

7656

BOARD DIPLOMA EXAMINATION, (C-20)

DECEMBER—2022

DME – FIFTH SEMESTER EXAMINATION

INDUSTRIAL ENGINEERING AND ESTIMATING COSTING

Time : 3 hours ]

[ Total Marks : 80

**PART—A**

3×10=30

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. What are the objectives of work study?
2. Define allowance. List four allowances of estimating the standard time.
3. List the advantages of sampling inspection over 100% inspection.
4. What is six sigma?
5. State the objectives of estimation.
6. Differentiate between depreciation and obsolescence.
7. Determine the volume of solid revolution of circular fillet about X-X axis at a distance R from the centre of gravity.
8. Find the time required to drill six holes in a casted flange each of 8 cm depth, if the hole diameter is 1 cm. Assume cutting speed as 20 m/min and feed as 0.02 cm/rev.

9. Mention the various elements involved in calculating the fabrication cost of a product. \*

10. How do you estimate the total cost of forging?

**PART—B**

8×5=40

**Instructions :** (1) Answer either (a) or (b) from the following questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. (a) What is SIMO chart? Prepare a SIMO chart for a bolt and nut assembly in a manufacturing unit.

**( OR )**

(b) Define standard time. How is the standard time calculated from observed time?

12. (a) Explain the difference between variable chart and attribute chart.

**( OR )**

(b) The values of sample means and ranges for 10 samples of size 5 each given below. Draw charts for the means and ranges. Comment on the state of control of the process. For  $n = 5$  ;  $A_2 = 0.58$  ;  $D_3 = 0$  ;  $D_4 = 2.11$ .

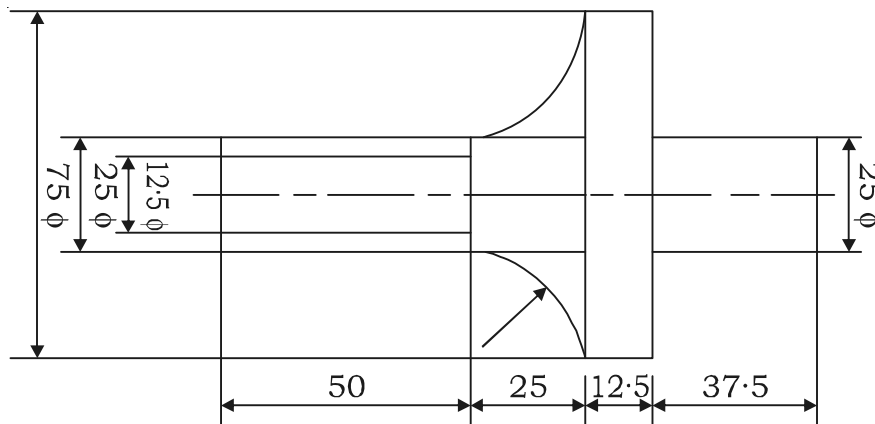
Sample No.	1	2	3	4	5	6	7	8	9	10
Mean (X-bar)	7	7.5	8.0	10	9.5	11.0	11.5	4.0	3.5	4.0
Range (R)	2	3	2	2	3	4	3	2	3	2

13. (a) A firm produces 150 parts per day. The direct material cost is found to be ₹ 160, direct labor cost ₹ 200 and factory over heads are 50% of the direct cost. If the selling on cost is 45% of the factory cost, what must be the selling price of each part to realize a profit of 20.9% of the selling price?

( OR )

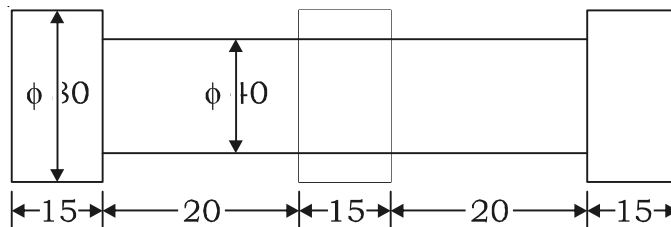
- (b) A drilling machine was purchased for ₹ 35,000. Its estimating value of the machine at the end of 8 years is ₹ 5,000. Calculate depreciation at the end of each year using sum of year's digits method.

14. (a) Estimate the volume of material required for producing 1500 parts as shown in the figure below. Assume that 18% of the finished material is wasted during finishing. Density of material is 7.8 gram/cc. All the dimensions are in mm.



( OR )

- (b) The shaft shown below is to be manufactured by turning out of 85 mm steel rod. Find out the minimum machining time if the job is to be turned at 300 r.p.m. with feed 0.5 mm/rev and depth of cut 3 mm. All dimensions are in mm.



15. (a) 2000 MS Pins of 5 cm dia and 12 cm length are to be drop forged from a bar stock of 6 cm diameter. Calculate the material cost, if bar is available at ₹ 60/m length, assuming all the possible losses.

( OR )

(b) Estimate the welding cost for butt welding to two mild steel plates each 300 mm × 200 mm × 4 mm. Assume the following data :

Consumption of oxygen : 0.55 m<sup>3</sup>/hr

Rate of oxygen : ₹ 40/m<sup>3</sup>

Consumption of acetylene : 0.27 m<sup>3</sup>/hr

Rate of acetylene : ₹ 120/m<sup>3</sup>

Welding time per meter of weld : 18 min

Length of filler rod consumed : 3.4 m/m of welding

Filler rod diameter : 3 mm

Filler material lost during welding : 20%

Density of filler rod : 7.2 gm/cc

Cost of filler rod : ₹ 40/kg

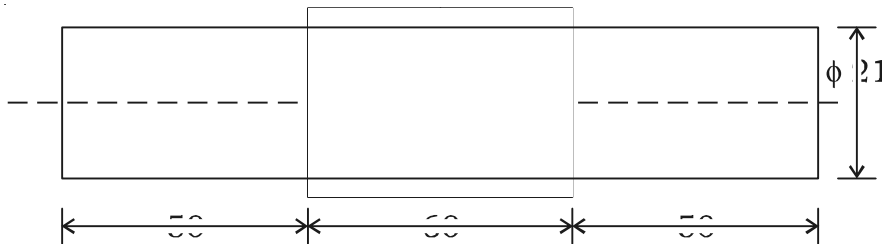
Welding is done on both sides.

**PART—C**

10×1=10

- Instructions :**
- (1) Answer the following question.
  - (2) The question carries **ten** marks.
  - (3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

**16.** Find the time required to turn 35 mm dia bar to the dimensions as shown in figure below. Cutting speed is 15.4 m/min and feed is 1 mm/rev. All cuts are 3.5 mm deep. All dimensions are in mm.



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