UNIT I	INTRODUCTION TO PROCESS PLANNING			
Introduction- methods of process planning-Drawing interpretation-Material evaluation – steps in process selection-.Production equipment and tooling selection				
PART – A				
CO Mapping : C205.1				
Q. No	**Questions**	**BT Level**	**Competence**	**PO**
1	Define process planning.	**BTL-1**	**Remembering**	**PO1,PO2**
2	Select the process parameter for setting machines and tooling's.		**Understanding**	
3	Identify the process planning activities.	**BTL-3**	**Analyzing**	**PO1,PO2**
4	Summarize the factors influencing process selection.	**BTL-1**	**Remembering**	**PO1,PO2**
5	Summarize the use of drawings interpretation in processing requirement.	**BTL-2**	**Understanding**	**PO1**
6	Quote the data is listed for each component of the product in the process sheet.	**BTL-2**	**Understanding**	**PO1**
7	List the use of process Sheet.	**BTL-1**	**Remembering**	**PO1**
8	Prioritize the sort of information can the process planner obtained from the engineering drawing of the component.	**BTL-1**	**Remembering**	**PO1**
9	Give a procedure for process planning for the manufacture of a component in machine shop.	**BTL-5**	**Evaluating**	**PO1**
10	List the objectives of process planning.	**BTL-2**	**Understanding**	**PO1**
11	Discuss the various parameters considered in the material selection?	**BTL-1**	**Remembering**	**PO1**
12	Illustrate briefly the characteristics of realistic estimates?	**BTL-2**	**Understanding**	**PO1**
13	Show the steps involved in process design	**BTL-3**	**Understanding**	**PO1,PO2**
14	Classify the work holding Devices and why they are used.	**BTL-1**	**Remembering**	**PO1,PO2**
15	Point out the main inputs and outputs for process planning activity.	**BTL-4**	**Understanding**	**PO1**
16	Explain briefly about depreciation?	**BTL-6**	**Creating**	**PO1,PO2**
17	Originate the advantages and disadvantages of process planning	**BTL-4**	**Analyzing**	**PO1,PO2**
18	Assume a process flow chart and how would it be used to help formulate a process plan	**BTL-5**	**Evaluating**	**PO1**
19	Categorize the main approaches of process planning.	**BTL-4**	**Understanding**	**PO1,PO2**
20	Compose the documents required for Process	**BTL-6**	**Creating**	**PO1,PO2**

	Planning?			
	PART – B			
1	(a) Identify the steps involved in Process Design. (b) Examine the basic factors affecting Process Design.	**BTL-2** **BTL-1**	**Understanding** **Remembering**	**PO1,PO2,PO3**
2	(a) Describe the steps or procedures involved in Process Planning. (b) (b) Show the data is listed for each component of the product in the process sheet	**BTL-2** **BTL-1**	**Understanding** **Remembering**	**PO1,PO2,PO3**
3	Explain with neat sketch and the steps followed for material selection process and methods.	**BTL-1**	**Remembering**	**PO1,PO2,PO3, PO5, PO6,PO9, PO12,**
4	Show the two approaches to Process Planning in the context of CAPP (Computer Aided Process Planning)? Explain them clearly.	**BTL-5**	**Evaluating**	**PO1,PO2,PO3, PO4**
5	Describe step by step procedure for estimating the direct material cost	**BTL-5**	**Evaluating**	**PO1,PO2,PO3, PO4**
6	(a) Discuss the various parameters considered in the material selection? (b) Summarize the documents required for Process Planning?	**BTL-2** **BTL-1**	**Understanding** **Remembering**	**PO1, PO2,PO3**
7	(a) Classify the four distinct processing strategies Give the basic steps in cost estimation. (b) Summarize the process layout with neat sketch.	**BTL-2** **BTL-2**	**Understanding** **Remembering**	**PO1, PO2,PO3**

UNIT II PROCESS PLANNING ACTIVITIES 10

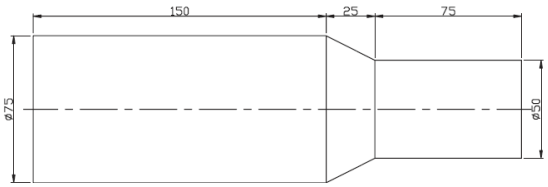
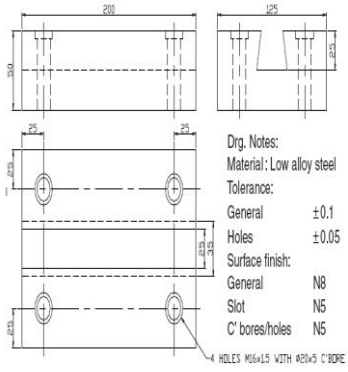
Process parameters calculation for various production processes-Selection jigs and fixtures election of quality assurance methods - Set of documents for process planning-Economics of process planning- case studies

