



MODEL ANSWER

SUMMER- 17 EXAMINATION

Subject Title: Estimation and Costing

Subject Code:

17557

Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more importance. (Not applicable for subject English and Communication Skills)
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



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Q. No.	MODEL ANSWER	Marks
1	Attempt any Ten	10 x 2
a)	<p>Costing has been defined by the Institute of Cost and Works Accountants, England as : "The technique and process of ascertaining costs". Whereas, Wheldon has defined the costing as :</p> <p>"Costing is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services; and for presentation of suitably arranged data for the purposes of control, and guidance of management".</p> <p>It is the determination of an actual cost of an article, after adding different expenses incurred in various departments.</p> <p>It may also be defined as the system, which systematically records all the expenditure to determine the cost of manufactured products.</p>	02 marks
b)	<p>Pricing Policy: Different methods are used by the firms in pricing their products. Some firms base their pricing on costs, while others chalk out their pricing policies considering competitive conditions in the market. Thus, different firms use different methods of pricing depending upon their own concept of market situations and the operational convenience, price determination is an important function, as this directly affects the earnings of the concern.</p>	02 marks
c)	<p>Prime Cost: It is the sum of direct labour, direct material and direct expenses, if any. It is also called as direct cost.</p> <p>Factory cost: It includes prime cost and factory on- cost. It is also known as works cost.</p>	01 mark 01 mark
d)	<p>Inflated price method: in this system, the charged cost of the material is slightly raised (inflated) by small percentage of the actual purchase price. All other methods have not taken into account the wastage of material in stores, which is unavoidable. Therefore certain percentage is charged for normal wastage on the purchase price. Thus cost of material issued is raised by some percentage to recover the wastage cost.</p>	02 marks
e)	<p>Depreciation: Efficiency and value of machine or asset reduces with the lapse of time during use this is called depreciation. Generally money is kept aside known as 'sinking fund'</p>	02 marks



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f)	Obsolescence: Reduction in the value of existing machinery or asset due to new and better invention or design of equipment or process etc.	02 marks
g)	Overhead: Excluding Direct materials and direct labour costs, all other expenses, that are made in converting raw materials into finished shape fall under this heading. These are also called as 'expenses, on-cost, burden or indirect cost.'	02 marks
h)	Tool cost: The expenses incurred from the time when the tool touches the job till the end of operation including its maintenance and purchase cost is called tool cost.	02 marks
i	Labour cost: The cost paid to labour is called labour cost. Its types are: Direct Labour Cost: Direct Labour Cost is the amount paid to the direct labour. Example: Worker engaged for operating on various production machines in machine shop, welding shop, pattern making shop, electric winding shop and assembly shop etc. are known as 'Direct Labour' and cost related to them is called as Direct Labour Cost Indirect Labour Cost: Indirect Labour Cost is the amount paid to the indirect labour. Example: Foreman, Supervisors, Inspectors, Chowkidars, Gate-keepers, Store-keepers, Crane Driver and Gangmen etc., are classified as Indirect Labour and cost related to them is called Indirect Labour Cost.	01 mark 01 mark
j	Mensuration: Mensuration is the study of areas, volumes, weights of different shapes. It includes different shapes like square, rectangle, circle, triangle, frustum, etc.	02 marks
k	Importance of mensuration: For correct calculation of weights of material, an estimator should have good knowledge of mensuration. With the knowledge of mensuration an estimator calculates areas, volumes, weights and hence determines cost of material (i.e. with the available on going rate/kg for that material) Therefore, careful study of mensuration is essential and the estimator should always remember the concerned formulae to arrive at the material cost because experience has shown that material cost is about 25% to 65% of the total production cost.	02 marks
l	Forging: It is the process, in which metal is heated at sufficiently high temperature to bring it to the plastic state. During this plastic state desired shape is given by applying sufficient force either by hand (manually) or by machine.	02 marks



