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Question Paper Code : 40844

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh/Eighth/Ninth Semester

Manufacturing Engineering

ME 8793 — PROCESS PLANNING AND COST ESTIMATION

(Common to Material Science and Engineering/Mechanical 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 × 2 = 20 marks)

1. Mention the factor affecting process planning.

2. What are parameters to determine the tool performance?

3. What are the functions of jig and fixture?

4. List the use of quality assurance.

5. Define overhead cost.

6. Distinguish cost estimation and cost accounting.

7. List the losses occur that during forging.

8. What is shrinkage allowance?

9. What is tear down time?

10. Mild steel shaft 20 cm long is to be ground rough from 33.3 to 33 mm dia using grinding wheel of 40 mm face width with the work speed of 12m/min and depth of cut 0.02 mm per pass, and 115 rpm. Calculate the time taken to grind the job.

PART B — (5 × 13 = 65 marks)

11. (a) Enlist the common approaches in CAPP system and state their advantages and limitations.

Or

(b) Explain basic steps involve in process planning.

12. (a) What are the factors to be considered in the selection jigs and fixtures?

Or

(b) Explain the various quality assurance methods in detail.

13. (a) From the following data provided by a mask machine manufacturer, find prime cost, factory cost, production cost, total coat and profit.

Items	INR
Value of stock material as on 1-07-2021	52,000
Material purchased	5,48,000
Wages to workers	2,40,000
Depreciation of plant and machinery	16,000
Depreciation of office equipment	4,000
Rent, taxes and insurance	32,000
General administrative expenses	6,800
Water, power and telephone bill of factory	19,200
Water, power and telephone bill of office	5,000
Transportation in factory	4,000
Insurance and rent of office building	4,000
Direct expenses	1,00,000
Commission and pay of salesman	21,000
Repair and maintenance	2,000
Production Managers salary	60,000
Salary of office staff	1,20,000
Value of stock of material on 30-06-2021	72,000
Sale of products	12,72,000

Or

(b) Find out the production cost per gear for a transmission unit in automobile from the following data.

Charges for forging per kg	Rs. 22.5
Wrought iron used per month @ Rs. 90 per Kg	27 tonnes
Wages of operator	Rs. 450/day
No of operator employed	36
Cartage/day	Rs. 2,250
Deprecation of machines and tools	Rs. 4500 per month
Wages of helpers	Rs. 270 per day each
No of helpers employed	8
Salary of supervisor	Rs. 45,000 per month
Packing charges for 108 gears	Rs. 360
Electric charges	Rs. 11700 Per month
Salary of manager and maintenance staff	Rs. 1,26,000 per month

If 13,500 gears are to be produced per month and factory runs 26 days a month at 8 hour shift then what should be the selling price of each gears so as to earn profit of 20 percentage of factory cost?

14. (a) Calculate the cost of forging a crank shaft as show in figure 1 below using the following data available. The forging is to be made out of 50 mm dia.

Material price	Rs.100 per kg
Direct labour charges	Rs. 43 per piece
Overhead charges	150% of material cost
Density	7.5 g/cc
Losses	28% of net weight

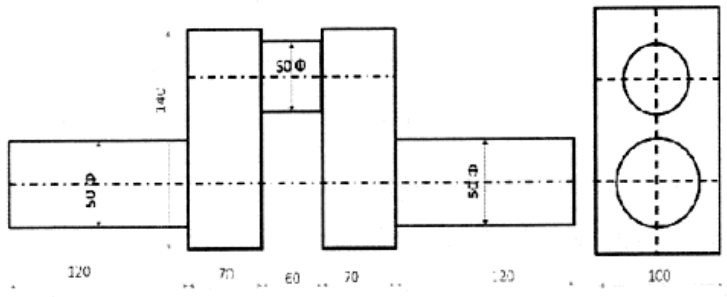

Figure 1

Or

(b) Calculate the cost of welding two pieces of mild steel sheets each 2 meters long and 7 mm thick. A 60° V is prepared by means of gas cutting before welding is to be commenced. The cost of oxygen is Rs. 7/cu meter and acetylene is Rs. 4/cu meter. The filler metal costs Rs. 20 per kg.

The following data is also available :

For gas cutting (10 mm thick plate)

Cutting speed	20 m/hr
Consumption of oxygen	2 cu m/hr
Consumption of acetylene	0.2 cu m/hr

Data for rightward welding

Consumption of oxygen	0.8 cu m/hr
Consumption of acetylene	0.8 cu m/hr
Dia of filler rod used	3.5 mm
Filler rod used per meter of weld	3.4 m
Rate of welding	3 m/hr
Density of filler metal	8 g/cc

15. (a) A 400 mm × 60 mm rectangular cast iron piece is to be face milled with a carbide cutter. The cutting speed and feed are 60 m/min and 60 m/mm. If the cutter diais 80 mm with 12 cutting teeth. Find cutter r.p.m. feed per tooth, milling time.

Or

(b) Calculate the machining time to drill eight 8 mm dia holes and one 40 mm dia central hole in the flange shown below (Figure 2). With cutting speed 10 m/min, feed for 8 mm drill 0.1 mm/rev, 40 mm drill is 0.4 mm/rev, 20 mm dia drill 0.2 mm/rev.