PART – A

CO Mapping : C205.2

Q .No	Questions	BT Level	Competence	PO
1	Give the factors that considered in Depth of Cut.	**BTL-2**	**Understanding**	**PO2,PO3**
2	List the factors Considered for selecting Process	**BTL-1**	**Remembering**	**PO1, PO2,PO3**

	parameter.			
3	A planer is capable of 15 strokes per minute over a stroke length of 2m. The cutting time ratio for the machine is 4:3. Determine cutting speed.	**BTL-1**	**Remembering**	**PO1, PO2,PO3**
4	Infer the factors previously considered for the tooling decision are the most influential on the calculation of the process parameters.	**BTL-3**	**Applying**	**PO1,PO2**
5	What are the general recommendations for cutting depths for turning and boring?	**BTL-2**	**Understanding**	**PO1,PO3,PO4**
6	Define cutting speed.	**BTL-1**	**Remembering**	**PO1,PO2,PO4**
7	Classify how milling operations can be classified.	**BTL-2**	**Understanding**	**PO1,PO2**
8	Classify the three basic functions of Jig.	**BTL-3**	**Applying**	**PO1,PO2**
9	Show the general factors that will influence the design and/or construction of a work holder.	**BTL-3**	**Applying**	**PO1,PO2**
10	Analyze the basic principles of jig and fixture design can be categorized	**BTL-4**	**Analyzing**	**PO1,PO4**
11	Show the main reasons for the use of jigs and fixtures.	**BTL-1**	**Remembering**	**PO1,PO2**
12	Draw the flow chart for design methodology for work holders	**BTL-6**	**Creating**	**PO1,PO4**
13	Categorize the main factors to be considered for work holding device.	**BTL-4**	**Evaluating**	**PO1,PO2,PO4**
14	Point out the quality function for process plan	**BTL-4**	**Evaluating**	**PO1**
15	Discuss how does the process planner use cost data?	**BTL-6**	**Creating**	**PO1**
16	Assess the three elements of Direct cost	**BTL-5**	**Evaluating**	**PO1**
17	Define press forging	**BTL-5**	**Evaluating**	**PO1**
18	Summarize major influences on the cost of materials for manufacture	**BTL-1**	**Remembering**	**PO1,PO4**
19	Quote the purpose of work holding Devices	**BTL-1**	**Remembering**	**PO1,PO2**
20	Calculate the spindle speed required to turn a 75mm diameter shoulder on a low- carbon steel component using a high-speed steel tool. What is the percentage increase in cutting speed if a carbide tool is used instead?	**BTL-2**	**Understanding**	**PO1,PO2**
21	Illustrate the formula to calculate the machining times for turning and boring.	**BTL-1**	**Remembering**	**PO1,PO2**
PART – B & C				
1	The top surface of the aluminum alloy component shown in Fig is to be milled by slab milling. It will be machined by a Ø20mm HSS cutter with eight cutting teeth at a constant surface speed of 45m min^{-1}.The depth of cut is 4 mm and the milling machine is capable of spindle speeds	**BTL-1**	**Remembering**	**PO1,PO2,**

	of up to 3000 rpm. Determine: (i) if the mill is capable of machining the component at the required surface speed (ii) the total machining time for the component if the mill is capable.			
2	Summarize the general recommendations for cutting depths for turning, boring, milling and Drilling?	**BTL-2**	**Understanding**	**PO1,PO2**
3	For the part shown in Fig. calculate the maximum surface speeds for facing, turning all surfaces and parting off. The maximum spindle speed of the lathe being used is 600rpm 	**BTL-1**	**Remembering**	**PO1,PO2,PO4**
4	Consider the component shown in Fig, and design a suitable type of jig for drilling the Ø10 mm holes, assuming the holes are manufactured last. 	**BTL-3**	**Applying**	**PO1,PO2**