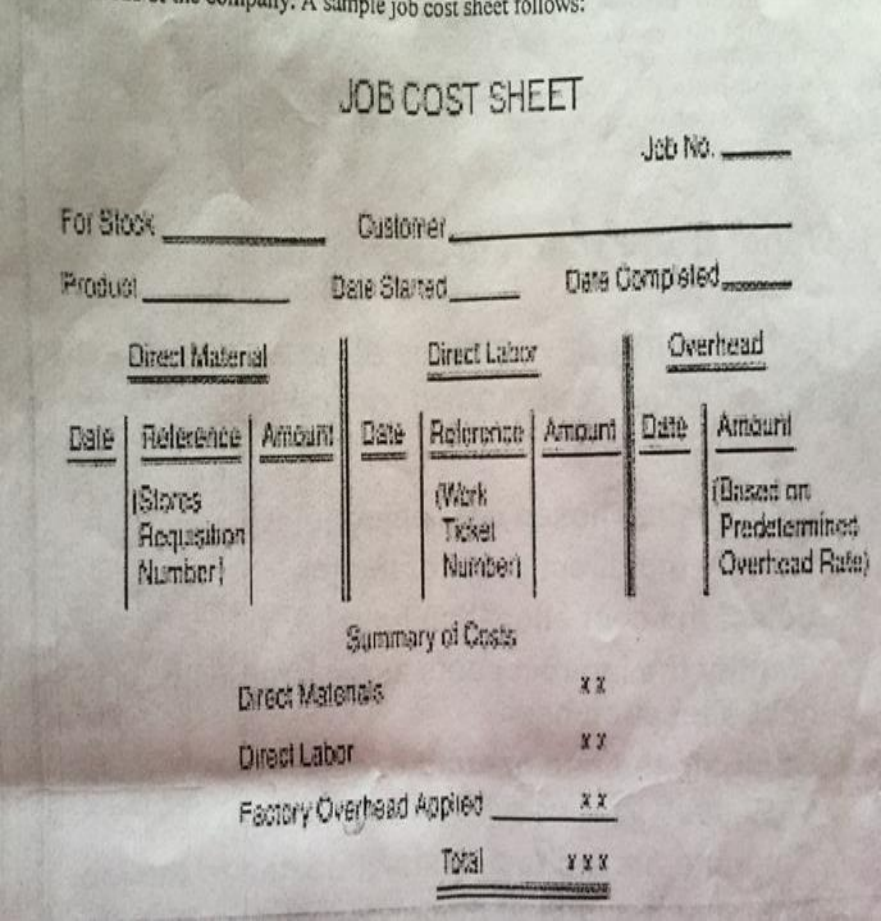
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<p>m</p>		<p>02 marks</p>
<p>n</p>	<p>Cost Accounting: Cost Accounting, as a tool of management, is an integral part of the management process and helps the management in efficient utilisation of resources and achieving the goal of the business.</p> <p>Cost accounting provides detailed analysis of the expenses incurred by a concern and the management can pin point various weak spots and can know the places of losses.</p>	<p>02 marks</p>



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2.	Attempt Any two	2 x 8
Ans a)	<p>i) Differentiation between costing and estimation:</p> <p>Although estimating and costing both are required to decide the price of the product, even then the two are different as explained below :</p> <ol style="list-style-type: none">1. Estimation is aimed to calculate the probable cost of the product before the manufacturing starts, and while costing is the determination of actual cost of the product by adding various elements of expenses incurred.2. Estimation requires a highly technical knowledge hence an estimator is basically an engineer and costing requires the knowledge of accounts and, therefore, costing is done by accountants.3. Estimation forecasts about the probable cost and hence one can know before the manufacture that the manufacturing of the product shall be profitable or not, and whether one should manufacture it or not, but costing tells after the manufacture about the profitability of the product. <p>4. Estimation is about forecasting or predicting the probable cost of a product whereas costing is the ascertainment of actual cost incurred</p> <p>ii) Cost Control:</p> <p>Cost control means the procedures and measures by which the cost of carrying out an activity is kept under check. The aim of cost control is two-fold,</p> <ul style="list-style-type: none">- To see that cost do not exceeds beyond a certain level.- Thereafter, as a further step, it must adopt such measures and procedures by which the cost is further reduced. <p>Cost control involves four steps: establishment of standards, measurement of performance, comparing the activity, and remedial action.</p> <p>First step is carried out by budgeting and standard costing.</p> <p>Cost accounting helps in second step of 'measurement of performance'</p> <p>Comparing function i.e., third step is carried out by cost analysis, also known as 'financial or accounting ratio analysis'.</p> <p>Whereas last step i.e. 'remedial action' is carried out by implementing cost control and cost reduction.</p>	<p>04 marks (01 marks for each point)</p> <p>04 marks</p>



