

23/6/23 - COE off

Reg. No.

Question Paper Code

11940

**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 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

- |                                                                                            | <i>Marks,<br/>K-Level, CO</i> |
|--------------------------------------------------------------------------------------------|-------------------------------|
| 1. List any four cutting tool materials.                                                   | 2,K1,CO1                      |
| 2. Define Process Planning.                                                                | 2,K1,CO1                      |
| 3. State the parameters involved in material selection.                                    | 2,K1,CO2                      |
| 4. Discuss the most influential factors in terms of tool performance.                      | 2,K1,CO2                      |
| 5. Classify the allowances considered in cost estimation.                                  | 2,K1,CO3                      |
| 6. Define overhead cost.                                                                   | 2,K1,CO3                      |
| 7. Solve the various costs involved in the calculation of total cost of Forged components. | 2,K1,CO4                      |
| 8. Define press forging.                                                                   | 2,K1,CO4                      |
| 9. Write formula to calculate the time required for drilling a hole in an object.          | 2,K1,CO5                      |
| 10. Differentiate length of cut and depth of cut.                                          | 2,K2,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Identify the steps involved in Process Design and also examine the basic factors affecting Process Design. 13,K1,CO1
- OR**
- b) Discuss the factors influencing process selection and write down the process selection parameters. 13,K3,CO1
12. a) Extend the types of jigs and fixtures with neat diagram and the clamping effectiveness. 13,K2,CO2
- OR**
- b) Explain the importance of selection of the right quality assurance method during manufacturing. 13,K2,CO2
13. a) Explain the procedure followed for estimating the cost of an individual product. 7,K2,CO3

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

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**OR**

b) Discuss various types of estimates.

13.K2,CO3

14. a) Explain the estimate procedure for the material cost involved in the manufacturing a casting.

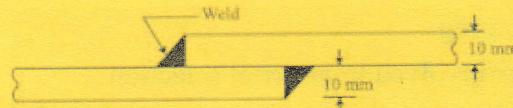
13.K2,CO4

**OR**

b) A lap welded joint is to be made as shown in Fig.1 Estimate the cost of weld from the following data :

13.K2,CO4

Thickness of plate= 10 mm; Electrode diameter= 6 mm;  
Minimum arc voltage= 30 Volts; Current used= 250 Amperes ;  
Welding speed= 10 meters/hour; Electrode used per meter of weld=  
0.350 kgs; Labour rate= Rs. 40 per hour , Power rate= Rs. 3 per kWh  
Electrode rate= Rs. 8.00 per kg , Efficiency of welding m/c= 50  
percent; Connecting ratio= 0.4 Overhead charges = 80 percent of  
direct charges; Labour accomplishment factor = 60 percent.



**Fig.1**

15. a) Estimate the time taken to drill a 25 mm diameter × 10 cm deep hole in a casting. First a 10 mm diameter drill is used and then the hole is enlarged by a 25 mm diameter drill. Assume:

13.K2,CO5

Cutting speed= 15 m/min.

Feed for 10 mm drill= 0.22 mm/rev.

Feed for 25 mm drill= 0.35 mm/rev.

**OR**

b) Discuss the various allowances to be considered while calculating the total time for manufacturing a component.

13.K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Estimate the grinding time to finish a shaft from 38.5 mm to 30 mm diameter. Length of shaft is 300 mm. Take width of grinding wheel 50 mm, cutting speed 12 m/min, depth of cut for rough and finishing operation is 0.785 and 0.05 mm respectively. Assume 1 mm diameter to be taken for finishing operation and remaining for rough cutting.

15.K2,CO6

**OR**

b) Estimate time required on a shaper to machine a plate 1100 X 500 mm, if the cutting speed is 16 m/min. the ratio of return stroke time to cutting stroke time is 2 : 3. The clearance at each is 20 mm long and 165 mm wide. two cuts are required one rough cut with feed 2 mm per stroke and finish cut with 1.25 mm feed per stroke.

15.K2,CO6