SUMMER – 15 EXAMINATIONS

Subject Code: **17557** **Model Answer** Page No: ____/ N

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.

Q. NO.	MODEL ANSWER	MARKS	TOTAL MARKS
1	**Attempt any 5**	**5*4**	**20M**
a.	As we know product cost consists of 1. Material cost, 2. Labour cost, 3. Overheads. Therefore to reduce cost it is necessary to bring down expenditure in following areas • Materials • Machinability • Tolerances • Fewer Parts • Tool Design • Make or Buy • Increase Productivity • Distribution Sys.	**1m for each pt.**	**4M**
b.	Repair-welding process machinery cast components is frequently not possible. Fortunately, however, there are salvaging methods that do not involve welding: Controlled-atmosphere furnace brazing. Applying molecular metals .Metal stitching of large castings. *Braze repair* of cavitation-damaged pump impellers is an adaptation of a braze-repair method originally developed for jet engine components.	**4m**	**4M**
c.	Depreciation It is a gradual deterioration or decrease in the value of asset after using that asset in our day to day work or after spending of time. In this world, everything is perishable, so making true profit and calculates true value of any asset at present time, it is very necessary to depreciate on fixed asset and deduct from it. Obsolescence When new fixed assets' quality, efficiency and capacity decrease the value and usability of old fixed assets, then it is called obsolescence of old fixed assets. The main example, we can look in different machines or technical equipment especially in medical field. Every new equipment decreases the value of previous equipment. Because of it is not related to the nature and use of fixed asset, so it is also not depreciation. Obsolescence is not important in field of accounting but it is important in technology research and marketing of product.	**2m Each**	**4M**
d.	• to determine Material cost • to determine labour cost • to determine cost of tools, equipments etc. • to conduct time and motion study • to keep contact with other departments regarding methods of operations	**1m for each pt. (Any 4)**	**4M**

	• to refresh themselves with modern methods and equipments in manufacturing. • to determine different overheads		
e.	• Shaping Operation E= (S/100)*N s= length of stroke N=cutting stroke per min. E=(3/5)*C C= Cutting speed $T=\frac{(L+5)(B+2.5)}{60\ CF}$ min. L = length of job B= width of job • Planning operation $T=\frac{(L+25)(B+5)}{K}$ min.	**2m Each**	**4M**
f.	• Gas Cutting 1. Actual cutting cost 2. finishing cost 3. on-costs • Arc Welding cost 1. Material cost 2. Labour cost 3. Power charges 4. Finishing cost 5. On-cost	**2m Each**	**4M**
g. Ans	For preparing blank layouts, following steps must be followed. • 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.	**1m each Pt.**	**4M**
2.	Solve any 2	**8 x 2**	**16**
a ans	Numerical: Volume of head $\frac{\pi}{6}h^2(3D-2h)$ h= 20mm D=2*28=56mm $\therefore Volume=\frac{\pi}{6}\times 400(3\times 56-2\times 20)$ $=26.5\ cm^3$ Volume of Cylinder $=\frac{\pi}{4}D^2L$ $=28.26cm^3$ Total Volume = 28.26+(26.5)*2 = 81.26 cm^3 Weight of one rivet	**2m for each step**	**8M**

	$= \frac{81.26 \times 8}{1000}$ $= 0.65\ kg$ No. of rivets which can be manufactured from 4kg M.S. $= \frac{4}{0.65}$ $\sim 6\ rivets$		
b. ans	Time Rate System: Under this system, the worker is paid by the hour, day, week, or month. • High Wage plan: Under this plan a worker is paid a wage rate which is substantially higher than the rate prevailing in the area or in the industry. In return, he is expected to maintain a very high level of performance, both quantitative and qualitative. • Measured day work : According to this method the hourly rate of the time worker consists of two parts, namely, fixed and variable. The fixed element is based on the nature of the job i.e. the rate for this part is fixed on the basis of job requirements. The variable portion varies for each worker depending upon his merit rating and the cost-of-living index. • Differential time rate : According to this method, different hourly rates are fixed for different levels of efficiency. Piece Work • Straight piece work system : The wages of the worker depend upon his output and rate of each unit of output; it is in fact independent of the time taken by him. • Differential piece work system: This system provide for higher rewards to more efficient workers. For different levels of output below and above the standard, different piece rates are applicable. • Taylor Differential Piece Work System • Merrick Differential Piece-rate System	**4m** **4m**	**8M**
c. ans	OPERATIONS IN SHEET METAL SHOP: Following are the important operations and processes carried out in Sheet Metal Shop. (i) Breaking out. In this process, folds or ribbs in sheets, if any,are removed either with the help of beating the sheets by mallet or by passing the sheets through rollers. (ii) Bending. Bending is carried out for making cylindrical shapesfrom sheets. The length of sheet required for bending can be calculated as follows: Length for bending = 2 πr x (θ/360°) where r = radius of bend θ^{O} = angle subtended by bend through centre. (iii) Turning up. This process is done for making sharp bends to sheets for seaming, hemming etc. (iv) Hollowing. It is the pricess of beating the metal for giving it concave	**1m for each explain ation**	**8M**