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	<p>Therefore, it is essential to keep control over each and every element of cost, such as:</p> <ul style="list-style-type: none">-control on prime cost-control on overheads-control on indirect materials and tools.	
b	<p>The cost which is calculated by finding the volume of the material and then multiplying it by the density of the same material. This is known as material costing. Material costing is about 25%-65% of the total production cost. In addition to cost of material, inventory carrying cost which is normally 20% of material costs should be checked.</p> <p>all the expenses incurred on materials, starting from purchase to the time till the material is ready for issue, constitute material cost. These expenditure include.</p> <ul style="list-style-type: none">i. Cost of material purchasedii. Procurement costiii. Inventory carrying costiv. Material handling costv. Material lossvi. Indirect expensesvii. Scrap and surplus	<p>04 marks for def. 04 marks for elements</p>
c	<p>To find out the cost of the materials issued from the stores on demand is called valuation.</p> <p>AVERAGE PRICE METHOD: In this method avg. cost of the material is charged for the product. The two methods commonly used are;</p> <ul style="list-style-type: none">i) Simple average method – It means the avg. cost of material in hand on the date of issue from stores. Each time, when the material is issued, avg. cost is calculated. Therefore, new calculations are necessary after every entry to obtain the mean price. <p>Application eg.</p>	<p>02 Marks</p> <p>06 marks for any one method</p>



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Date	Receipts			Issues			Balance		
	Quantity	Rate Rs.	Amount Rs.	Quantity	Rate Rs.	Amount Rs.	Quantity	Rate Rs.	Amount Rs.
Jan. 1	—	—	—	—	—	—	100	1.00	100
Jan. 3	200	1.00	200.00	—	—	—	300	1.00	300.00
Jan. 6	—	—	—	250	1.00	250.00	50	1.00	50.00
Jan. 9	200	1.25	250	—	—	—	250	1.20	300.00
Jan. 22	—	—	—	150	1.20	180	100	1.20	120.00

OR

- ii) Month end average method – In this method avg. cost of each type of material is calculated at the end of each month and is charged for all the issues during the following months.

Application eg.

Average of previous month Rs. 1.10 per unit

Date	Receipts			Issues			Balance		
	Quantity	Rate Rs.	Amount Rs.	Quantity	Rate Rs.	Amount Rs.	Quantity	Rate Rs.	Amount Rs.
Jan. 1	—	—	—	—	—	—	50	1.10	55
Jan. 6	100	1.00	100.00	—	—	—	150	—	155
Jan. 10	—	—	—	100	1.10	110.00	50	—	45
Jan. 14	—	—	—	30	1.10	33	20	—	12
Jan. 19	300	1.20	360	—	—	—	320	—	372
Jan. 23	—	—	—	200	1.10	220	120	—	152.00
Jan. 26	—	—	—	70	1.10	77	50	—	75



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	<p>FIXED PRICE METHOD:</p> <p>In this method, issued material is charged at a predetermined estimated price, for a fixed period. Mostly for one year one rate is charged. Therefore, receipts and issues are recorded in quantities only which make store-keeping easy. This method is also known as "Standard Price" method. Price is generally fixed on the basis of past experience and future trends.</p> <p>Application. This system is mostly used where the fluctuations in the market price are very less and few.</p>	
3.	Attempt any two	2 x 8
Ans	(i)	02 marks
a)	<p>Whenever, any machine or equipment performs useful work, its wear and tear is bound to occur. This can be minimised upto some extent by proper care and maintenance but can't be totally eliminated. Its efficiency also reduces with the lapse of time and at one time it becomes uneconomical to be used further and needs replacements by another new unit.</p> <p>Therefore we can say that efficiency and value of machine or asset reduces with the lapse of time during use, which is known as 'Depreciation'.</p> <pre>graph TD; A[Depreciation] --> B[Depreciation due to Physical condition]; A --> C[Depreciation due to Functional condition]; B --> D[Wear and tear]; B --> E[Physical decay]; B --> F[Accidental]; B --> G[Deferred maintenance and neglect]; C --> H[Inadequacy]; C --> I[Obsolescence]</pre>	02 marks (Defn.)
	(ii)	02 marks (any 4 causes)



