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BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DME - FIFTH SEMESTER EXAMINATION

INDUSTRIAL ENGINEERING AND ESTIMATING AND 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. Define work study. List any four advantages of work study.

2. Draw a two hand process chart to assemble bolt and nut with the following events :

   Left hand : pick up bolt, hold, hold, hold;

   Right hand : idle, pick up nut, to left hand, assemble.

3. What are the uses of standard data?

4. List out the techniques of SQC.

5. Write any three main differences between variable data and attribute data.

6. List out various constituents of estimation.

7. What are the various causes of depreciation?

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8. Calculate the volume of a circular ring (made from 10 mm diameter rod) whose outer and inner radii are 40 mm and 20 mm.

9. What is the purpose of calculating machining time?

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

PART—B

**Instructions :** (1) Answer *any* **five** questions.

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

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

11. Write short notes on cycle graph, chronocycle graph and micro-motion study. 10

12. *(a)* Describe the procedure for method study.

(b) Explain the procedure to collect PMTS data. 10

13. Explain briefly about methods of time study. 10

14. Find the $\bar{x}$ (mean) and σ (standard deviation) from the following data : 10

x	5	7	10	12	15	18	20
f	5	10	15	20	14	11	6

15. Estimate the volume of material required for manufacturing 100 pieces of shaft as shown in the figure. The shafts are made of M.S. weighing 7.8 gm/cc and costs ` 10 per kg. Calculate also the material cost for such shafts. All dimensions are in mm. 10
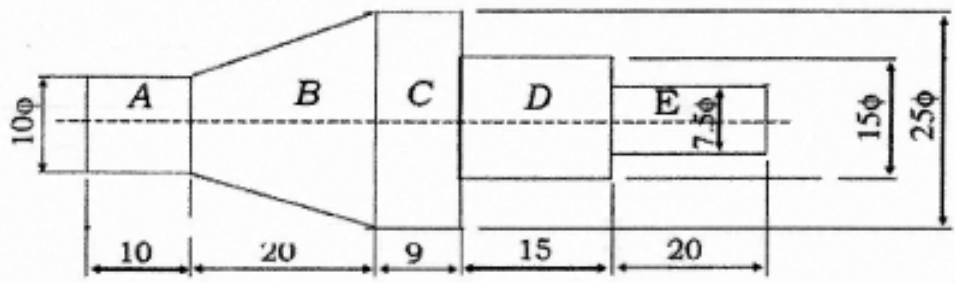
16. *(a)* Find the time for surface grinding an M.S. surface 80 cm long and 30 cm wide on a horizontal surface grinding machine with a segmental grinding wheel. The diameter of wheel is 40 cm and it runs at maximum peripheral speed of 1500 m/min. The work table moves with a feed of 2·5 cm/rev of wheel. The desired thickness of stock is removed in 40 passes of the job below the wheel.　　　7

(b) A CI rectangular block of 10 cm × 3 cm is required to be shaped to reduce the thickness from 1·5 cm to 1·3 cm in one cut. Determine the time required for shaping, if cutting speed is 20 m/min and feed 0·2 cm/stroke and the cutting time ratio is 3/5.　　　3

17. Cast iron pulley is shown in the given figure. Estimate the cost of casting
150 CI pulleys using the following data :　　　10

Cost of metal = ` 10/ kg.

Moulds prepared by each worker per day = 20.
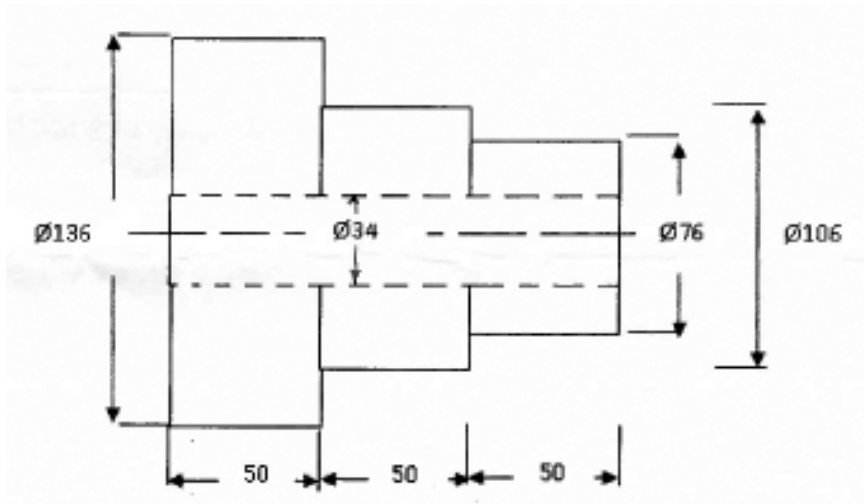
Melting charges = 20% of metal cost.

Machining allowance on each side may be taken as 2 mm.

Wages to each moulder = ` 20/ day.

Density of CI = 7·2 g/cc

Overhead charges = 25% of metal.

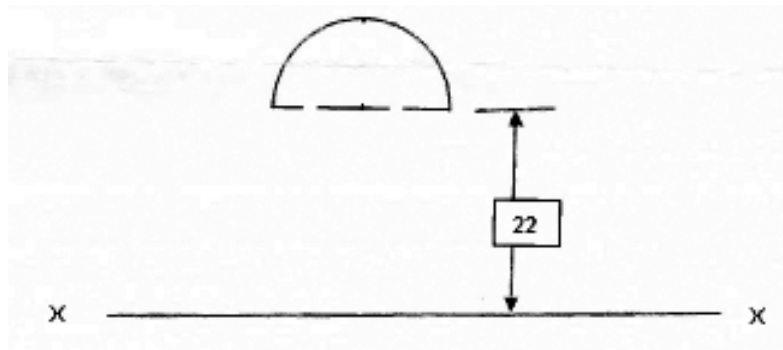Pattern is supplied by the consumer.

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18. (a) Two 1 meter long MS plates of 10 mm thickness are to be welded by a lap joint on both sides with the help of 6 mm electrode. Calculate the cost of welding. Assume the following data : 10

   (i) Current speed = 250 ampere

   (ii) Voltage = 30 volt

   (iii) Welding speed = 10 m/hr

   (iv) Electrodes used = 0·5 kg/m of welding

   (v) Labour charges = ` 20 per hour

   (vi) Power charges = ` 2 per kWh

   (vii) Cost of electrodes = ` 25 per kg

   (viii) Efficiency of the machine = 60%

   (b) Determine the volume of solid of revolution of a semicircle of radius 7 mm about xx axis as shown in the following figure :

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