ME 8793 & PROCESS PLANNING AND COST ESTIMATION

QUESTION BANK

UNIT-1

Part-A

1. What is meant by process planning?
2. List out the various activities of process planning.
3. What is a route sheet?
4. What are the information that a route sheet can provide?
5. List the main outputs for process planning activity.
6. What are the material selection parameters?
7. List the various approaches to process planning.
8. What is CAPP?
9. Differentiate between variant and generative CAPP systems.
10. List the main types of drawing used in engineering
11. List out any four information that the process planner can obtain from the engineering drawing of a component.
12. What are the main areas focused upon during the material evaluation?
13. List out the factors to be considered in the selection of manufacturing processes.
14. What are the factors considered for machine selection?
15. List out the various factors considered for tooling selection.

Part-B&C

1. Explain the technological framework of process planning by using a block diagram.
2. What are the factors that influence process planning? Discuss.
3. Explain in detail the process planning activities. (Drawing Interpretation, Material Evaluation and Process Selection, Selection of machine tools, setting process parameters, quality assurance method, cost estimation, process planning documentation and communicate process knowledge).
4. Describe the various types of charts and diagrams used in process planning.
5. List out the objectives of process planning. Explain the various approaches (Manual and CAPP) to process planning.

6. What do you understand by CAPP? Explain in detail about the types of CAPP and mention the benefits of CAPP.
7. Describe material selection parameters.
8. Explain the various steps involved in process selection.
9. What are the factors considered in machine selection?
10. List and explain the various factors considered for tooling selection.

UNIT-2

Part-A

1. What are the main process parameters that can influence the success of the machining?
2. What is meant by cutting speed?
3. List any four factors that are to be considered during selection of cutting speed.
4. What is meant by feed rate and depth of cut?
5. List any four factors that are to be considered during selection of feed rate.
6. Compare and contrast between jigs and fixture.
7. What is meant by statistical quality control?
8. What are the uses of control charts?
9. List any six documents that are required for process planning.
10. List any four factors to be considered for selection of measuring instruments.
11. What do you understand by break even analysis?
12. What is meant by break even point?

Part-B&C

1. What is process parameter (cutting speed, feed rate and depth of cut)? Also list the major factors that are to be considered during selection of process parameters.
2. Discuss the selection of Jigs and fixture.
3. What is the purpose of a workholding device? List the types of workholding devices.
4. Discuss the selection of quality assurance methods.
5. Define the concepts of TQM.
6. List the seven statistical tools of quality and their uses.
7. Explain various types of control charts used in quality control.
8. What is meant by process capability?
9. List out the set of documents/information that are required for process planning?
10. What do you understand by break-even analysis? List its objectives.
11. A mild steel component shown in figure.1 has to be made from a stock of 220mm long and calculate the maximum cutting speed for (i)facing (ii) turning for all surfaces (iii) parting off. The maximum spindle speed of the lathe being used is 500 rpm.

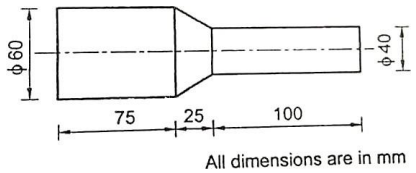

Fig 1

12. The fixed cost for the year 2000-01 are Rs.600000, variable cost per unit is Rs.40. Each unit sells at Rs.160, Determine: (i) Break-even point (a) in terms of physical units, and (b) in terms of rupees (ii) If a sales volume of 5500 units has been expanded, then what will be the profit earned? (iii) If the profit target of Rs. 120000 has been budgeted, compute the no of units to be sold. (iv) If the company sells 6500 units, calculate the margin of safety and profit.

UNIT-3

Part-A

1. What do you understand by estimation?
2. What are the objective of cost estimation?
3. State the functions of estimating.
4. What are the different types of estimates?
5. What do you understand by budgetary estimates?
6. Describe the sources of errors in estimating.
7. Distinguish between over estimation and under estimation.
8. Define costing or cost accounting.
9. Why is costing essential to industrial control?
10. Differentiate between estimation and costing.
11. List the various methods of costing.
12. Name the various elements of cost.
13. What is direct labour cost? Differentiate between direct labour cost and indirect labour cost.
14. Describe various allowances of time in estimating.
15. What is administrative overhead?
16. What are the various components of cost?
17. Define prime cost.
18. What is meant by factory cost?
19. What do you meant by catalogue price?
20. What is meant by total cost?