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	<p>Sinking fund method:in this system, a depreciation fund equal to actual loss in the value of the asset or machine is estimated, taking into account the interest on the so accumulated fund. The rate of depreciation will be constant throughout the life of the machine.</p> <p>Let, $D = \text{rate of depreciation per year}$ $R = \text{Rate of interest on depreciated fund in fraction number}$ $C = \text{Total cost of machine}$ $S = \text{Scrap value}$ $N = \text{no. of years of life of machine}$ $D = \frac{R(C - S)}{(1 + R)^N - 1}$</p>	<p>04 marks</p>
<p>Ans b)</p>	<p>The importance of estimating is as given below:</p> <div data-bbox="293 1062 1179 1864" style="border: 1px solid black; padding: 10px;"><p>In all organisations, before starting actual production or filling up the tenders, estimation is done. Therefore, accurate estimating is very necessary to compete in the market and to be sure whether manufacture of a particular article will be profitable or not. Both over and under estimating are dangerous. Over-estimating leads to increase the cost and hence tenders may not get suitable response. Under-estimating may lead to heavy losses to the concern. Hence accurate estimating is very essential and, therefore, staff of the estimating department must be well qualified, experienced and trained in this profession.</p><p>For example, a concern wants to start the manufacturing of Lathe-chucks. The firm finds through market survey that its market price is approximately Rs. 1500. But estimated price for the manufacture is more than this value. Then the drawings may be sent back to design section, to find out an alternate design, so that price can be reduced. If reduction of price is not possible then idea of manufacturing the chucks would be dropped otherwise it would lead to a great loss.</p></div>	<p>04 marks</p>



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	<p>Estimating procedure is laid down here under:</p> <ol style="list-style-type: none">1. Production planning department decides the requirements and specifications of the product.2. Production planning department makes out the drawings; lays down the method and sequence of operations, machines to be used, rates allowed to the labour in consultation with the Time and Motion Study Department and wages department.3. To decide accuracy and finish required.4. To prepare a list of the components of the product.5. To decide which component can be manufactured in the concern itself and which should be procured from outside.6. Determine the material cost by calculating the quantities of various types of material required.	<p>04 marks for steps (any 4 steps)</p>
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	<ol style="list-style-type: none">7. Determine the time required on various operations by using calculation methods or by time and motion study and adding suitable allowances.8. Determine labour cost considering the wage rate allowed for various categories of operators and other workers employed for manufacturing the product.9. Determine the prime cost after adding direct expenses in the direct material and direct labour costs.10. Determine the factory overheads including depreciation and expenditure on maintenance of the plant, insurance, power etc.11. Determine administrative overheads considering the policy of the concern for calculating these expenses (<i>i.e.</i> by percentage or by hourly rate or by unit rate).12. Determine the packing and delivery charges etc.13. Then to calculate the total cost.14. To decide profit and add in the total cost, in order to fix up the sale price.15. To decide the discount allowed to distributor.16. To decide delivery time in consultation with the production department and sales department.	
Ans c)	<p>Volume of square bar = Area of cross-section x length = 40 x 40 x 250 = <u>400000mm³</u></p> <p>As 8% of the material is lost in forging as scale loss, hence material available for producing hexagonal bar = 400000 x (92/100) = <u>434782.609mm³</u></p> <p>Now this cm³ volume of material is given the shape of hexagonal bar.</p> <p>As area of cross-section of hexagonal bar = $(\frac{3\sqrt{3}}{2}) \times a^2$ Where, a = length of each side of hexagon</p> <p>Therefore, Area = $(\frac{3\sqrt{3}}{2}) \times 20$ = <u>1039.23mm²</u></p>	<p>02 marks</p> <p>02 marks</p> <p>02 marks</p>