5	Calculate the spindle speed required to turn a 75mm diameter shoulder on a low- carbon steel component using a high-speed steel tool. What is the percentage increase in cutting speed if a carbide tool is used instead?	**BTL-1**	**Remembering**	**PO1, PO2,PO3**
6	Describe depth of cut and what are the most important factors that affect the depth of cut possible when machining?	**BTL-1**	**Remembering**	**PO1, PO2,PO3**

UNIT III INTRODUCTION TO COST ESTIMATION 8

Importance of costing and estimation –methods of costing-elements of cost estimation – Types of estimates – Estimating procedure- Estimation labor cost, material cost- allocation of over head charges- Calculation of depreciation cost

PART – A

CO Mapping : C205.3

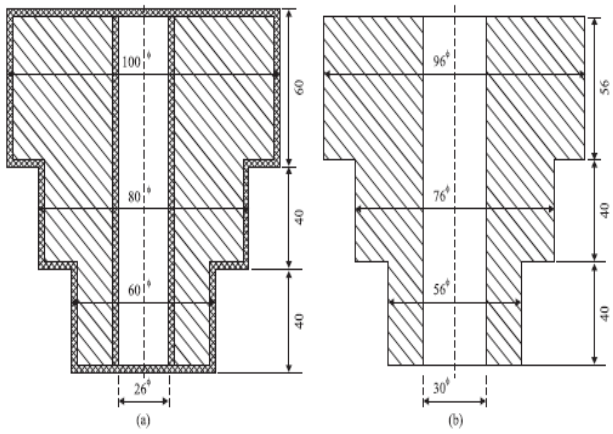
Q.No	Questions	BT Level	Competence	PO
1	Define cost accounting	**BTL-1**	**Remembering**	**PO1**
2	Distinguish between cost estimation and cost accounting	**BTL-2**	**Understanding**	**PO1**
3	List the types of estimates	**BTL-1**	**Remembering**	**PO1**
4	Classify the sources of cost estimation?	**BTL-4**	**Analyzing**	**PO1**
5	Point out any two objectives of cost estimation	**BTL-4**	**Analyzing**	**PO1,PO4**
6	Summarize batch costing	**BTL-5**	**Evaluating**	**PO1**
7	Describe briefly standard data	**BTL-2**	**Understanding**	**PO1**

8	Define under estimate	**BTL-1**	**Remembering**	**PO1,PO2**
9	Explain about target cost	**BTL-4**	**Understanding**	**PO1,PO4**
10	Explain briefly about conceptual cost estimating	**BTL-5**	**Evaluating**	**PO1,PO2**
11	Define contingency allowances	**BTL-1**	**Remembering**	**PO1**
12	Illustrate briefly the characteristics of realistic estimates?	**BTL-3**	**Applying**	**PO1,PO2**
13	Classify the allowances considered in cost estimation	**BTL-3**	**Applying**	**PO1,PO2**
14	Give the methods of costing	**BTL-2**	**Understanding**	**PO1,PO2**
15	Demonstrate how the standard data is developed?	**BTL-3**	**Applying**	**PO1**
16	Explain briefly about depreciation?	**BTL-4**	**Remembering**	**PO1**
17	Define multiple cost method	**BTL-1**	**Remembering**	**PO1,PO2,PO4**
18	Generalize the meaning direct material with an example	**BTL-6**	**Creating**	**PO1**
19	Give any two functions of cost estimation	**BTL-2**	**Understanding**	**PO1**
20	Define parametric estimating	**BTL-1**	**Remembering**	**PO1,PO2**
PART – B & C				
1	(a) Discuss the objectives of cost estimation (b) Give the advantages of cost accounting	**BTL-5**	**Evaluating**	**PO1,PO2,PO4**
2	With suitable application examples classify costs	**BTL-5**	**Evaluating**	**PO1,PO2, PO3,PO4**
3	(a) Discuss various types of estimates (b) Explain the data requirements for cost estimation and their sources	**BTL-5**	**Evaluating**	**PO1,PO2,PO3**
4	(a) Describe the different methods of estimates (b) Explain the allowances in estimation	**BTL-4**	**Analyzing**	**PO1,PO2, PO3**
5	Describe step by step procedure for estimating the direct material cost	**BTL-5**	**Evaluating**	**PO1,PO2**
6	Explain the various allowances to be considered in estimation of direct labour cost	**BTL-1**	**Remembering**	**PO1,PO2, PO3**
7	(a) Differentiate cost accounting and cost estimating (b) Give the basic steps in cost estimation	**BTL-4** **BTL-2**	**Understanding** **Understanding**	**PO1,PO2, PO3**