Part-B&C

1. State and explain the objectives and functions of cost estimation.
2. What are the types of estimates?
3. Discuss in detail about the types and methods of estimating,
4. What do you mean by a realistic estimate? Describe the following (1) Under estimating, and (ii) Over estimating.
5. Explain the procedure involved in cost estimation. Distinguish between estimating and costing.
6. Briefly discuss about most commonly used methods of costing
7. Define costing or cost accounting. Describe cost accounting with an example.
8. Elaborate the various elements of the cost estimation.
9. Explain the terms ladder of cost(prime cost, factory cost, total cost and selling price). Show the relationship between various components of cost with the help of a block diagram.
10. Discuss the various allowances to be considered while making cost estimation.
11. Explain the process of estimation of material cost, labour cost and overheads.
12. Describe and compare the various methods of allocation of overhead expenses.
13. For manufacture of 1000 bolts and nuts per hour, a factory incurs following expenses:
    Direct material cost: Rs.350
    Direct labour cost: Rs.200
    Direct expenses: Rs.75

Factory overheads: 150% of labour cost
Office overheads: 30% of factory cost
Determine whether the factory is making profit or loss in selling one set of bolt and nut for Rs.1.

14. A factory is producing 1000 bolts and nuts per hour on a machine. Its material cost is Rs. 400, labour cost Rs. 350 and direct expenses is Rs. 75. The factory on cost is 150% of the total labour cost and office on cost is 25% of the total factory cost. If the selling price of each bolt and nut is Rs. 1.75, calculate whether the factory is going in loss or gain and by what amount.

15. Estimate the weight of material required for manufacturing 220 pieces of shaft as shown in Fig.2. The shafts are made of mild steel which weighs 7.87 gm/cm³ and costs Rs.100 per kg. Also calculate the material cost for 220 such shafts.

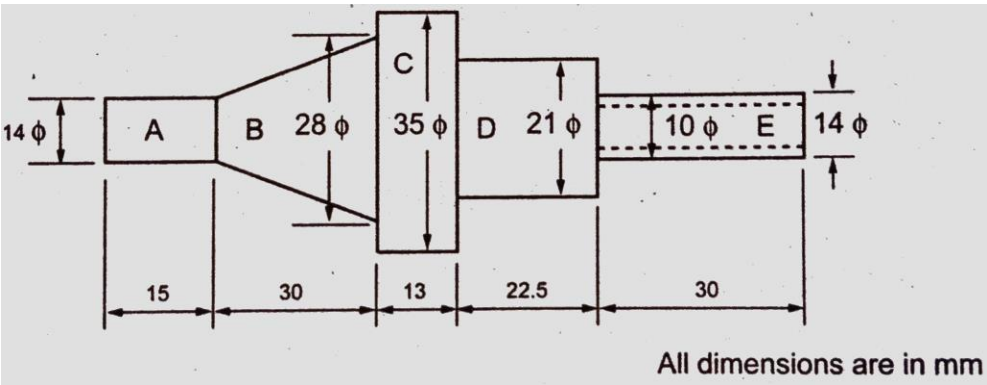

Fig 2

16. A factory has 15 lathes of same make and capacity and 5 shapers of same make and capacity. Lathes occupy 30m2 area while shapers occupy 15 m² area. During the calendar year, factory expenses for this section are as follows: (1) Building rent and depreciation = Rs ,5,000;(ii) Indirect labour and material Rs. 15,000; (iii) Insurance = Rs 2,000; (iv) Depreciation charges of lathes Rs. 5,000; (v) Depreciation charges of shapers= Rs. 3,000; (vi) Power consumption for lathes= Rs. 2,000; (vi) Power consumption for shapers= Rs. 1,000. Find out the machine hour rate for lathe and shapers, if all the lathes and shapers work for 25,000 hours and 8,000 hours respectively.
17. A cast factory employees 30 persons. It consumes material worth Rs. 25,000 pays workers at the rate of Rs. 10 per hour and incurs a total overhead of Rs.20,000. In a particular month (25 days) workers had an overtime of 150 hours and were paid twice than the normal rate. Find: (i) the total cost. and (ii) the man hour rate of overheads. Assume an 8 hours working days.