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	Therefore, Length of hexagonal bar produced = (volume/ Area of cross-section) = (434782.609/1039.23) = <u>4180.37mm</u>	02 marks
4.	Attempt any two	2 x 8
Ans a)	Total stock to be removed = (40-38)/2 = 1mm But depth of one cut is 0.2mm Therefore, no. of cuts required = 1/0.2 = 5 cuts Length of cut = 200 + 5 = 205 mm (assume 5mm as over travel) Feed / rev. = w/2 (for roughening) = 19/2 = 9.5 mm/rev r.p.m. = (100S)/(πD) = (100 x 200)/(π x 40) = 159.155 Time required/ cut = Length of cut/ ((Feed / rev.) x r.p.m.) = 205/(9.5 x 159.155) = <u>0.1355 min.</u> Total time required for 5 cuts = 0.1355 x 5 = <u>0.678 min</u>	01 mark 01 mark 01 mark 01 mark 01 mark 02 mark 01 mark
Ans b)	Machine time calculation for turning operation: It is operation of metal removal in which job is rotated against a tool. Let S = Cutting speed in m/min. D = Dia of job to be turned in cm. N = Revolution of the job/min. and F = Feed/rev.	Any two operations (04 marks for each)



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Materials	Operations (cutting speeds are in m/min)							
	Turn- ing and Boring	Drill- ing	Ream- ing	Thread- ing	Tap- ping	Mill- ing	Shap- ing, Slot- ting and plan- ing	Grind- ing
Aluminium	300	120	120	30	45	200	25	20
Brass/Gun Metal	50	50	25	30	20	40	12	22
Mild steel	30	25	12	25	5	20	20	15
Cast Iron	20	15	10	20	7	50	10	12
Copper	30	50	15	30	20	40	10	22

and $S = \frac{\pi DN}{100}$ m/min.

$\therefore N = \frac{100S}{\pi D}$ r.p.m.

As we know that feed/min = r.p.m. \times Feed/rev. and Time taken to turn unit length

$$= \frac{1}{\text{Feed/min}} \text{ min.}$$

\therefore Time taken to turn L metre length

$$= \frac{L}{\text{Feed/min}} = \frac{L}{\text{Feed/rev.} \times \text{r.p.m.}}$$

Hence $T = \frac{\text{Length of the job to be turned}}{\text{Feed/rev.} \times \text{r.p.m.}}$

Hence,

$$T = L / F * N \text{ min}$$

Machinig time for Shaping and Grinding operation

- Shaping Operation

$$E = (S/100) * N$$

s= length of stroke N=cutting stroke per min.

$$E = (3/5) * C$$

C= Cutting speed

$$T = \frac{(L+5)(B+2.5)}{60 CF} \text{ min.}$$

L = length of job

B= width of job

- Planning operation

$$T = \frac{(L+25)(B+5)}{K} \text{ min.}$$



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	<p>Machining Time for Milling Operation:</p> $Time \frac{\text{required}}{\text{cut}} = \frac{\text{length of cut}}{\frac{\text{feed}}{\text{rev}} \times r.p.m.}$ <p>where,</p> $\text{length of cut} = \text{length of job} + \text{added table travel}$ $\frac{\text{feed}}{\text{rev}} = \frac{\text{feed}}{\text{tooth}} \times \text{no. of teeth on cutter}$ $R.P.M. = \frac{100S}{\pi D}$ $D = \text{Dia of cutter}$ <p>where,</p> $\text{total time} = \frac{\text{length of cut}}{\text{feed/min}} \times \text{no. of cuts or index}$ <p>Time for Grinding Operation Time required for cylindrical grinding/cut=Length of cut/(Feed/rev. x r.p.m).</p> <p>where, Length of cut = Length of job + Over-travel =L + 0.5 cm. and Feed /rev. = w/2 (for rough cut) = w/4 (for finishing cut) where w = width of grinding wheel.</p>	
<p>Ans c)</p>	<p>(i) Factors affecting the welding costs are:</p>	<p>04 marks for any 4 points</p> <p>04 marks for any 4 welded joints</p>

