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D 4309

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Seventh Semester

(Regulation 2004)

Mechanical Engineering

ME 1007 — PROCESS PLANNING AND COST ESTIMATION

(Common to Production Engineering)

(Common to B.E. (Part-Time) Sixth Semester Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the important applications of work study in industry.
2. What is 'therblig'?
3. What are the objectives of process planning?
4. Compare manual process planning with computer aided process planning.
5. Why costing is essential to industrial control?
6. What do you understand by a realistic estimate? Explain its importance in production.
7. Distinguish between estimation and costing.
8. What are the factors by which profit will be decided during estimation?

9. Describe briefly, with examples the following terms: overheads, direct material and direct labour cost.
10. A machine of initial cost Rs. 5000 is to be overhauled two times during the life of 12 years. On each overhauling job, a sum of Rs. 1,000 is spent. Calculate the depreciation per year if the residual cost of the machine after 12 years is 1,000.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail about the following motion study tools (i) motion economy (ii) micromotion analysis (iii) therbligs analysis. (16)

Or

- (b) Give symbols used in flow process charts of method study for operation, storage, delay, transport, inspection-cum-operation. State the significance of flow process charts. (16)

12. (a) Explain the criteria of selecting operating sequences and machine selection in process planning. (16)

Or

- (b) Explain how the manufacturing logic, production time and optimum cost are used in process planning. (16)

13. (a) (i) For the manufacture of 1000 bolts and nuts per hour, an industrial unit undergoes the following expenses :

Direct material cost = Rs. 350

Direct Labour cost = Rs. 200

Direct expenses = Rs. 75

Factory on cost = 150% of total labour cost

Office on cost = 30% of total factory cost

The bolt and nut is sold at Rs 1.025 per piece. Make calculations to work out the loss or gain per piece to the management. (8)

- (ii) In a toy manufacturing plant, there are 7 employees working 7 hours per day for 6 days in a week. They are paid Rs. 8 per day. The standard output has been fixed as 6 toys per man hour. The overhead expenses are Rs. 500 per week. Other factory expenses are Rs. 200 per week. Material cost per toy is 50 paise. In a particular

week the output was 2200 toys when it was declared that a bonus of 2 paise per worker would be paid for each toy produced above the standard output. Find the factory cost per toy if only standard output is available and also if the production is 2000 toys per week. Compare these costs and give your comments. (8)

Or

- (b) (i) A firm producing air circular wants to place a improved design in the market. Suggest a selling price covering the on cost and keeping the previous profit proportions on sales. The material in new model will cost Rs 350 and the direct wages would be Rs. 200. The following figures relate to the previous year.

Stock of material on 1st April, 1976 = Rs. 25,000

Stock of material on 31st march 1975 = Rs. 27,000

Purchase of raw materials in this period = Rs. 50,000

Manufacturing wages = Rs. 15,000

Works on cost = Rs. 7,500

Administrative and sales on cost = Rs. 7,500

Sales during the year = Rs. 95, 000 (8)

- (ii) Two workmen engaged on a forging hammer complete 20 connecting rod drop forging each weighing 8 kg in a shift of eight hours. The workmen are paid at the rate of Rs 5 and Rs 3 per day and material cost is Rs 1.60 per kg. If 140% of the direct labour is engaged to compensate for both factory overheads and administrative expenses, what will be per unit cost of production of these forging? (8)

14. (a) (i) Explain in details about the methods of estimation. (8)

- (ii) In a manufacturing concern the variable overhead charges are Rs. 1.50 per article and the fixed overhead charges per month are Rs. 30,000. It is estimated that 60,000 articles are produced each month under normal conditions. Find

(1) the normal overhead cost per product

(2) if the factory drops to 80% production, the overhead charges that remain unrecovered

- (3) if the production is increased to 120% by what amount these charges will be over recovered.

Take the overhead rate per article the same as that during normal conditions, in both the cases. (8)

Or

- (b) (i) What are the different types of estimates? (4)
- (ii) Discuss briefly the allowances permitted during estimation. (4)
- (iii) The estimated life of a lathe is 10 years and it works 16 hours a day. The initial cost of the lathe is Rs. 80,000 and scrap value after 10 years is Rs. 25,000. If the machine works for 5840 hours in a year, calculate the rate of depreciation charged annually under machine hour basis method. (8)
15. (a) (i) Find out the reduced value of a machine after 2 years when the cost of the machine was Rs. 1,20,000 its scrap value after 4 years is Rs. 40,000. Rate of interest is 4%. Use annuity method. (8)
- (ii) A machine was purchased at Rs 30,000. What will be the value of the machine after 4 years if the depreciation is calculated by the reducing balance method, interest being 5% and constant percentage of reduction per year being 20%? (8)

Or

- (b) (i) What do you understand by depreciation? Explain the causes of depreciation. (6)
- (ii) It is required to produce a hole 15 mm in diameter and 10 cm deep through the mild steel piece. Estimate the time taken for completing the hole in the following two cases : (10)
- (1) The hole is drilled by a 15 mm drill. Assume the cutting speed for the mild steel to be 30 m/min and feed for 15 mm drill to be 0.2 mm/rev.
- (2) First a 10 mm hole is drilled which is then brought to accurate size by boring. Assume the cutting speed for boring and drilling to be 30 m/min. the feed for 10 mm drill to be 0.15 mm/rev and feed for boring operation to be 0.13 mm/rev.