301007

Seat No.	

T.E. (Civil) (Semester – II) Examination, 2014
PROJECT MANAGEMENT AND ENGINEERING ECONOMICS
(2008 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answers to the **two** Sections should be written in **separate** answer books.*
*2) Answer **any three** questions from **each** Section.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) Figures to the **right** side indicate **full** marks.*
*5) Use of calculator is **allowed**.*
*6) Assume suitable data if **necessary**.*

SECTION – I

1. a) Define organization and explain the organization structure mostly suited for construction industry. **4**

   b) Differentiate between AOA and AON method with help of suitable example. **4**

   c) The data pertains to small construction firm are as follows : **10**

   (i) Construct the network diagram (ii) Find expected duration and variance (iii) what is the probability of completing the project on or before 20 weeks ? Take Probability 93.3 for Z = 1.5 and Probability 94.5 for Z = 1.6 (iv) If the probability of completing project is 0.8, find the expected project completion time. Take Z = –2.4 for Probability 0.8.

Activity	A	B	C	D	E	F	G	H
Immed. Predecessors	none	none	A	B	B	C, D	C, D, E	F
a, (weeks)	1	2	6	1	1	1	1	1
m, (weeks)	2	2	7	2	4	5	2	2
b, (weeks)	3	8	8	3	7	9	3	9

OR

2. a) State the equations showing the relationship between various activity times and floats. **4**

   b) Listed below are the activities of a project along their durations. **14**

Activity (i-j)	A	B	C	D	E	F	G	H	I	J
Immediately Preceding	None	A	A	A	D	D	E, F	G	C, H	B
Duration (Months)	1	4	2	2	1	3	2	1	3	2

   i) Draw AOA network and calculate the total project duration. Highlight the critical path.

   ii) Calculate EST, EFT, LST, LFT, find out TF, FF, IF. Write in tabular form with sample calculation.

3. a) What is Updating of network ? Explain its necessity. **4**

   b) The data related to small constructions project is as under **12**

Activity	1-2	2-3	2-4	3-4	4-5	4-6	5-6	5-7	6-7
Normal time	9	17	10	11	8	8	9	15	10
Minimum time	7	14	9	8	8	7	9	12	9
Increase in cost for each day less (Rs.)	10	40	30	20	–	10	–	60	40

   i) Draw the network diagram and determine minimum normal time for completion of project.

   ii) Determine minimum crash time for completion of project and additional minimum cost to achieve it.

   iii) Determine optimum crash time if the project has a fixed overhead cost of Rs. 60 per day.

OR

4. Consider the project scheduling problem as shown in the following table : **16**

Activity	Duration (Weeks)	Mason requirement
1-2	4	9
1-3	8	5
2-3	10	7
2-4	6	6
3-4	4	8
4-5	2	7

   i) Schedule the activities of the project with maximum limit on man power requirement as 14.

   ii) What would be the increase in project duration ?

   iii) Draw histogram and find out EFR before and after leveling.

5. a) If you are the head of store dept. How can you purchase and store the material ? 4

   b) Define the term EOQ with sketch. "Surya Agrotech, Mayani" monthly demands 1000 bags of Urea. The unit cost of a bag is Rs. 200/- and inventory carrying cost per unit per annum is 20% of average inventory cost. If the cost of procurement is Rs. 70/- determine :
      i) EOQ
      ii) No. orders per annum
      iii) Total cost of purchasing. 8

   c) Define safety stock and lead time. Explain factors affecting on it. 4

OR

6. a) Define Inventory. Explain the costs associated with inventory problems with sketch. 6

   b) "Sakshi general stores" carries inventory of 10 items based on the price and usage. Determine which item should be categorized as A, B and C. Plot A-B-C curve. 10

Items	1	2	3	4	5	6	7	8	9	10
Price (Rs.)	70	45	400	200	40	0.50	18	2.5	5.5	350
Annual Consumption	320	380	500	800	350	4000	200	1600	1000	400

SECTION – II

7. a) Define site layout. Which factors will you consider in deciding the layout of a typical construction site ? 6

   b) On a particular construction project, the contractor on an average employed 100 workers with 60 hours per week. The project lasted for 40 weeks and during this period, 15 disabling injuries occurred. Work out I.F.R. If number of days lost due to injuries is 25 days, work out also I.S.R. and injury index. 6

   c) What are the personal protective devices used on construction site ? 4

OR

8. a) What are the various causes of accidents that may take place during tunneling operation ? Write down safety measures to avoid it. 6

   b) "Safety is important but somewhat neglected on construction site" comment. 4

   c) Define :
      i) I.S.R.
      ii) I.F.R. and
      iii) Injury index. 6

9. a) Explain 'Law of diminishing marginal utility' and "law of substitution" with an example. 4

   b) Define the following terms with neat sketch w.r. to break even analysis : 6
      i) Fixed cost
      ii) Variable cost
      iii) Total sales
      iv) Total cost
      v) Break-even point
      vi) MOS

c) "Baramati Agro" produces 10,000 units and sells them at Rs. 90/- each. The variable cost per unit is Rs. 20/- and fixed cost amounted to Rs. 3 lakh. Calculate breakeven point in units and sales by graphical representation method. And also calculate margin of safety showing angle of incidence. **6**

OR

10. a) Draw cash flow diagram of equal payment capital recovery amount also state the formula for capital recovery factor. **8**

"Mansi Earth Movers" took a loan to purchase an excavator of Rs. 20 lakh at an interest rate of 18% compounded annually. This amount should be repaid in 10 years in equal installments. Find the installment amount that 'Mansi Earth Movers' has to pay to the bank.

b) Define Engineering Economics. Explain its importance in construction industry. **4**

c) Explain demand and supply curve with suitable sketch. **4**

11. a) Mrs. Shubhangi invests sum of Rs. 50,000 in a bank at nominal interest rate of 18% for 15 years. The compounding is monthly. Find maturity amount after 15 years. **4**

b) Define the terms goods, wants, cost, price, value, capital. **6**

c) Following data pertains to Projects A and B has the net cash flows as follows. Which project is to be selected by using NPV and B/C ratio method ? Consider rate of interest i = 10%. **8**

Proposal	End of Years				
	Initial Investment	Annual Income (Rs.)			
		1	2	3	4
A	1,00,000	32,000	76,000	34,000	28,000
B	1,00,000	30,500	25,000	45,000	80,000

OR

12. a) Mr. Hrishi invests Rs. 10,000 in a bank at nominal interest i = 15% for 12 years. The compounding is quarterly find maturity amount after 12 years. **4**

b) What do you mean of project appraisal ? Explain methods of project appraisal. **8**

c) The data pertaining to two projects A and B as given below. Suggest which one is to be accepted using NPV method. Company expects a return of 10%. **6**

Project	Initial Investment (Rs.)	Annual Benefits (Rs.)		
		1st Year	2nd Year	3rd Year
A	50,000	35,000	15,000	18,000
B	40,000	23,400	20,600	11,000