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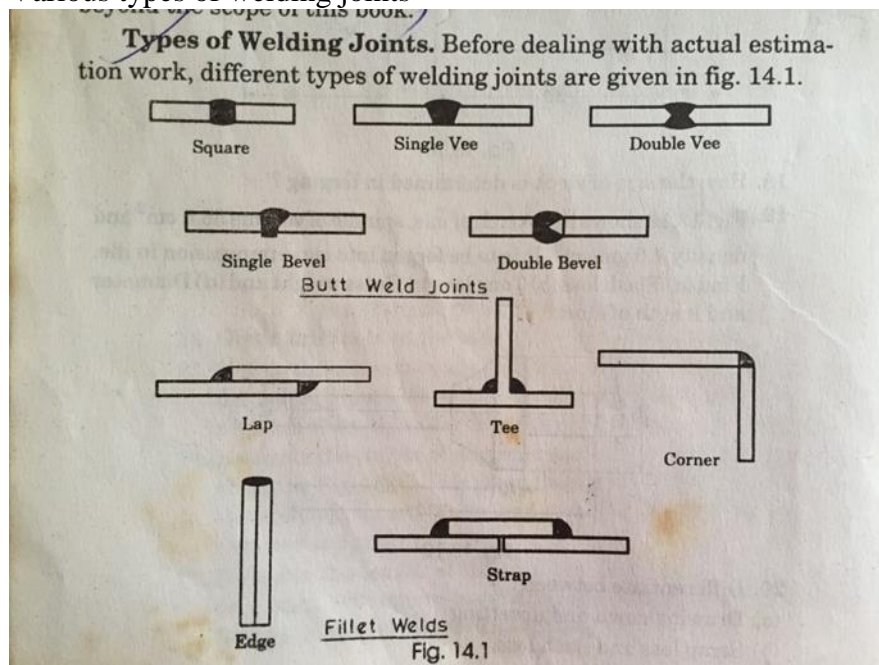
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There are certain factors which affect largely on the welding cost. These factors are being discussed below :

- (i) Time required for handling and setting the job and equipment in correct position.
- (ii) Time required for fixing the fixtures.
- (iii) Rest and fatigue time allowance. These are generally taken as 5 to 10% of the total time for which an operator remains engaged.
- (iv) Excessive welding—it increases the cost of welding.
- (v) When excessive current is used, welding cost also increases.

(ii)
Various types of welding joints



5.	Attempt any two	2 x 8
Ans a)	<p>Estimation of Welding Cost For estimating the welding cost, following cost elements should be considered.</p> <p>(a) Preparation Cost. It includes the cost of edge preparation, proper fit up and other elements before actual starting of welding.</p> <p>(b) Actual Welding Cost. This includes two costs.</p>	02 marks for each point



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	<p>(i) Cost of material used in welding process like O₂, C₂H₂ filler rod, and flux etc.</p> <p>(ii) Labour Cost. It will be obtained from wages sheets.</p> <p>(iii) Welding Finishing Cost. This includes, the expenditure made for finishing the welding joint after welding. Post welding treatment (such as heat treatment) cost can also be taken into account.</p> <p>(iv) On-cost. All the other overheads on the equipment and other facilities connected with welding operations are considered under on-cost heading.</p>	
<p>Ans b)</p>	<p>Procedure of sheet metal shop estimation involves:</p> <p>i) Estimation of time:</p> <p>Before proceeding to actual operation, strip is to be picked up, entered in the dies and process is started, these preparation items generally require 15 sec for small strips to 30 sec for heavy strips. This preparation time of 15 to 30 sec is equally divided among the blanks in each strip.</p> <p>Actual operations are generally performed on presses, either having automatic feeding arrangement or manual feeding. In automatic feeding all the strokes of the ram are utilised for blanking, while in hand feeding nearly 40% of the strokes are generally missed.</p> <p>After blanking operation is over 10 to 15 sec per strip are required for collecting the blanks and disposing the bridges, 10 to 15% of the total time, calculated as above, generally added, for fatigue and personal needs etc., to get estimated time.</p> <p>ii) Estimation for inserting, piercing and ejecting, etc.:</p>	<p>04 marks</p> <p>04 marks</p>