UNIT-4

Part-A

1. Define forging.
2. Differentiate hot forging and cold forging.
3. List out various operations that can be performed by forging.
4. In what ways, press forging and upset forging are different?
5. What do you mean shear loss, tong hold loss in forging?
6. What do you mean scale loss, flash loss in forging?
7. What are the types of welding?
8. What are the various elements considered while calculating the cost of a welded joints?
9. Define the term foundry, casting and a mould.
10. What is the pattern?
11. What is shrinkage allowance
12. What are the various losses considered while calculating direct material cost for a casting?

Part-B&C

1. What are the various losses considered while calculating the material cost for a forged component?
2. What are the various elements considered while calculating the cost of a welded joint?
3. What are the allowances that need to be considered while making patterns in foundry shop. Discuss.
4. Write the step-by-step procedure to estimate the cost of a cast component in the foundry shop.
5. Calculate the net weight and gross weight for the component shon in figure 3 Density of material used is 7.86 gm/cc.Also calculate: (i) Length of 14 mm dia bar required to forge one component, (ii) Cost of forging/piece if: Material cost = Rs. 80 per kg; Labor cost = Rs. 15 per piece. Overheads=150 percent of labour cost.

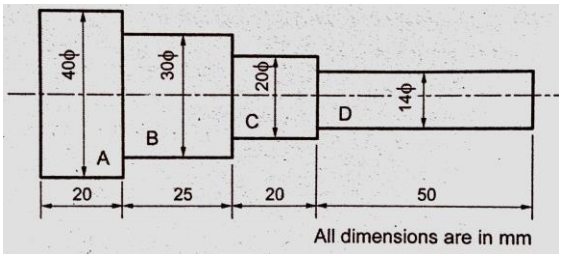

Fig 3

6. 500 pieces of a component as shown in Fig.4 are to be drop forged from 80 mm diameter stock bar. Calculate the cost of manufacturing, if material cost is Rs.2,750/- per meter. Forging charges Rs.1.50 per cm^2 of surface area to be forged. Overhead expenses to be 12% of the cost of the material cost. Consider all possible losses during operations.

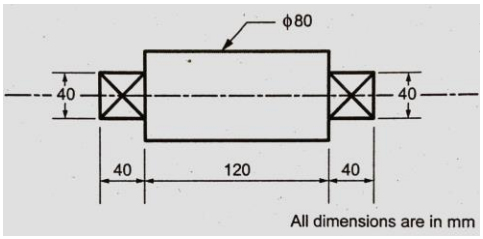

Fig.4

7. Two plates each 1.2 m long and 8 mm thick are to be welded. A 60° Vee is prepared by means of gas cutting before welding is to be commenced. The cost of oxygen is Rs. 15/m³ and of acetylene Rs. 60/m³. The labour charges are Rs. 40 per hour. The filler metal costs Rs. 50/kg. Using rightward technique, find the cost of cutting and welding. Take density of filler metal as 10 gm/cc. The following data is also available:

   For cutting (for 10 mm thick plate):
   Cutting speed = 20m / hr
   Consumption of oxygen 2 m³/hr
   Consumption of acetylene = 0.2m3/h
   Data for rightward welding (for 8 mm thick plate):
   Consumption of oxygen =0.78 m³/hr
   Consumption of acetylene = 0.8 m³/hr
   Diameter of filler rod used = 4 mm
   Rate of welding 2.25 m/hr
   Filler rod used per metre of weld = 3.4 m

8. A welded platform top is made by 20 mm steel plates requiring 10 joints of 1 metre length each. Welding is done on one side only by arc welding process. Labour charges are Rs.40 per hour. Electrode required per metre run in 2.5 m and costs Rs.20 per metre. Power consumption is 6 kWhr per metre of the weld and cost Rs.8 per kWhr. Time for welding 1 m length is 18 min. Assuming overheads as Rs.40 per hour, calculate welding expenses.