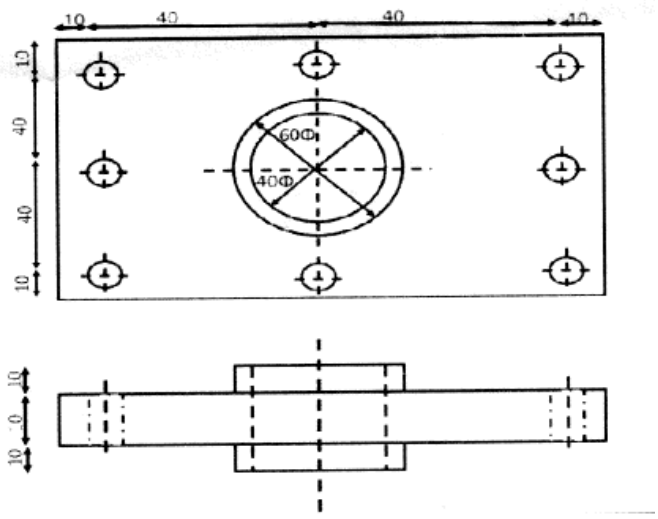

Figure 2

PART C — (1 × 15 = 15 marks)

16. (a) A mild steel bar 150 mm long and 48 mm in diameter is turned to 45 dia and was again turned to diameter of 42 mm over a length of 60 mm as shown in Figure 3 below. The bar was machined at the both the ends to give the chamber of 45° × 5 mm after facing. Calculate the overall machining time, take cutting speed of 60 m/min and feed 0.4 mm/rev. The depth of cut should not exceed 3 mm.

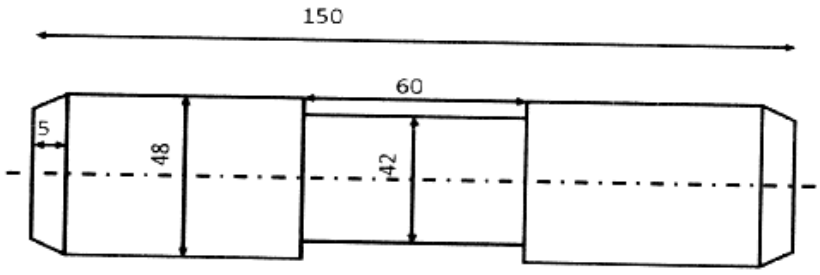

Figure 3

Or

(b) A cast iron component is to be manufactured as shown in Figure below. Estimate the selling price per piece from the following data:

Density of material	7.2 gms/cc
Cost of molten metal at cupola spout	Rs. 20 per kg
Process scrap	20 percent of net weight
Scrap return value	Rs. 6 per kg
Administrative overheads	Rs. 30 per hour
Sales overheads	20 percent of factory cost
Profit	20 percent of factory cost

The component shown in figure 4 is obtained after machining the casting. The pattern which costs Rs. 5,000 can produce 1,000 pieces before being scrapped. The machining allowance is to be taken as 2 mm on each side.

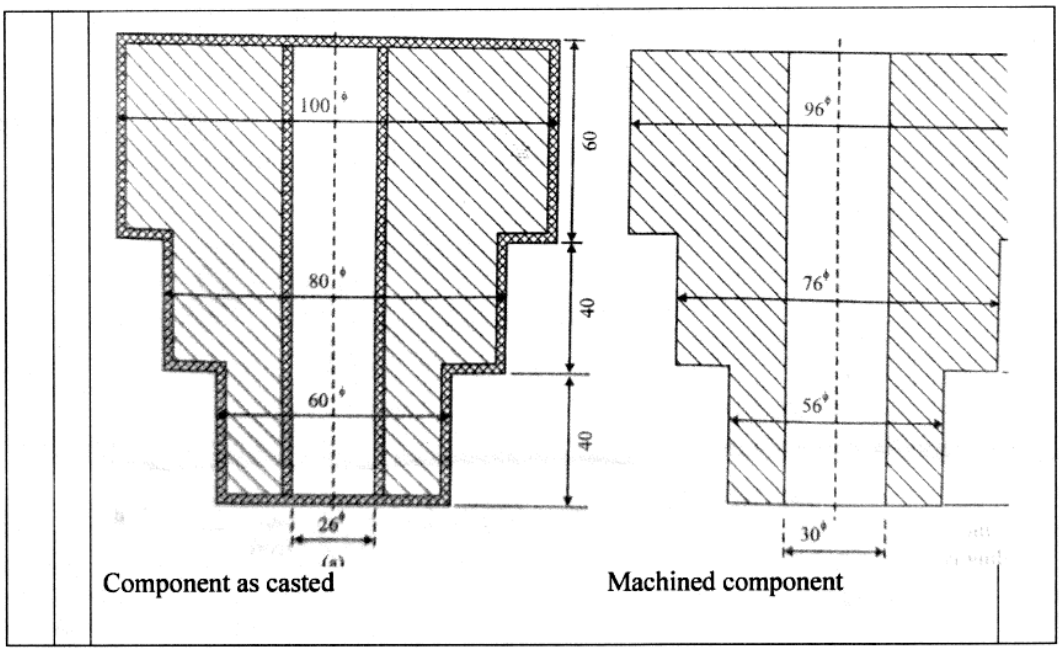

Figure 4