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**Question Paper Code : 40933**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Seventh/Eighth/Ninth Semester

Mechanical Engineering

ME 8793 — PROCESS PLANNING AND COST ESTIMATION

(Common to : Manufacturing Engineering/Material Science and Engineering/  
Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/  
Mechatronics Engineering/Production Engineering/Robotics and Automation)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

1. Write the approaches of process planning.
2. What are the factors should be considered for process and equipment selection?
3. What is meant by statistical quality control?
4. How does the fixture differ from jig?
5. Define parametric estimating.
6. What is meant by Depreciation due to Accident?
7. A butt joint between two square metal plates of  $250 \times 250$  cm is made using electric arc welding. If the rate of welding is 5 metre/hr, calculate the time required to complete ten such welding operations.
8. What are the various losses considered while calculating direct material cost for a casting?
9. Distinguish between feed and depth of Cut.
10. List the factors to be considered for the Selection of feed and Depth of cut for a particular operation.

PART B — (5 × 13 = 65 marks)

11. (a) Explain process planning activities in detail and documentation involved in preparation of process plan.

Or

- (b) Explain the use of computers in process planning and cost estimation and list out their advantages.

12. (a) (i) Discuss about economics of process planning. (6)

- (ii) Discuss about the factors to be considered while selecting Jigs and fixtures for a machining process. (7)

Or

- (b) A planer is capable of 15 strokes per minute over a stroke length of 2 m. The cutting time ratio for the machine is 4:3. Determine cutting speed. The feed per stroke  $f_s$  is quoted as 2 mm/stroke. What is the feed rate  $f_m$  in mm/min?

13. (a) A certain piece of work is produced by a firm in batches of 100. The direct material cost for that 100 work piece is Rs. 160 and the direct labor cost is Rs. 200. Factory on cost is 35% of the total material and labor cost. Overhead charges are 20% of the factory cost. Calculate the prime cost and factory cost. If the management wants to make a profit of 10% on gross cost, determine the selling price of each article.

Or

- (b) A manufacturer is making 100 units of an item per hr and incurs the following expenses :

Direct Material cost Rs. 35

Direct labour cost Rs. 200

Direct Expenses Rs. 75

Factory on cost 150% of labour cost

Office on cost 30% of factory cost

Find out the selling price for a profit of 15% on the selling price.

14. (a) A square bar of 3 cm side and 25 cm length is to be hand forged into a hexagonal bar of side of 1.5 cm. Find length of the hexagonal bar ignoring metal losses. Density remains same.

Or

- (b) A small fuse box 300 mm long, 20 mm wide and 60 mm deep with a 30 mm deep is to be manufactured in grey iron. The average thickness is 4.5 mm. The pattern supplied by the customer is of loose type, hence bench moulding is to be followed. Estimate the selling price per piece, assume the following data :

- (i) Cost of iron at the cupola sprout = Rs. 1.2 per kg
- (ii) Cost of process scrap return = Rs. 55 paise per kg
- (iii) Administrative cost = Rs. 3.2 per hour
- (iv) Profit margin = 16%
- (v) Density = 7.3 gm/cc,
- (vi) Process scrap = 20% of net weight. Other expenditure details are

| Operation            | Time per piece | Labour charges per minute | Works on cost per hour |
|----------------------|----------------|---------------------------|------------------------|
| Moulding and pouring | 16 min         | Rs. 1.50                  | Rs. 4.50               |
| Shot blasting        | 6 min          | Rs. 0.25                  | Rs. 4.00               |
| Fettling             | 4 min          | Rs. 0.10                  | Rs. 3.25               |

15. (a) Describe the procedure of estimating the machining time required during the shaping operation on a shaper.

Or

- (b) Calculate the drilling and tapping time for producing threads in a mild steel 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 is 3 per cm. Taking cutting speed and feed for drill as 20 m/min and 0.25 mm/rev respectively, tapping speed as 5 m/min. Neglect the time taken for setting up and approaching and over travelling of tools.

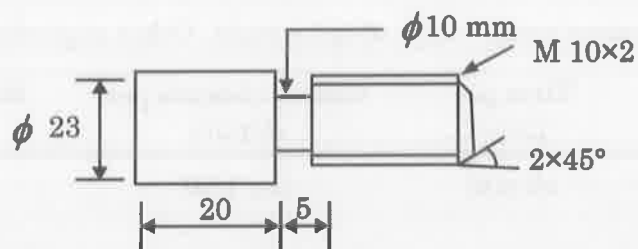
PART C — (1 × 15 = 15 marks)

16. (a) (i) Evaluate the various losses considered while calculating the material cost for a forged component? Describe the various constituents of cost of a forged component. (8)
- (ii) Evaluate the cost of filler material and gases consumed in welding of two plates 8 mm thick and 1.5 m long. Gas cutting is used to make 60° V on the edges of both the plates. The cost of Oxygen is Rs. 10 per cu meter and cost of acetylene is Rs. 5 per cu meter. The filler rod costs Rs. 6.50/kg. Take other data from the tables. Density of filler metal is 10 gms/cc. (7)

Or

(b) Calculate the machining time required to produce one piece of the component shown in fig starting from 25 mm bar. The following data is available.

- (i) For turning :
- (ii) Cutting speed = 40 m/min
- (iii) Feed = 0.4 mm/rev
- (iv) Depth of cut = 2.5 mm/per pass
- (v) For thread cutting :
- (vi) Cutting speed = 8 m/min.



All dimension mm