9. Estimate the total cost of 20 C.I flanged pipe casting shown in Fig.5, assuming the following data: Cost of C.I= Rs. 30/kg; Cost of process scrap = Rs. 7/kg; Process scrap = 2% of net weight of casting; Moulding and pouring charges = Rs. 15/piece; Casting removal and cleaning Rs. 5/piece; Administrative overheads = 5% factory cost; Selling overheads = 70% administrative overheads.

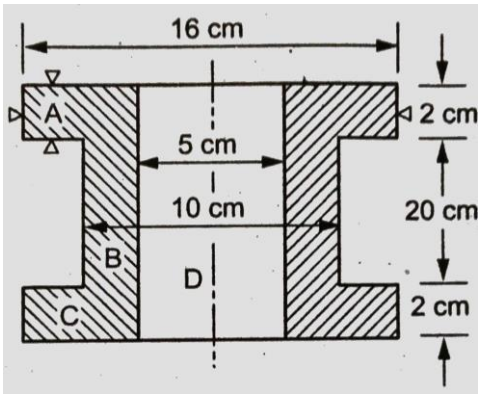

Fig.5

UNIT-5

Part-A

1. What are the various elements of total time required to manufacture a component?
2. Define machining time?
3. What is length of cut?
4. What is mean by tool approach and tool overtravel?
5. What is Tear Down Time
6. What is Allowances.
7. Name the different types of allowances
8. Write the formula used for calculating the turning time.

Part-B&C

1. What are the various terms used in the study of machining time in lathe operation.
2. Briefly explain the estimation of machining time for various lathe operations.
3. Describe the procedure of estimating the machining time required during shaping (or planning) operation on a shaper (or planer).
4. Explain the procedure on estimating the machining time for plain milling a flat surface when the width of the job to be milled is more than the width of the plain milling cutter.
5. How can you estimate the grinding time for a cylindrical grinding operation?
6. A 100 mm thick laminated plate used in pressure vessels consists of 80 mm thick steel plate cladded with titanium plate of thickness 20 mm. A 10 mm diameter hole is to be drilled through this composite plate. Estimate the time taken for drilling this hole if, cutting speed of steel and titanium are 25 mm/min and 10 mm/min respectively. Also the feed of drill for steel and titanium are 0.25 mm/rev and 0.20 mm/rev respectively.
7. 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 is 3 per cm. Taking 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.
8. Calculate the machining time required to produce one piece of the component shown in Fig.6 given below starting from f 25 mm bar. The following data is available. For turning: Cutting speed = 40 m/min. Feed = 0.4 mm/rev. Depth of cut = 2.5 mm/per pass. For thread cutting: Cutting speed = 8 m/min.

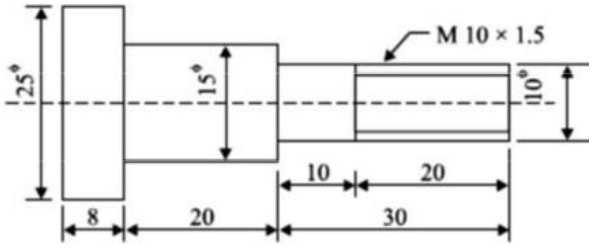

Fig. 6

9. A mild steel bar 100 mm long and 38 mm in diameter is turned to 35 mm dia. And was again turned to a diameter of 32 mm over a length of 40 mm as shown in the Fig.7. The bar was machined at both the ends to give a chamfer of 45°× 5 mm after facing. Calculate the machining time. Assume cutting speed of 60 m/min and feed 0.4 mm/rev. The depth of cut is not to exceed 3 mm in any operation.

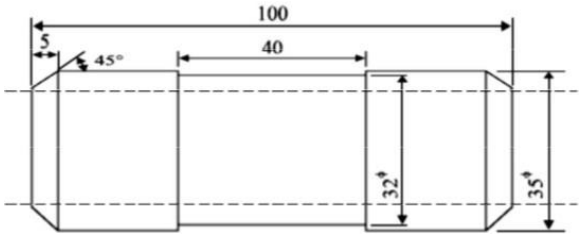

Fig.7