Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 70912

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Seventh/Eighth/Nineth 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/Mechtronics Engineering/Production Engineering/Robotics and Automation)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the approaches of process planning.

2. What are the material selection parameters?

3. What are the main process parameters that can influence the success of the machining?

4. What is the function of work holding device?

5. Define-Design Cost.

6. What is meant by Depreciation due to Accident?

7. What are the various types of forging?

8. List the various allowances provided to the pattern.

9. What are the various factors considered for selection of cutting speed?

10. Differentiate between drilling, boring and reaming.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the main functions of Product design and manufacture and its interface in detail.

Or

(b) Explain the various machine selections and Tooling selection method in detail.

12. (a) What are all the process planning parameter of production processes. Explain in detail about the principles and practice of location and clamping in jigs and fixtures.

Or

(b) A 25 cm × 10 cm C.I surface is to be faced on a milling machine with a cutter of diameter of 15 cm and 16 teeth. If the cutting speed and feed are 55 m/min and 6 cm/min. respectively, determine the rpm of the cutter, feed/tooth and the milling time.

13. (a) Explain the various time allowances which should be considered for calculating labour cost.

Or

(b) The direct material used is Rs.1000 and direct wages of Rs.443 for the manufacture of certain items. Calculate factory cost (i) when the on-cost is to be 60% of prime cost, and (ii) when the on-cost is to be 90% of direct productive labour cost.

14. (a) 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 loose type, hence bench moulding is to followed. Estimate the selling price per piece, given the following data

(i) Cost of iron at the cupola spout = 660 paise/kg

(ii) Cost of process scrap return = 30 paise/kg

(iii) Administrative on cost = 2.00/1 hr

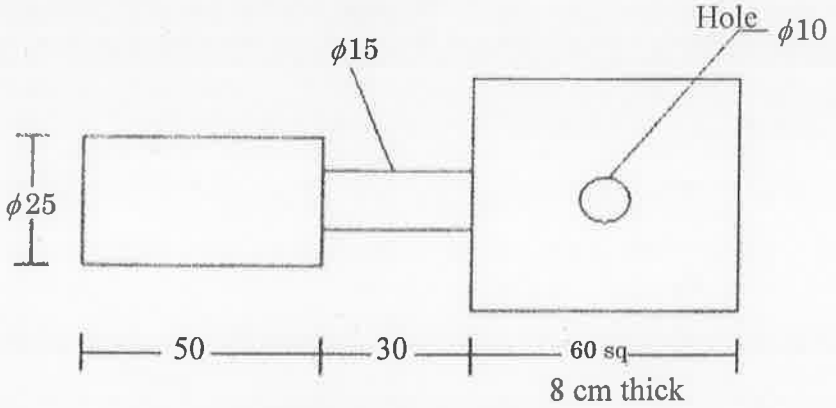
(iv) Profit margin = 15%

Assume : Gate is 18.5 mm in diameter and 5 cm long. Runner is 1.85 cm wide, 22.5 cm long and 1.25 cm deep. 4 gates and 4 runners. (i.e. two on the box and lid each)

Operation cost	Time per piece	Labour charges per minute	Works on cost per hour
Moulding and pouring	20 min	Rs.2.00	Rs.3
Shot blasting	2 min	Rs.0.20	Rs.5
Fettling	1 min	Rs.0.05	Rs.3

Or

(b) Calculate the net weight and gross weight for the manufacture of 500 levers shown in figure. The material weighs 7.8 g/cc and the total losses account for 25% of net weight of the lever. Also calculate (i) length of 3 cm diameter required per component (ii) the cost of forging 500 pieces if material cost Rs.8 per kg, labor costs Rs.1.20 per piece and overheads are 25% of material cost.



All dimensions are in mm

15. (a) 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.

Or

(b) Find the time required for doing rough grinding of a 15 cm long steel shaft to reduce its diameter from 4 to 3.8 cm with the grinding wheel of 2 cm face width. Assume cutting speed as 15 m/min and the depth of cut as 0.25 min.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the basic steps to the material selection process and stages of material evaluation procedure in detail?

Or

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

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