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	<p>After the blanks are prepared, each of the blanks is to be inserted in the press to get the desired shape. For inserting (also known as loading) a blank, estimated time is generally taken as :</p> <p>2 to 5 sec for small components, 6 to 8 sec for medium components (of size say between 25 cm × 25 cm to 50 cm × 50 cm) 8 to 10 sec for large size components.</p> <p>To pierce a hole in a component generally 2 sec are taken. Ejection or removal of the component after operation is over generally takes 10 sec, if it is done manually, and 2 sec if it is done on automatic machine.</p>	
Ans c)	<p>(i) For preparing blank layouts, following steps must be followed.</p> <ul style="list-style-type: none">• layout on sheet metal• sheet is cut in accordance with layout• Different operations are performed like forming, assembling etc.• Allowances must be kept for operations. <p>Importance of Blank Layout and their effects are:</p> <p>i) Provides an outline of the object either on the sheet metal directly or firstly on paper which is then transferred to the sheet</p> <p>ii) Enables the ease of cutting in accordance to the outline prepared</p> <p>iii) Enables other operations like forming, assembling etc. to give required shape of the article</p> <p>iv) Helps to decide allowances to be provided for operations like raising, wiring, jointing, hemming, etc.</p> <p>v) For lot production, helps to decide width of strip to be cut</p> <p>vi) With help of patterns (templates), helps to evaluate an economical layout.</p> <p>vii) Helps, achieve economy in material use</p> <p>viii) Helps, achieve economy in labor employed</p> <p>(ii) Capacity of Power press: It is generally expressed in terms of Tonnage of a Press as shown from an eg. below; To determine the tonnage capacity for cutting a rectangular blank of size a *b cm² from MS plate of thickness, t cm by using a press having D cm diameter pin, we have; Pressure required to cut the rectangular blanks = Area to be sheared * Shearing stress of MS</p>	<p>02 marks</p> <p>02 marks (Any 4 points)</p> <p>04 marks</p>



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	$= 2(a + b) * t * \text{Shearing stress of MS}$ $= X \text{ tonnes}$	
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Ans a)	<p>Erection costing: The determination of actual cost of an erected structure or element after adding different expenses incurred by different erection engineering departments. Cost elements in the estimation for erection costing are; 1) Material to be actually erected. 2) Material to be used for helping the erection material for fixing. 3) Cost of erection equipments. 4) Labour cost. 5) Administration cost 6) Inspection cost 7) Other expenses Explain the steps in estimation of erection costs. Ans. i.To find out the cost of the direct material used for installation or erection purpose. This also involves in-direct expenditure on material handling equipment such as ropes, chains, splices, jigs etc. ii.To find out the labour involved in certain erection work this laborers are mostly on temporary basis and will be paid on daily or weekly wages. iii.To find out overheads which cannot be categorized in any particular area this involves cost of repair & maintenance, insurance for various people and machines. It also includes electricity charges and water utility tax.</p>	<p>04 marks (any 4 points , 1 mark for each)</p> <p>04 marks</p>
Ans b)	<p>Forging operation: The shape of material can be transformed by forging with the aid of the following operations: 1. Drawing Down. It is also known as Drawing Out. This operation is performed to increase the length of the workpiece in forging by decreasing the cross-sectional area.This process is performed by hammering the hot workpiece lengthwise to reduce cross-section. 2. Up Setting. This is the reverse of Drawing Down operation.In this operation, the cross-section of the workpiece is increased at the expense of length. This process is performed by hammering one end of hot workpiece while other end is supported against the anvil.</p>	<p>04 marks for each point</p>



