April 2018

<u>*Time – Three hours*</u>
(Maximum Marks: 75)

[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART - B

(2) Answer division (a) or division (b) of each question in PART - C.

(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]

PART – A

1. What is manual process planning?

2. What is machine capacity?

3. What are the factors influencing choice of machinery?

4. Define ergonomics.

5. Name the various constituents of cost.

6. What do you mean by inspection time?

7. Define tool approach and tool over travel.

8. What is the objective of line balancing?

PART – B

9. State the advantages of computer aided process planning (CAPP).

10. Explain the uses of jigs and fixtures.

11. What are the objectives of work study?

12. Give the name, explanation, abbreviation and symbol of any three therblig.

13. What data are required for making a cost estimate?

14. List the various steps of cost estimating.

15. Define feed. What are the factors influencing for the selection of feed?

[Turn over.....

16. The handle of a gauge of 30mm diameter has 80mm length. It is to be knurled in lathe. Find the machining time for knurling the handle, if the cutting speed is 20m/min and the feed is 0.3mm per rev.

PART – C

17. (a) Explain the generative process planning and state its advantages.

(Or)

(b) A company is buying one of the component that go into their product at a total purchase cost of ₹. 20 per unit. Their annual requirements of the component is 6000 units. One of the supervisors had put up a proposal for making the component in the shop itself because the variable cost per unit comes to ₹. 2 only. It was found that it requires sophisticate machines and the accounts department had worked out and estimated the annual fixed cost of ₹. 1,40,000. Should the proposal be accepted? Draw the breakeven chart and find the minimum level of annual requirements of the component above which making the component would be profitable.

18. (a) Construct suitable operation planning sheets for manufacture of spur gear having 24 teeth using a 2 module gear cutter. The spur gear is to be made for a total quantity of 1000 pieces. The material of the gear is medium carbon steel.

(Or)

(b) A component can be produced on either a turret lathe or an automatic lathe. The different cost factors for the two machines are given below.

For turret lathe
Fixed cost = ₹. 400
Variable cost = ₹. 2 per piece

For automatic lathe
Fixed cost = ₹. 1600
Variable cost = ₹. 0.50 per piece.

Assume that the cycle time for production of the component is same for both machines.
Which machine will you select for producing (i)900 (ii)700 components? Also determine the breakeven quantity.

19. (a) What are the objectives of method study? Explain the basic procedure followed for conducting method study.

(Or)

(b) The mean observed time and the rating factor for 5 elements of a job are given below.

Elements	Mean observed times in minutes	Rating factor in %
1	0.3	120
2	0.6	100
3	2.2	80
4	1.5	110
5	1.4	90

Fatigue allowance-5%. Personal allowance-10%. Contingency allowance-5%. Calculate the allowed time for the job.

20. (a) Estimate the sales price to be quoted for the product from the following given data.
Direct material cost per piece — ₹. 14
Direct labour cost per piece — ₹. 18
Factory overhead — 100% of prime cost.
General overhead — 25% of factory cost.
Profit — 10% of total cost.

(Or)

(b) An electric immersion rod is being sold in the market for ₹. 65. Find its production or manufacturing cost assuming 20% profit on the selling price and selling expenses to be 40% of production cost. If the cost of material used for the rod is ₹. 15 and overheads of the department in which it is being is 40% of labour cost. Find the time taken for its manufacture, if the labour rate is ₹. 2 per hour.

21. (a) Estimate the machining time required on the shaper to complete one cut on a plate 500 × 900mm, if the cutting speed is 6m/min. The return time to cutting time ratio is 1:3 and the feed is 2mm per stroke. The clearance at each end is 70mm. Width wise allowance may be taken as 25mm.

(Or)

(b) A slot 25mm deep is to be cut through a work piece 200mm long with the help of a HSS side and face cutter whose diameter is 150mm and that has 10 teeth. The cutting speed is 50m/min. and feed is 0.25mm/tooth. Determine (i)table feed in mm/min. (ii)total cutter travel and (iii)time required to machine the slot.