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VI Semester Diploma Examination, May 2009
MECHANICAL ENGINEERING BOARD
ESTIMATION AND COSTING

Time : 3 Hours]

[Max. Marks : 100

- Instructions :** (1) Section – A is compulsory.
 (2) Answer any **two** full questions from each of the remaining Sections.

43

SECTION – A

1. (a) List any five functions of Estimating. 5
 (b) Define Standard Cost. What are its advantages? 5

SECTION – B

2. (a) Draw a block diagram of showing the relationship between the elements of cost and components of cost. 3
 (b) List any six methods of Allocation of on-cost in costing. 3
 (c) A factory is producing 1000 bolts and nuts per hour on a machine. The direct material cost is Rs. 375, direct labour cost is Rs. 245 and the direct expense is Rs. 80. The factory on-cost is 150% of the total labour cost and office on-cost is 30% of the total factory cost. If the selling price of each bolt and nut is Rs. 1.50, calculate whether the management is going in loss or gain and by what amount? 9
3. (a) Define the following : 3
 (i) Depreciation
 (ii) Obsolescence
 (iii) Inadequacy
- (b) List any six methods of calculating depreciation. 3
 (c) A machine is purchased for Rs. 40,000. The estimated life of machine is 15 years and scrap value is Rs. 15,000. If the rate of interest on the depreciation fund is charged at 5%, calculate the rate of depreciation by Sinking Fund Method. 9

After 5 years, the machine was sold for Rs. 24,000. Find the extra capital needed to purchase the new machine for Rs. 50,000. 9

4. (a) Write the formula for calculating the volume of following solids :
- (i) Frustum of Pyramid.
 - (ii) Frustum of Cone.
 - (iii) Segment of Sphere. 6
- (b) Estimate the volume of material required for an engine flywheel. Also calculate the material cost, if it weighs 8 gm/cc and the cost is Rs. 15 per kg. Use the following data : 9
- (i) Outside dia. of RIM = 800 mm
 - (ii) Inside dia. of RIM = 660 mm
 - (iii) Width of RIM = 150 mm
 - (iv) Outside dia. of HUB = 150 mm
 - (v) Inside dia. of HUB = 100 mm
 - (vi) Length of HUB = 250 mm
 - (vii) Section of Arms – Elliptical = 70 mm × 40 mm
 - (viii) No. of Arms = 4

SECTION – C

5. (a) Define : 6
- (i) Turning
 - (ii) Drilling
 - (iii) Tapping
- (b) Find the time taken to prepare a job according to the dimensions shown in Fig. 1, from a bar stock of 35 mm dia. and 60 mm long. Use the following data : 9
- (i) Cutting speed for turning and boring = 20 m/min.
 - (ii) Cutting speed for drilling = 30 m/min.
 - (iii) Feed for turning and boring = 0.2 mm/rev.
 - (iv) Feed for drilling = 0.23 mm/rev.
 - (v) Depth of cut not to exceed = 3 mm

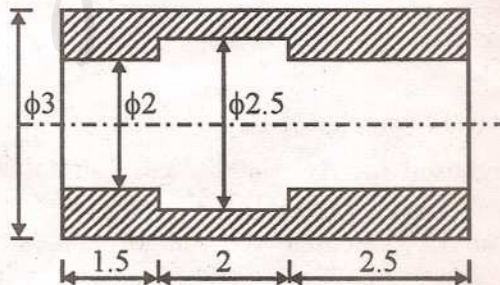


Fig. 1

Note : All dimensions are in cm.

6. (a) A slot is to be made on a milling machine with the help of a cutter, revolving at 120 rpm. Find the time required to prepare the slot in two cuts, if it is 20 mm deep and 100 mm long with a cutter of 80 mm dia. Assume the feed as 0.5 mm/rev. 5
- (b) The top of Cast Iron Table of size 300 mm × 600 mm is to be ground by a wheel having 20 mm face width. If the feed is $\frac{1}{4}$ th of the width of the wheel and the table moves 8000 mm in one minute, find out the time required for grinding in two cuts. 5
- (c) Estimate the time required to shape a 400 mm long 10 mm wide and 6 mm deep keyway in a C.I. blank. Take cutting speed = 15 m/min., Feed = 0.2 mm/stroke and depth of cut = 1.5 mm. 5
7. (a) Explain the following operations with respect to sheet metal shop : 6
- (i) Breaking out
 - (ii) Hollowing
 - (iii) Raising
- (b) A container open on one side (Top open) of size 500 × 500 × 1000 mm height is to be made from 6 mm thick plate. Take density of plate metal as 8 gm/c.c and the joints are to be welded on one side only. Estimate the cost of the container from the following data : 9
- (i) Cost of plate = Rs. 4.00/kg
 - (ii) Sheet Metal Scrap = 5% of material
 - (iii) Cost of Labour = 10% of material cost
(i.e. sheet cost + welding material cost)
 - (iv) Cost of Welding Material = Rs. 5 per metre weld.

SECTION - D

8. (a) Explain Right-ward and Left-ward welding techniques with sketches. 6
- (b) Estimate the material cost for welding 2 flat pieces of M.S. 15 × 6 × 1 mm size, at an angle of 90° by gas welding. Use the following data : 9
- (i) O₂ consumption = 0.7 m³/hr, which is available @ Rs. 10/m³.
 - (ii) C₂H₂ consumption = 0.5 m³/hr, which is available @ Rs. 60/m³.
 - (iii) Length of Filler rod used of dia. 5 mm = 4.5 m/m of welding
 - (iv) Cost of Filler metal = Rs. 12/kg
 - (v) Density of Filler Metal = 7 gm/c.c.
 - (vi) Welding time = 30 min/m of welding.

9. (a) Explain Time or Day Rate System of wage payment. Write its merits and demerits. 6
- (b) There are five workers manufacturing 24, 32, 36, 40 and 48 electric switches respectively. The standard day rate is Rs. 80.00 per worker and the standard output is 40 switches. Calculate their daily earnings and hourly rate by Emerson Efficiency Plan. 9
10. (a) Differentiate between Net Working Capital and Gross Working Capital. 6
- (b) List any ten steps involved in project planning and explain any two steps. 9
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