UNIT IV PRODUCTION COST ESTIMATION				
Estimation of Different Types of Jobs - Estimation of Forging Shop, Estimation of Welding Shop, Estimation of Foundry Shop				
PART – A				
CO Mapping : C205.4				
Q. No	**Questions**	**BT Level**	**Competence**	**PO**
1	How do you estimate the time required for forging?	**BTL-2**	**Understanding**	**PO1,PO2**
2	Explain the actual welding costs involved in estimation in welding shop?	**BTL-5**	**Evaluating**	**PO1,PO2**
3	List the losses to be considered in estimating the gross weight of a forging component	**BTL-1**	**Remembering**	**PO1**
4	List the losses to be considered in estimating the gross weight of a forging component	**BTL-5**	**Evaluating**	**PO1,PO2**
5	Illustrate how to estimate the gas cutting costs	**BTL-3**	**Remembering**	**PO1**
6	Give the losses in forging process	**BTL-2**	**Understanding**	**PO1,PO2**

7	List the various sections that will be normally found in a foundry shop.	**BTL-1**	**Remembering**	**PO1**
8	List the various elements of cost involved in the total cost of manufacturing a casting.	**BTL-1**	**Analyzing**	**PO1**
9	Explain overhead expenses	**BTL-4**	**Evaluating**	**PO1,PO2**
10	Explain how cost estimation is done in respect of a welded component or welding job.	**BTL-4**	**Remembering**	**PO1,PO2**
11	List the various elements of cost involved in weldment or a welded component.	**BTL-1**	**Analyzing**	**PO1,PO4**
12	What are the various costs involved in the calculation of total cost of forged components.	**BTL-6**	**Remembering**	**PO1,PO2**
13	What is pattern making and fettling in foundry? Generalize it	**BTL-2**	**Remembering**	**PO1**
14	Differentiate leftward and rightward welding?	**BTL-1**	**Remembering**	**PO1**
15	List the types of forging processes	**BTL-4**	**Analyzing**	**PO1,PO3**
16	Explain machine forging or upset forging in a brief manner.	**BTL-1**	**Remembering**	**PO1**
17	Define press forging	**BTL-6**	**Creating**	**PO1,PO3**
18	Generalize the meaning of tonghold loss in forging?	**BTL-4**	**Analyzing**	**PO1,PO3**
19	Describe briefly a sprue loss?	**BTL-2**	**Understanding**	**PO1**
20	Give the formula for calculating the cost of power consumed in arc welding.	**BTL-2**	**Understanding**	**PO1**
PART – B & C				
1	A cast iron component is to be manufactured as per Fig. 5.2. Estimate the selling price per piece from the following data : Density of material = 7.2 gms/cc Cost of molten metal at cupola spout = Rs. 20 per kg Process scrap = 20 percent of net weight Scrap return value = Rs. 6 per kg Administrative overheads = Rs. 30 per hour Sales overheads = 20 percent of factory cost Profit = 20 percent of factory cost	**BTL-3**	**Applying**	**PO1,PO2, PO3**

Operation	*Time (min)*	*Labour cost/hr (Rs.)*	*Shop overheads/hr (Rs.)*
Moulding and pouring	15	20	60
Shot blasting	5	10	40
Fettling	6	10	40

	The component shown is obtained after machining the casting. The pattern which costs Rs. 5,000 can produce 1,000 pieces before being scrapped. The machining allowance is to be taken as 2mm on each side.  Fig. 5.2 (a) Component as cast, (b) Finished component (All dimensions are in mm).			
2	A lap welded joint is to be made as shown in Fig. 5.4  Fig. 5.4. Lap joint Estimate the cost of weld from the following data : 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	**BTL-3**	**Applying**	**PO1,PO2**