shape. This process is done over a hollow stake (Fig.).

Allowance for hollowing = $1/2(\text{Base})^2 + (\text{Height})^2$

(v) Raising. It is the process of beating the metal over a sp herica I hea.d Th is process gives a convex shape to the sheet metal. This process should be done on the sheets, having more than 20 gauge.

Allowance for raising = $1/2\ (\text{Base})^2 + (\text{Height})^2$.

(vi) Planishing. This is the process, which gives the final finish to the hollow or raised surfaces by removing minor bends. This is carried out by beating the sheet with the help of planishing hammer. Planishing hammer is a short hammer and has high polish.

(vii) Edge Stiffening. Whenever a sheet metal object is made, some type of edge must also be formed. No object is 'made without some short of edge to give the product a finished appearance, as well as edge eliminates the raw edge of the metal that is likely to cut some one and also provides additional strength for the edge. For edge stiffening following are the important ways:

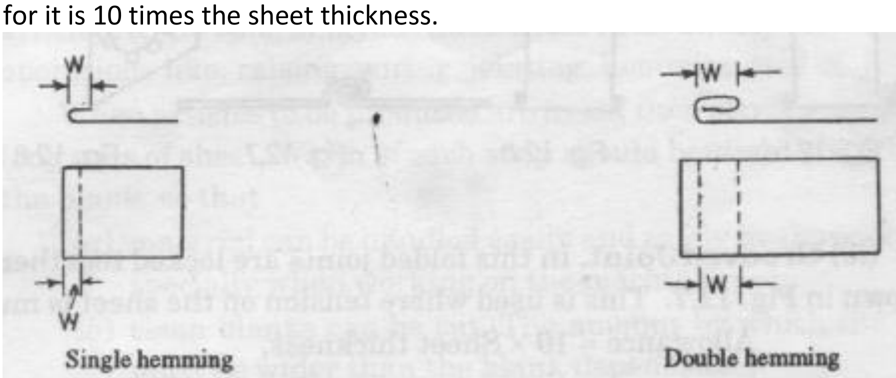
(a) Wiring. In this process, a wire is inserted at the edge of sheet metal articles. This wire adds in the stiffness of edge. Generally,wires used for the blank tin plated and G.I. sheets are of mild steel, copper and G.!. respectively.

Allowance for wiring= 2.5 x Dia of wire + 4 x Thickness of sheet.

(b) False Wiring. This process is done like a wiring process but in the end wire is taken out so that its appearance is just like that as it has been wired, and therefore, known as False Wiring. In this process strength will be less as compared to wiring process.

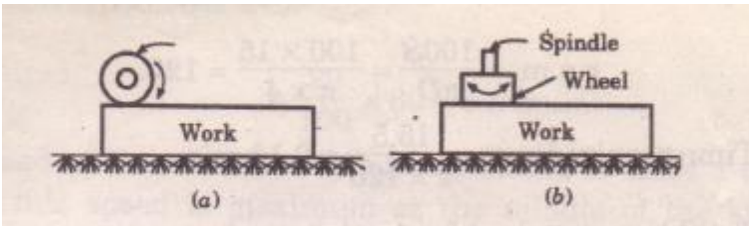
Allowance = 2.5 x ilia of wire + 4 x Thickness of sheet.

(c) Hemming. In this process, edges of sheet are folded, when folding is done once as shown in Fig., it is called single hemming. The allowance for it is 4.5 times the sheet thickness.When folding is done twice at the edges to give larger strength,as shown in Fig. , it is known as double hemming. Allowance for it is 10 times the sheet thickness.



(d) Flanging. In this process, edge of the sheet is folded, at an angle of 90°, to give the shape of flange, as shown in Fig.

