

R 8511

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Seventh Semester

Mechanical Engineering

MF 441 — PROCESS PLANNING AND COST ESTIMATION

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define simplification.
2. What is Marginal contribution?
3. What are the objectives of cost estimation?
4. Define process material.
5. What are the causes for depreciation?
6. Define machine-hour rate.
7. What are the components of labour cost in welding cost?
8. What is sprue loss?
9. Define cycle time.
10. How will you estimate the time for tapping operation?

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Explain the important features of product design and selection? (6)
(ii) Describe the important steps involved in manual experience based planning and CAPP with an example. (10)

Or

- (b) The present output details of a manufacturing department are as follows :

Average output per week 48,000 units from 160 Employees
 Saleable value of output Rs. 1,50,000

Contribution made by output towards }
 fixed expenses and profit } Rs. 60,000

The board of directors plans to introduce more mechanisation into the department at a capital cost of Rs. 40,000. The effect of this will be to reduce the number of employees to 120 but to increase the output per individual Employee by 40%. To provide the necessary incentive to achieve the increased output, the board intends to offer a 1% increase in average individual output achieved. To sell the increased output, it will be necessary to decrease the selling price by 4%. Calculate the extra weekly contribution resulting from the proposed change and evaluate, for the board's consideration, the worth of the project. (16)

12. (a) (i) Describe in detail the procedure of estimating. (10)
 (ii) What is over estimating and under estimating? (2)
 (iii) Differentiate Costing Vs Estimation. (4)

Or

- (b) (i) What is the importance of realistic estimates? (2)
 (ii) What are the functions of estimating? (4)
 (iii) Describe the cost of product with an example. (10)

13. (a) The following particulars have been extracted from the accounts of M. Motor Manufacturing Co. Ltd., manufacturer of 14 H.P Motor Cars, for the year ended 31st December, 2001.

	Rs.
Opening stock of raw material	50,000
Purchase of raw material	12,00,000
Carriage of raw material	60,000
Wages to manual labour and also that working on machine	7,00,000
Works overhead	1,96,000
Establishment and general charges	1,49,170
Closing stock of raw material	75,000

Find out the works cost and total cost of motor car, the percentage the works overhead bears to the wages and percentage that establishment charges bear to the works cost.

Work out what price the company should quote for a motor car, which it is estimated will require an expenditure of Rs. 5,500 in raw material and Rs. 4,000 in wages, so that it would yield profit of 25% on cost and 20% on the selling cost? (16)

Or

- (b) A factory works on an average 168 hours in a month, there are 4 machines in the factory for which necessary particulars are given as under :

	I	II	III	IV
	Rs.	Rs.	Rs.	Rs.
Annual Depreciation	660	2,400	360	6,600
Annual interest on cap.	240	900	210	1,350
Annual repairs	120	1,110	90	180
Monthly exp. for power	28	150	22	480
Monthly Misc. exp.	19.60	60	9.70	78
Portion of the floor area	12%	10%	15%	8%

The monthly charges for rent and taxes for the entire factory are Rs. 3,300. One foreman supervises all these 4 machines, his salary is Rs. 2,520/month. An attendant getting Rs. 192/month looks after all these machines.

In the execution of a certain work, the I Machine is used for 84 hours, the II for 72 hours, the III for 100 hours and the IV for 120 hours. The cost of material is Rs. 35,930 and that of direct labour Rs. 670.

Calculate the factory cost of the work order. (16)

14. (a) Two plates each 100 cm long, 25 cm wide and 5 mm thick are to be welded. A 60° vee is prepared by gas cutting prior to welding. The overall cost of oxygen is 70 paise per cubic metre, cost of acetylene Rs. 7.0 per cubic metre and the cost of filler rod material is Rs. 3.0 per kg. Using Leftward Technique, find the cost of cutting and welding. Take density of filler material as 11.28 gram. per. cubic. cm. Assume necessary data for the problem. (16)

Or

- (b) A small fuse box 25 cm. long, 17.5 cm. wide and 5 cm. deep with a lid 2.5 cm. deep is to be manufactured in grey iron. It has the usual legs and ears with an average thickness of 3.9 mm. The pattern supplied by the customer is of the loose type, hence, bench moulding is to be followed. Estimate the selling price per piece, given the following data :

- (i) cost of iron at the cupola spout = 60 paise/kg
- (ii) cost of process scrap return = 30 paise/kg
- (iii) administrative on cost = Rs. 2.00/hour
- (iv) profit margin = 15%

Process	Time	Labour charges per piece	Works on cost per hour
Moulding and pouring	20 mins	Rs. 2.00	Rs. 3.00
Shot blasting	2 mins	Rs. 0.20	Rs. 5.00
Fettling	1 min	Rs. 0.05	Rs. 3.00

(16)

15. (a) (i) It is required to produce a hole 15 mm in diameter and 10 cm. deep through the mild steel piece. Estimate the time taken for completing the hole in the following two cases :

(1) The hole is drilled by a 15 mm drill. Assume the cutting speed for the mild steel to be 30 metres/min and feed for 15 mm. drill to be 0.2 mm/rev.

(2) First, a 10 mm. hole is drilled which is then brought to accurate size by boring. Assume the cutting speed for boring and drilling to be 30 metres/minute. The feed for 10 mm. drill to be 0.15 mm/rev and feed for boring operation to be 0.13 mm/rev.

(10)

(ii) Calculate the drilling and tapping time for producing threads in a mild steel sheet of 25 mm thickness. The size of H.S.S. drill to be used is 20 mm and the number of threads to be cut as 3 per cm. Take cutting speed and feed for drill as 20 m/min and 0.25 mm/revolution respectively, tapping speed as 5 m/min. Neglect the time taken for setting up and approaching and over travelling of tools.

(6)

Or

(b) (i) Estimate the planning time for a casting 1.25 metre long and 1/2 metre wide which is machined on a planer having cutting speed of 12 metre/minute and a return speed of 30 metres/minute. Two cuts are required; one roughing with a depth of 3.125 mm and a feed of 0.1 mm/revolution and other finishing with a depth of 0.125 mm. and using a feed of 0.125 mm.

(10)

(ii) Calculate the time required to rough grind a steel shaft of 3.75 cm diameter to 3.7 cm diameter size using a grinding wheel of 5 cm face and assuming a cutting speed of 12 metre/minute and depth of cut 0.0025 cm. Length of shaft to be ground is 25 cm.

(6)