	Overhead charges = 80 percent of direct charges Labor accomplishment factor = 60 percent			
3	Calculate the welding cost from the following data : Plate thickness =12 mm Form of joint = 60°V Root gap = 2 mm Length of joint = 2 meters Electrode diameters = 3.5 mm and 4.0 mm Electrode length = 350 mm	**BTL-2**	**Understanding**	**PO1,PO2, PO4**
4	(i) Describe in detail the procedure for estimating. (ii) Explain the various constituents of estimation.	**BTL-1** **BTL-2**	**Remembering** **Understanding**	**PO1,PO2,PO3**
5	(i) Calculate the material cost of 20 gun metal bushes as per the diagram. Assume the density of gun metal as 8.3gm per cc and its cost is re.70 per kg. Consider 10% material loss during process. All dimension are in mm.	**BTL-5**	**Evaluating**	**PO1,PO2,PO4**

UNIT V MACHINING TIME CALCULATION

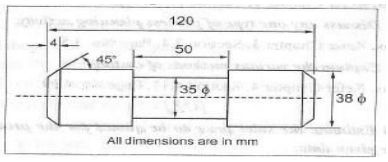
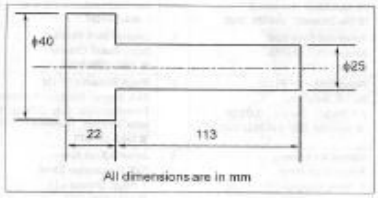
Estimation of Machining Time - Importance of Machine Time Calculation- Calculation of Machining Time for Different Lathe Operations ,Drilling and Boring - Machining Time Calculation for Milling, Shaping and Planning -Machining Time Calculation for Grinding

PART – A

CO Mapping : C205.5

Q.No	Questions	BT Level	Competence	PO

1	**Define Direct Expenses**	**BTL-1**	**Remembering**	**PO1**
2	**Define Indirect Expenses (Overhead Expenses)**	**BTL-2**	**Understanding**	**PO1,PO2**
3	**What are the analysis used for overhead expenses?**	**BTL-1**	**Remembering**	**PO1,PO3**
4	**Define Factory Expenses**	**BTL-1**	**Remembering**	**PO1**
5	**Define Administrative Expenses**	**BTL-2**	**Understanding**	**PO1**
6	**Define Selling Expenses .**	**BTL-1**	**Remembering**	**PO1**
7	**What you mean by distribution Expenses?**	**BTL-4**	**Analyzing**	**PO1,PO2**
8	**What are the components of cost?**	**BTL-2**	**Understanding**	**PO1,PO12**
9	**Define Prime Cost**	**BTL-2**	**Understanding**	**PO1,PO12**
10	**Define Works Cost**	**BTL-2**	**Understanding**	**PO12**
11	**Define Production or Manufacturing or Office Cost**	**BTL-2**	**Understanding**	**PO1**
12	**Define Machine or Upset Forging**	**BTL-2**	**Understanding**	**PO1,PO3**
13	**Write the forging operations.**	**BTL-2**	**Understanding**	**PO1**
14	**Define Shear Loss**	**BTL-2**	**Understanding**	**PO1**
15	**Define Tong hold Loss**	**BTL-1**	**Remembering**	**PO1**
16	**Define Scale Loss**	**BTL-1**	**Remembering**	**PO1**
17	**Define Flash Loss**	**BTL-4**	**Analyzing**	**PO1**
18	**Define Sprue Loss**	**BTL-1**	**Remembering**	**PO1**
	PART – B			
1	Briefly explain the distribution or allocation of overheads.	**BTL-4**	**Analyzing**	**PO1,PO3**
2	Write a critical note on the production cost estimation.	**BTL-5**	**Evaluating**	**PO1,PO2,PO3**
3	Estimate the machining time to turn a M.S bar of 3 cm diameter down to 2.5 cm for a length of 10 cm in a single cut. Assume cutting speed = 30	**BTL-2**	**Understanding**	**PO1,PO3,PO12**

	m / min and feed = 0.4 mm/ rev.			
4	A mild steel bar 120mm long and 40mm in diameter is turned o 38mm diameter and was again turned to a diameter of 30mm over a length of 50mm as shown in the figure. The bar was chamfered at both the ends to give a chamfer of 45°X4mm after facing. Calculate the machining time. Assume cutting speed of 50m/min and feed 0.3 mm/per. The depth of cut is not to exceed 3mm in any operation. 	**BTL-2**	**Understanding**	**PO1,PO3,PO12**
5	Three hundred pieces of the bolt are to be made from 25mm diameter rod. Find the length of each bolt before up setting. What length of the rod is required if 4% of the length goes as scrap? 	**BTL-6**	**Creating**	**PO1,PO2, PO3,PO12**