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<p>3. Bending. Bending is done by holding the workpiece between two fixtures and desired bend can be given by striking the workpiece with the help of hammer, This operation can also be carried out on the anvil beak.</p> <p>4. Punching and Drafting. Punching operation is performed by a tool called punch, for producing holes in the workpiece, when it is in the hot state ; and drafting is an operation carried on by a special tool known as draft to enlarge the hole.</p> <p>Procedure of forging shop is as follows Estimation of Net Weight For estimation of net weight of the forged component, following procedure is adopted:</p> <p>(a) Break up the job drawing into suitable geometrical sections, whose volumes can easily be calculated by using mensuration.</p> <p>(b) Next, find the volume of each section, neglecting rounded corners and taking suitable assumptions.</p> <p>(c) Now, find total volume of material required by subtracting the volume of the hollow spaces.</p> <p>(d) Lastly, calculate the weight of the component by multiplying the total volume with its density.</p> <p>Estimation of Losses . Certain amount of material is lost during different forging operations. The exact estimation of losses is very difficult, but by practical experience, the losses can be calculated during forging as accurate as possible. Various losses in forging are :</p> <p>(i) Tong Loss. While performing forging operations, some length of stock is required for holding the job in tong. This length is an extra length, which is removed after completion of the job. For estimation purposes, the weight of this extra length is also considered and is known as Tong loss. This loss may be taken as 2 to 3cm of the stock length.</p> <p>(ii) Scale Loss. The outer surface of the hot metal is generally oxidised, and when hammering is done oxidised film is broken and falls down in the form of scale. It reduces the dimensions of the job, and therefore, this loss must be considered for estimation purpose. Generally, it is taken as 6% of the net weight.</p> <p>(iii) Flash Loss. It is the surplus metal, which comes out between the two meeting surfaces of the dies. The surplus material will be all around the</p>	<p>04 marks for any one estimation</p>
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<p>periphery of the dies. For getting finished product, this surplus metal is required to be trimmed off. This loss may be calculated by assuming it to be 20 mm wide and 3 mm thick all around the periphery of the dies. Thus, volume of flash loss = Periphery x 20 x 3 cu mm nearly.</p> <p>(iv) Shear Loss. The required sizes of workpieces for forging operations are obtained from long bars by sawing or shearing. In sawing operation, some material, is always lost. If last piece of bar is not to the required length, it is rejected. This loss of material is taken as 5% of the net weight.</p> <p>(v) Sprue Loss, The portion of metal between the length held in the tong and the material in the die is called sprue. This is also a metal loss and can be taken as 7% of the weight. Thus, we can see that nearly 15-20% of the net weight of metal is lost during forging. Therefore, in estimation their consideration is very essential and total weight will be net weight of job plus sum of the weight of different losses occurred during forging. Thus this gives the amount of weight of material required for forging.</p> <p>Estimation of Time Estimation of time required in forging is very difficult and only practical experience it can be ascertained, which is also not satisfactory, since it varies from worker to worker depending on their skill. However, time required can be divided into following two categories:</p> <p>(i) Heating the job upto the required temperature. (ii) Performing the operation to get the required shape.</p> <p>These timings are with normal working on anvil and hammer.</p>	
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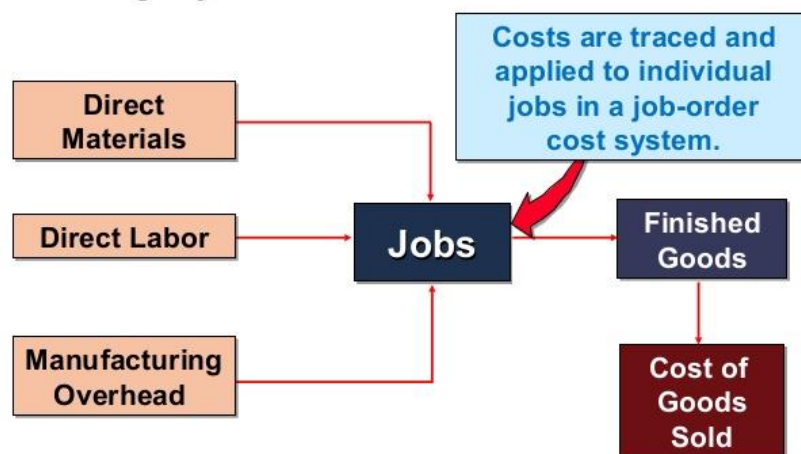
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c)

i)

The Flow of Costs in a Job-Order Costing System



ii) characteristics of process cost accounting?

Following are the characteristics of process cost accounting

- i. The output consists of product which are homogenous
- ii. Production is carried on in different stages having continuous flow
- iii. Production takes place continuously except in cases where the plant and machinery are shut down for maintenance etc.
- iv. The input will pass through two or more processes before it takes shape of the output.
- v. The output of the process may also be saleable in which case the process may generate some profit.
- vi. The input of process may be capable of being acquired from outside sources.
- vii. The output of a process is transferred to next process generally at the cost of process.

Normal and abnormal losses may arise in the process