3.	Solve any 4	**4 x 4**	**16**
a	Machine-Hour Rate. This method is generally used where work is done mostly by machines and not by hand. The indirect expenses increased in each shop during a particular period are distributed over a group of similar machines. These expenses are then distributed on the basis of total productive machine hours. Machine hour rate is the rate of the total overheads to the total productive machine hours, i.e. Machine- hour rate = Total overheads /Total productive machme hours	**4m**	**4M**
b	Although estimating and costing both are required to decide the price of the product, even then the two are different as explained 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 know ledge 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	**4m**	**4M**
c	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 oflength. This process is performed by hammering one end of hot workpiece while other end is supported against the anvil. 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. 4. Punching and Drafting. Punching operation is perfcrmed 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.	**4m for each point**	**4M**
d	It is a process of metal removal by abrasion. Following are the important methods of grinding: (a) Surface Grinding. (b) Cylindrical Grinding . (A)Surface Grinding. This process is useful for removing small amount of material from flat	 **2m**	**4M**

	surfaces. The time required for surface grinding is calculated by using the formula used in milling. When grinding is done as shown in Fig. (a), time is calculated as for cutting operations on milling machine; and when grinding is done as shown in Fig. (b), time is calculated as for facing operationson milling machine.  (B)Cylindrical Grinding. As the name suggests, the process is used for grinding the internal and external surfaces of the cylindrical jobs which have previously been turned on the lathe, to get accurate size and smooth finish. Time required for cylindrical grinding/cut=Length of cut/(Feed/rev. x r.p.m). where, Length of cut = Length ofjob + 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.	**2m**	
e	Following are the constituents of estimation: 1. Design cost. 2. Drafting cost. 3. Time and Motion Studies, Planning and Production Control cost. 4. Cost of Design and arrangement of special items. 5. Cost of Experimental work. 6. Materials cost. 7. Labour cost. 8. Time allowances. 9. Overheads. 10. Profit.	**4m for any 4 points**	**4M**
f	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) Lobour cost. 5) Administration cost 6) Inspection cost 7) Other expenses.	**2m** **2m for any 4 points**	**4M**

4.	Solve any 2	8*2	16
a	Welding is the process of joining two or more metal pieces by heating them upto the desired temperature with or without the application of pressure and with or without the use of filler. Gas cutting is the cutting of material with the help of gas flame. It is generally done with the help of oxy-acetylene flame. It can be done either by hand or by machine. Estimation of Welding Cost For estimating the welding cost, following cost elements should be considered. (a) Preparation Cost. It includes the cost of edge preparation,proper fit up and other elements before actual starting of welding. (b) Actual Welding Cost. This includes two costs. (i) Cost of material used in welding process like O2,C2H2 filer rod, and flux etc. (ii) Labour Cost. It will be obtained from wages sheets. (iii) Welding Finishing Cost. This in,cludes, the expenditure made for finishing the welding joint after welding. Post welding treatment (such as heat treatment) cost can also be taken into account. (iv) On-cost. All the other overheads on the equipment and other facilities connected with welding operations are considered under on-cost heading. Estimation of Gas Cutting: Cost cutting may be estimated by considering following elements: (i) Actual Cutting Cost. This includes: (a) Cost of material used in cutting process, like cost of oxygen acetylene etc. (b) Labour cost. . (i) Pinishing Cost. This is the expenditure made on finishing and cleaning in cut parts. (iii) On-costs. These are the other overhead charges made on equipment and other items which are connected with cutting processes	**2m** **2m** **2m for any 4 points** **2m for any 4 points**	**8M**
b) **a)**	Estimation of Net Weight For estimation of net weight of the forged component, following procedure is adopted: (a) Break up the job drawing into suitable geometrical sections,whose volumes can easily be calculated by using mensuration. (b) Next, find the volume of each section, neglecting rounded corners and taking suitable assumptions. (c) Now, find total volume of material required by subtracting the volume of the hollow spaces. (d) Lastly, calculate the weight of the component by multiplying the total volume with its density.	**2m**	**8M**
b) **b)**	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 : (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. (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 ofscale. 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. (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 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. (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% ofthe net weight. (v) Sprue Loss, The portion of metal between the length heldin 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 ofjob plus sum of the weight of different losses occurred during forging. Thus this gives the amount of weight of material required for forging.	**4m for any 4 points**	
b) **c)**	Estlmation 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: (i) Heating the job upto the required temperature. (ii) Performing the operation to get the required shape. These timings are with normal working on anvil and hammer.	**2m**	
c	Turning is operation of metal removal in which job is rotated against a tool. Let S= Cutting speed in mlmin. D = Dia of job to.,he turned in cm. N =.Revolution of the job/min. and F = Feed/rev and $S=\pi DN / 100$ m/min $N=100S/\pi D$ rpm	**4m**	**8M**

