Question Paper Code	12478

B.E. / B.Tech. -DEGREE EXAMINATIONS, NOV / DEC 2023
Fifth Semester
Mechanical Engineering
20MEEL514 - PROCESS PLANNING AND COST ESTIMATION
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

Marks, K-Level, CO

1. Define Process planning. — *2,K1,CO1*

2. List the factors affecting tooling selection. — *2,K1,CO1*

3. In a turning process, the length of the work piece is 80 mm, the feed is 0.5 mm/rev and the cutting speed is 500 rpm. Calculate the time required for the cutting operation. — *2,K2,CO2*

4. What is the use of quality assurance? — *2,K1,CO2*

5. Differentiate between Estimating and costing. — *2,K2,CO3*

6. A machine costs Rs. 25,000 and is expected to run for 10 years, at the end of which its scrap value is likely to be Rs. 2500. The machine is expected to run 2000 hours/year on average. Determine the depreciation charges per hour of the machine. — *2,K2,CO3*

7. Classify the types of forging. — *2,K2,CO4*

8. Why machining allowance is kept in a pattern? — *2,K1,CO4*

9. Distinguish between drilling, boring, and reaming. — *2,K2,CO5*

10. Define tear-down time. — *2,K1,CO5*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Illustrate the steps involved in the process planning activities. — *13,K2,CO1*

OR

   b) Explain the factors influencing equipment selection in process planning. — *13,K2,CO1*

12. a) Explain the principles of Jigs and fixtures design. — *13,K2,CO2*

OR

   b) Outline the set of documents/information required for the process planning. — *13,K2,CO2*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   ***12478***

13. a) Classify the types of estimates and explain them in detail. 13,K2,CO3

OR

b) Explain the various elements of the cost. 13,K2,CO3

14. a) Estimate the length of the 20 mm diameter rod to be used for making a key of size as shown in Fig.14.a. 13,K3,CO4
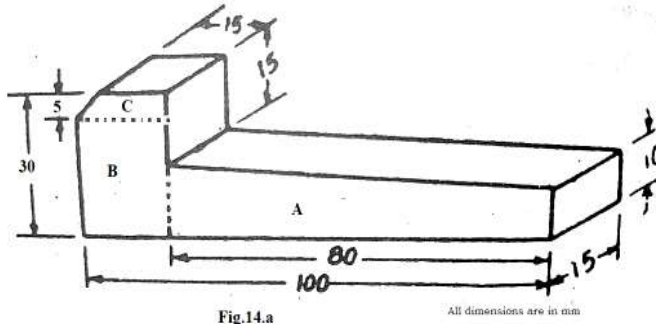

Fig.14.a All dimensions are in mm

OR

b) Estimate the material cost for welding 2 flat pieces of M.S 15 x 16 x 1 cm size at an angle of 90° by gas welding Fig 14.b. Neglect edge preparations cost and assume: 13,K3,CO4
Cost of O_2 = Rs 15/m^3
Cost of C_2H_2 = Rs 60/m^3
Density of filler metal = 7 gm/cc
Cost of filler metal = Rs. 50/kg
The filler rod diameter = 5
The filler rod required 4.5 m/m of welding
Assume
O_2 consumption = 0.7 cu. m/hr
C_2H_2 consumption = 0.5 cu. m/hr
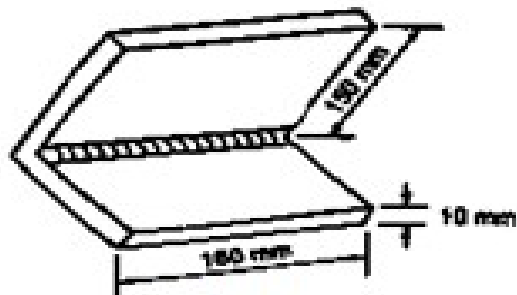Welding time = 30 min/m of welding.

Fig.14.b

15. a) Calculate the machining time required to produce one piece of the component shown in *Fig 15.a* given below starting from 25 mm bar. The following data is available. 13,K3,CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12478**

For turning:
Cutting speed = 40 m/min.
Feed = 0.4 mm/rev.
Depth of cut = 2.5 mm/per pass
For thread cutting:
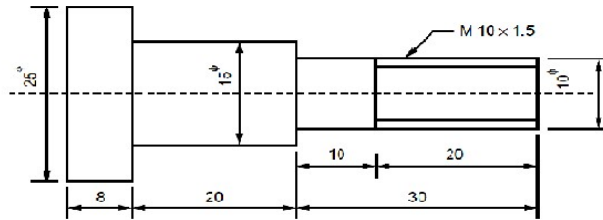Cutting speed =8 m/min.

Fig 15.a

OR

b) Determine the time taken to prepare a job according to the dimensions as shown in *Fig. 15.b* from a bar 3.5 cm diameter and 6 cm long. Assume the following data: *13,K3,CO5*

   (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.
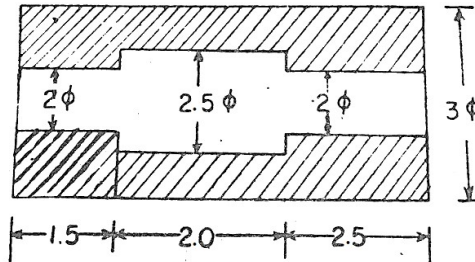   (v)   Depth of cut not to exceed   = 3 mm.

Fig 15.b

PART - C (1 × 15 = 15 Marks)

16. a) Estimate the planning time for a casting 1.25 m long and 0.5 m wide which is machined on a plane having cutting speed of 12 m/min and a return speed of 30 m/min. Two cuts are required; one roughing with a depth of 3.125 mm and a feed of 0.1 mm per rev and other finishing with a depth of 0.125 mm, and using of few of 0.125 mm.   *15,K3,CO6*

OR

b) Estimate the time required to rough grind a mild steel rod 200 mm long from 28.3 mm diameter to 28 mm diameter. Width of grinding wheel is 40 mm and job surface speed is 3 meters per minute and depth of cut is 0.1 mm. The longitudinal feed is to be half the wheel width per revolution of work piece.   *15,K3,CO6*