

B. E. Civil 4th YEAR EXAMINATION, 2018
(2nd Semester)
CONSTRUCTION MANAGEMENT

Time: 3 hours

Full Marks: 100

Use a separate answer-script for each part.

Part I (60 Marks)

Answer All questions

1. (a) Deduce EOQ model with shortage explaining the variables excluding lead.
 1. (b) Storage tanks and pumps are to be provided for a growing demand. Two alternative proposals are to be considered.
- A. Construct Tank 1 with pump in year 1 at capital cost of \$4,00,000 and annual operating charges of \$30,000. Then in Year 12 construct Tank 2 with pump at additional cost of \$500,000 and operating cost of \$55,000 per annum.
- B. Construct Tank 3 in year 1 at capital cost of \$650,000 and running cost of \$30,000 per annum. Then at Year 12 add extra pump at additional capital cost of \$50,000 and increased running cost of \$55,000 p.a.
- Use a discount rate of 8% p.a. in either case.
 Compare the proposals in the basis of **net present value**. 10+10=20

2. A construction company runs three fabrication yards that require bolts. Three suppliers have been invited to bid on supplying bolts. Their bids are as follows:

Supplier	Production cost, per pack	Annual capacity, in packs
A	90	28000
B	100	76000
C	110	135000

The cost of transport and profit in rupees per pack varies from each supplier to each yard and is given as follows:

From Manufacturer	Sites number		
	1	2	3
A	20	40	10
B	50	30	60
C	30	20	70

The annual requirements of packs for 3 sites are 30000, 60000, and 122000, respectively. Use VAM and MODI to determine how many packs should each yard purchase from each manufacturer to minimize expenditure? 20

3. Maximize the following linear programming problem by Simplex (big M) method:

$$\text{Objective function: } Z = x_1 + 2x_2 + 3x_3 - x_4$$

$$\text{Subject to: } x_1 + 2x_2 + 3x_3 = 15$$

$$2x_1 + x_2 + 5x_3 = 20$$

$$x_1 + 2x_2 + x_3 + x_4 = 10,$$

where all x_i are non-negative quantities.

B. E. CIVIL ENGINEERING FOURTH YEAR SECOND SEM. EXAM. -2018

Ex/CE/T/421/2

Sub: CONSTRUCTION MANAGEMENT Time: Three Hours

Full Marks 100

PART-II

(40 marks for this p

Use a separate Answer-Script for each part

No. of questions	Answer question No.1 and question No. 2	Marks (20x2)=
1. a) i) ii)	<p style="text-align: center;"><u>Answer either question a) or question b)</u></p> <p>What do you know about parallel activity, predecessor activity and dummy activity?</p> <p>A project consists of six activities designated from A to F, With the following relationships:</p> <ol style="list-style-type: none">1) A is the first job to be performed.2) B and C can be done concurrently, and must follow A.3) B must precede D4) E must succeed C, but it cannot start until B is complete.5) The last operation F is dependent on the completion of both <p>Draw the network diagram.</p>	8+12=20

<p>b)</p> <p>i)</p> <p>ii)</p>	<p>The three estimates t_o, t_m, t_p of each activity of a project are given below.</p> <table border="1" data-bbox="438 357 1153 661"> <thead> <tr> <th>Activity</th> <th>t_o (days)</th> <th>t_m (days)</th> <th>t_p (days)</th> </tr> </thead> <tbody> <tr> <td>1-2</td> <td>2</td> <td>5</td> <td>14</td> </tr> <tr> <td>1-3</td> <td>3</td> <td>12</td> <td>21</td> </tr> <tr> <td>2-4</td> <td>5</td> <td>14</td> <td>17</td> </tr> <tr> <td>3-4</td> <td>2</td> <td>5</td> <td>8</td> </tr> <tr> <td>4-5</td> <td>1</td> <td>4</td> <td>7</td> </tr> <tr> <td>3-5</td> <td>6</td> <td>15</td> <td>30</td> </tr> </tbody> </table> <p>1) Draw the network diagram. 2) Find the expected duration and variance of each activity 3) Determine the expected duration of the project 4) Find the variance and the standard deviation of the entire project.</p> <p>What do you mean by slack?</p>	Activity	t_o (days)	t_m (days)	t_p (days)	1-2	2	5	14	1-3	3	12	21	2-4	5	14	17	3-4	2	5	8	4-5	1	4	7	3-5	6	15	30	<p>16+4 =20</p>
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<p>2.</p> <p>a)</p> <p>i)</p> <p>ii)</p> <p>b)</p>	<p style="text-align: center;"><u>Answer either question a) or question b)</u></p> <p>What is the different between PERT and CPM and what do you know about super critical ,critical and sub critical activity</p> <p>Define Total float, Free float, Independent float and Interfering float.</p> <p>The network diagram of a project is given below. The Durations (t^{ij}) of each activity are given in following table. Calculate only Earliest Event time (T_E), Latest Event occurrence time (T_L), Earliest start time (EST), Earliest finish time (EFT), Latest start time (LST), Latest finish time (LFT) and total float (F_T) for each activity. Assume T_E and T_L of last event (event 8) is same. Also assume T_E and T_L of start event (event 1) is Zero.</p>	<p>10+10 =20</p> <p>20</p>																												

Activity (i-j)	Duration (t ^{ij})
1-2	10
1-3	12
2-5	8
2-7	12
3-4	6
3-6	5
4-5	8
5-6	8
5-7	10
6-7	6
7-8	12

