

Seat No: \_\_\_\_\_

Enrollment No: \_\_\_\_\_

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**M.Tech. Winter 2019 - 20 Examination**

**Semester: 3**  
**Subject Code: 203200204**  
**Subject Name: Cost Management of Engineering Projects**

**Date: 28/11/2019**  
**Time: 10:30am to 01:00pm**  
**Total Marks: 60**

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 (A)** Alpha Co. Ltd., manufactures and sells four types of products under the brand names (05)  
of A, B, C & D. The sales mix in value comprises 33.33%, 41.67%, 16.67% and 8.33% of products A, B, C and D respectively. The total budgeted sales (100% are Rs60000 p.m.). Operating Costs are:  
Variable Costs: Product A 60% of selling Price, Product B 68% of selling Price, Product C 80% of selling Price, Product D 40% of selling Price  
Fixed Costs: Rs14700 p.m.  
Calculate the break-even-point for the products on overall basis.

**(B)** An agriculturist has a 125-acre farm. He produces radish, mutter and potato. (05)  
Whatever he raises is sold fully in the market. He gets Rs 5 per kg for radish, Rs 4 per kg for mutter and Rs 5 per kg for potato. The average per acre yield is 1500 kg of radish, 1800 kg of mutter and 1200 kg of potato. To produce each 100 kg of radish and mutter and 80 kg of potato, a sum of Rs 12.50 has to be used for manure. Labour required for each acre to raise the crop is 6 man-days for radish and potato each and 5 man-days for mutter. A total of 500 man-days of labour at a rate of Rs 40 per man-day is available.  
Formulate this as a linear programming model to maximise the agriculturist's total profit.

**(C)** Differentiate PERT and CPM. (05)

**Q.2 Answer the following questions.** (Attempt any three) (Each five mark) (15)

- (A)** Discuss the advantages of Just In Time Approach method.
- (B)** What are the benefits of Enterprise Resource Planning?
- (C)** List out the types of benchmarking process and discuss any two in detail.
- (D)** Discuss 6'C concept in Total Quality Management.

**Q.3 (A)** Solve Graphically, (07)

$$\begin{aligned} \text{Maximize } & Z = 10x_1 + 15x_2 \\ \text{Subject to, } & 2x_1 + x_2 \leq 26 \\ & 2x_1 + 4x_2 \leq 56 \\ & x_1 - x_2 \geq -5 \\ & x_1, x_2 \geq 0 \end{aligned}$$

**(B)** Alpha Paver Blocks Co. Ltd. Manufactures two types of paver blocks A and B. Its (08)  
sales department has three divisions: West, South and East. Preliminary sales budgets for the year ending 31st December 2017, based on the assessments of the divisional executives:

Product A : West 40,000 units: South 1,00,000 units and East 20,000 units

Product B : West 60,000 units: South 80,000 units and East Nil

Sales Price A Rs. 20 and B Rs. 30 in all areas.

Arrangements are made for the extensive advertising of product A and B and it is estimated that West division sales will increase by 20,000 units. Arrangements are also made to advertise and distribute product B in the Eastern area in the second half of 2017 when sales are expected to be 1,00,000 units.

Since the estimated sales of the South division represented an unsatisfactory target, it is agreed to increase both the estimates by 10 %.

Prepare a sales budget for the year to 31<sup>st</sup> December 2017.

**OR**

- (B) A company is expecting to have Rs. 750,000 cash in hand on 1st April 2018 and it (08) requires you to prepare an estimate of cash position in respect of three months from April to June 2018, from the information given below :

	Sales (Rs.)	Purchase (Rs.)	Wages (Rs.)	Expenses (Rs.)
February	700,000	400,000	80,000	60,000
March	800,000	500,000	80,000	70,000
April	920,000	520,000	90,000	70,000
May	1,000,000	600,000	100,000	80,000
June	1,200,000	550,000	120,000	90,000

Additional Information :

- (a) Period of credit allowed by suppliers - two months.
- (b) 25 % of sale is for cash and the period of credit allowed to customer for credit sale one month.
- (c) Delay in payment of wages and expenses one month.
- (d) Income Tax Rs. 250,000 is to be paid in June 2018.

- Q.4 (A)** The cost conscious company requires for the next month 300, 260 and 180 tonnes of (07) stone-chips for its three constructions C1, C2 and C3 respectively. Stone-chips produced by the company at three mineral fields taken on short lease by the company. All the available boulders must be crushed into chips. Any excess chips over the demands at sites C1, C2 and C3 will be sold ex-fields.

The fields are M1, M2 and M3, which will yield 140, 320 and 280 tonnes of stone chips respectively.

Transportation costs from mineral fields to construction sites vary according to distances, which are given below in monetary unit (MU).

		To		
		C1	C2	C3
From	M1	8	7	6
	M2	5	4	9
	M3	7	5	5

Determine the optimal transportation cost and quantities to be supplied from M1, M2 & M3 to C1, C2 & C3.

**OR**

- (A) Alpha Construction Co. has its concrete mix plant located at three locations X, Y and Z. Company's construction sites are located at locations A, B, C and D respectively. Transportation cost from concrete mix plant to construction sites are given in following matrix. Moreover, each plants capacity to prepare concrete mix in  $m^3$  per day and construction site demand of concrete mix in  $m^3$  per day, both are as follows.

Capacity of Concrete mic plant:

X:  $200 m^3$

Y:  $500 m^3$

Z:  $300 m^3$

Demand of each construction site:

A :  $180 m^3$

B:  $320 m^3$

C:  $100 m^3$

D :  $400 m^3$

		Per $m^3$ Transportation Cost (Rs)			
		Construction Site			
		A	B	C	D
Concrete Mix Plant	X	12	18	6	25
	Y	8	7	10	18
	Z	14	3	11	20

As a manager of the company, you are supposed to help the company to optimize the transportation cost of concrete from Mix plant to construction site using VAM method of solution.

- (B) A construction company has four large bulldozers located at four different garages. The bulldozers are to be move to four different construction sites. The distances in miles between the bulldozers and the construction sites are given below. (08)

Bulldozer	Site			
	A	B	C	D
1	90	75	75	80
2	35	85	55	65
3	125	95	90	105
4	45	110	95	115

How should the bulldozers be moved to the construction sites in order to minimize the total distance traveled?