SAFETY AND RISK ASSESSMENT
 Course Code: IET 5081

Day & Date: *Fri, 13/5/2016*
 Time : *2:30 - 5:30 pm*

Max. Marks : 100

Instructions :

- i. All questions are compulsory
- ii. Assume suitable data if necessary and mention it.

Q.1	a	Describe Job Hazard Analysis (JHA) as an accident prevention technique. Think of yourself as a site safety supervisor; perform JHA for the job of "Piping Fabrication Work" . The manufacturing process consists of following operations: unloading of raw materials, cutting, welding, grinding and loading finished product. Prepare JHA worksheet.	CO1	14
	b	Differentiate between safety hazard and health hazard giving examples.	CO1	06
	OR			
	b	Differentiate between accident and incident giving examples.	CO1	06
Q.2	a	What is Fault Tree Analysis (FTA)? What are the standard symbols used in the construction of FTA? Fig:1 shows the circuit diagram indicating the connections of the motor with battery and switch. Construct FTA for the top event "Motor does not run when switch is pressed" . <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0;">Fig.1. Circuit diagram for motor connection</p> </div>	CO2	14
	b	What do you understand by Risk Assessment? Explain how you will conduct the Risk Assessment Program.	CO2	06
	OR			
	b	What do you understand by Risk Analysis? Describe quantitative, semi-quantitative risk and qualitative risk.	CO2	06
Q.3	a	Prepare a detailed safety improvement plan for your college premises considering following aspects: Traffic, lighting, accessibility, ventilation, obstruction, classroom conditions, sanitation, and other related factors.	CO3	14
	b	What are the various types of personal protective equipments used by workmen in industries? What steps you will suggest for accepting personal protective equipments by employees?	CO3	06
	OR			

	b	What do you understand by occupation health and industrial hygiene? Discuss the three types of interaction in the working environment.	CO3	06																		
Q.4	a	<p>It is proposed to assess the landslide risk potential of a river basin. The parameters contributing to the problem of landslide susceptibility of the river basin are mainly: slope angle, soil type and precipitation.</p> <p>i. Develop an Artificial Neural Network (ANN) model to estimate the landslide risk potential of the river basin. Draw the sketch of ANN model.</p> <p>ii. Indicate potential of landslide susceptibility based on the output of ANN model in qualitative terms namely "High" or "Low" by comparing the obtained outputs of iterations (1st & 2nd iteration) with the threshold values.</p> <p>Use the data given in Table 1 for training the ANN.</p> <p style="text-align: center;">Table 1: Data for training of ANN</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Initial input values</th> <th rowspan="2">Initial weight coefficients (input layer to hidden layer), w_i</th> <th colspan="2">Initial weight coefficients (hidden layer to output layer), w_j</th> </tr> <tr> <th>For 1st iteration</th> <th>For 2nd iteration</th> </tr> </thead> <tbody> <tr> <td>x1=1</td> <td>0.50</td> <td>0.30</td> <td>0.40</td> </tr> <tr> <td>x2=0</td> <td>0.50</td> <td>0.30</td> <td>0.40</td> </tr> <tr> <td>x3=0.5</td> <td>0.50</td> <td>0.30</td> <td>0.40</td> </tr> </tbody> </table> <p>Consider the range of Threshold values (TV) as given below:</p> <ul style="list-style-type: none"> • TV > 2.50 indicate landslide susceptibility is "High" • TV between 2.25 to 2.50 indicate landslide susceptibility is "Low" 	Initial input values	Initial weight coefficients (input layer to hidden layer), w_i	Initial weight coefficients (hidden layer to output layer), w_j		For 1 st iteration	For 2 nd iteration	x1=1	0.50	0.30	0.40	x2=0	0.50	0.30	0.40	x3=0.5	0.50	0.30	0.40	CO4	14
Initial input values	Initial weight coefficients (input layer to hidden layer), w_i	Initial weight coefficients (hidden layer to output layer), w_j																				
		For 1 st iteration	For 2 nd iteration																			
x1=1	0.50	0.30	0.40																			
x2=0	0.50	0.30	0.40																			
x3=0.5	0.50	0.30	0.40																			
	b	What are the various applications of Artificial Neural Network?	CO4	06																		
		OR																				
	b	What is Artificial Neural Network (ANN)? Explain the various elements of an ANN.	CO4	06																		
Q.5	a	What do you understand by Safety Management System? What are the important elements of a safety management system? Explain with a block diagram the management model to develop, implement and maintain a safety management system.	CO5	14																		
	b	What is safety audit? Describe briefly various types of safety audit.	CO5	06																		
		OR																				
	b	What are the main objectives of an emergency plan? What are the various aspect you will consider while preparing an on-site emergency plan?	CO5	06																		

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Enrollment No	
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Q.P. Code	EM676
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K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar.
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End Semester Examination- May 2016
First Year M. Tech. Institute Elective SEMESTER - II
Value Engineering (IET5061)

Day and Date: Fri, 13/5/2016
Time: 2:30 - 5:30 pm

Max Marks- 100

Instructions:

- 1) All questions are compulsory.
- 2) Assume suitable data where ever necessary.

Q.1 Attempt any two.

- a) Out of seven types of values which value is more important and why? Also list the same. (10) CO1
- b) Comment on the statement. 'Value is different for different people.' (10) CO1
- c) Why worth is important in Value Engineering study? How it is calculated? (10) CO1

Q. 2 Attempt any two.

- a) What is function? Explain types and levels of function. (10) CO2
- b) Identify basic and secondary function of the following.
1. Chair 2. Electrical switch 3. Lawn sprinkler system 4. Pencil
5. Shaft 6. Calculator 7. Mobile 8. Screw Driver 9. Fan 10. T. V. (10) CO2,3
- c) Prepare element cost matrix for any two of the above. (10) CO4

Q.3 Attempt any two.

- a) Identify and explain with suitable example at least four reasons of poor value. (10) CO2
- b) Explain creative phase in V.E. job plan with reference to any two examples. (10) CO2
- c) What do you mean by FAST diagram? Prepare FAST diagram for any one product. (10) CO2,3

Q.4 Attempt any two.

- a) Develop evaluation criteria for selecting product/process from your discipline. Justify your selection. (10) CO4

b) Compare above developed evaluation criteria on 1 to 3 scale with each other and find out raw score and weighted score on 1 to 10 scale. (10) CO4

c) Formulate evaluation matrix and select best alternative from any three alternatives by calculating total score. (10) CO4

Q.5 Explain in detail any one V. E. case study with reference to V. E. job plan. (20) CO2,3,4,5
