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Question Paper Code : 81011

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

Fifth/Sixth Semester

Mechanical Engineering

CME 396 — PROCESS PLANNING AND COST ESTIMATION

(Common to Manufacturing Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out any four objectives of process planning.
2. Write down the steps in interpretation of drawings.
3. Define economics of process planning.
4. Outline the basic qualities required for a process planning engineer.
5. Compare the process of estimation and costing.
6. List out various methods of allocation of overhead expenses.
7. Classify different types of welding joints.
8. Brief about the flash loss in forging shop.
9. What is tear-down time?
10. Write the formula to calculate time taken for drilling operation in lathe machine.

PART B — (5 × 13 = 65 marks)

11. (a) Illustrate various methods of process planning used for different types of manufacturing systems in industries.

Or

- (b) Summarize the procedure for selecting suitable production equipment and tools for manufacturing a new industrial product, using an example of your choice.

12. (a) Discuss how quality assurance methods are selected based on product and process requirements with suitable examples.

Or

- (b) Elaborate on how jigs and fixtures improve accuracy and productivity in manufacturing industries in these present industry 4.0 scenarios.
13. (a) Calculate prime cost, factory cost, production cost, total cost and selling price per item from the data given in table-13(a), for the financial year 2023-2024.

Particulars	Cost in Rs.
Cost of raw material in stock 1.04.2023	25,000
Raw material purchased	40,000
Direct labour cost	14,000
Direct expenses	1,000
Factory/Works overhead	9,750
Administrative expenditure	6,500
Selling and distribution expenses	3,250
No. of items produced	650
Cost of raw material in stock as on 31-03-2024	15,000
Net profit/item is 10 percent of total cost of product	

Table – 13(a) Cost Particulars

Or

- (b) (i) A certain machine was purchased for Rs.25,000 and it was assumed that it will last for 20 years. It was also considered that by selling scrap of machine, the residual value will be Rs.4,000. If the depreciation is charged by reducing balance method, find the depreciation fund after 3 years and depreciation amount for the third year. Also find out percentage by which value of machine is reduced every year. (7)
- (ii) The estimated life of shaper is 8 years and it works 12 hours a day. The initial cost of shaper is Rs. 85,000 and scrap value after 8 years is Rs.8,500. The machine works for 3330 hours a year. Calculate rate of depreciation charged per hour by using machine hour basis method and also calculate rate of depreciation charged annually. (6)
14. (a) Illustrate the procedure for doing real time estimation in a modernized semi-automated foundry shop with a case example.

Or

- (b) A steel chain is made of links of the type shown in below figure 14(b). The link is made out of steel bar of 6 mm diameter. What is the total length and the total weight of steel bar needed to make the chain of 60 m length? Assume suitable losses. Weight density of steel is 7.7 gm/cu.cm.

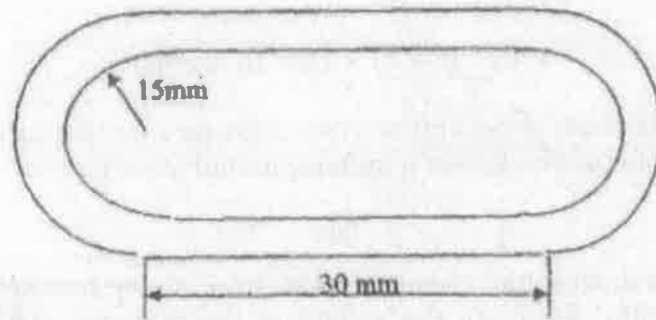


Figure — 14(b). All the dimensions are in 'mm'

15. (a) Find the machining time to complete the job as shown in below figure 15(a), from a 45 mm diameter and 95 mm long raw material. Assume the following data:

'V' for turning	= 30 m/min
'f' for turning	= 0.35 mm/rev
'V' for drilling	= 30 m/min
'f' for drilling	= 0.1 mm/rev
Depth of cut	= 1.25 mm
'f' for chamfering	= 0.25 mm/rev
'V' for thread cutting	= 10 m/min

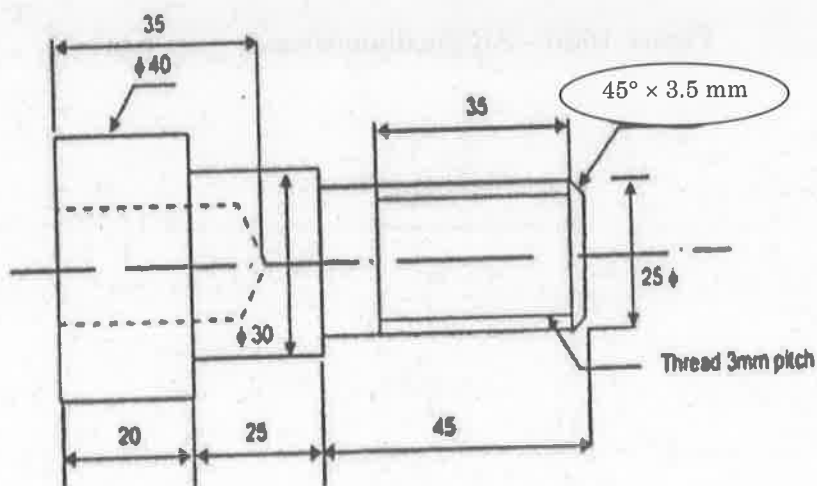


Figure — 15(a) All dimensions are in 'mm'

Or

- (b) Find the time required on a shaper to machine a plate $600 \text{ mm} \times 1200 \text{ mm}$, if the cutting speed is 15 meters/min. The ratio of return stroke time to cutting time is 2 : 3. The clearance at each end is 25 mm along the length and 15 mm on width. Two cuts are required, one roughing cut with cross feed of 2 mm per stroke and one finishing cut with feed of 1 mm per stroke.

PART C — (1 × 15 = 15 marks)

16. (a) Prepare a route sheet and activity chart for manufacturing a 100 number of sheet metal bracket on a midsize manufacturing unit.

Or

- (b) Three orthographic views of cast iron angle brackets are shown in figure 16(b). Estimate the weight of the material of the bracket if the material weighs 7.2 g/cc.

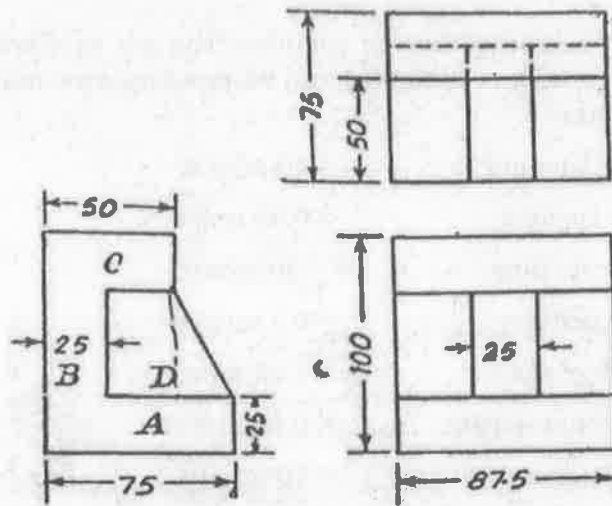


Figure 16(b) – All the dimensions are in 'mm'