	as we know that feed/mon = rpm x feed/rev.and time taken to turn unot length=1/(Feed/min) min therefore time taken to turn L metre length = L/(feed/min)= L/(feed/rev x rpm) hence T= length of the job to be turned/(Feed/rev. x rpm) there for T= L/(F x N) min The other time considerations are: 1. Turning 2. Knurling, 3. Facing, 4. Drilling, 5. Boring, 6.Reaming, 7. Threading, 8. Tapping, 9. Milling, 10. Grinding, 11.Shaping, 12. Planning In addition to this machining time (also known as operation time), following time considerations are taken: (i) Setting up the job and tool or cutters. (ii) Setting up the machine, (iii) Inspection of job. (iv) Fatigue allowance. (v) Tool changing and sharpening time. (vi) Machine cleaning and servicing time. (vii) Personal allowance.	**4m for any 4 points**	
5.	Solve any 4	**4 x 4**	**16**
a	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.	**1m** **1m** **1m** **1m**	**4M**
b	Qualifications for estimator: i) He must be able to read and understand drawings and blue prints well.		**4M**

	ii) He must have good knowledge of different machines, their operations and operation timings for the products being manufactured. (iii) He should have a good knowledge for the use of proper tools, jigs and fixtures etc. (iv) He must have good knowledge of market prices of different materials required in the manufacture. (v) He must have good knowledge about the wage rates of all types of workers. (vi) He should have good knowledge about different allowances for time, i.e. personal allowance, fatigue allowance, tool changing allowance, grinding allowance and checking allowance etc. (vii) He must have good knowledge about the cutting speeds, feeds and depth of cuts for different materials, operations and different types of tools. (viii) He must be a well qualified and trained technical person and must be able to suggest new methods of production to reduce the production cost. (ix) He must know official account classification. (x) He must know the procedure for conducting "Time and Motion Study". (xi) He should also have good knowledge about the business matters. (xii) He must co-operate with other departments, specially with production, design, planning and sales departments. Qualities of Estimator. An estimator must possess following essential 'qualities : (i) He must be able to read and understand drawings and blue prints well. (ii) He must have good knowledge of different machines, their operations and operation timings for the products being manufactured. (iii) He should have a goodknowledge for the use ofproper tools, jigs and fixtures etc. (iv) He must have good knowledge of market prices of different materials required in the manufacture. (v) He must have good knowledge about the wage rates of all types of workers. (vi) He should have good knowledge about different allowances for time, i.e. personal allowance, fatigue allowance, tool changing allowance, grinding allowance and checking allowance etc. (vii) He must have good knowledge about the cutting speeds,feeds and depth of cuts for different materials, operations and different types oftools. (viii) He must be a well qualified and trained technical person and must be able to suggest new methods of production to reduce the production cost. (ix) He must know the official account classification. (x) He must know the procedure for conducting "Time and Motion Study". (xi) He should also have good knowledge about the business matters. (xii) He must co-operate with other departments, specially with production,design,planning and sales departments.	**2m for any 4 points** **2m for any 4 points**	
c	(1)Direct Expenses. These are those expenses, which can be Charged directly to a particular job	**2m**	**4M**

	and are incurred for that specific job only. For example, cost of special jigs and fixtures,cost of some special patterns and cost of experimental work on a particular job etc. (2)Indirect Expenses. These are also known as overhead charges,on cost, burden or indirect charges. These can be furtherclassified as : (a) Factory expenses (b) Administrative expenses (c) Selling expenses and (d) Distribution expenses (a) Factory Expenses. These overheads include all the expenditures made on the actual operation of the product in the plant.Such as Indirect materials and Indirect labour. It is also named as works on cost.	**2m**	
d	Efficiency and value of machine or asset reduces with the laps of time during use,which is known as Depreciation. It's Causes: 1) Depreciation due to wear and tear 2) Depriciation due to physical decay. 3) Accidential depreciation. 4) Depreciation due to deferred maintenance and neglect. 5) Inadequacy. 6) Depreciation by obsolescence	**2m** **2m for any 2 points**	**4M**
e	Valuation of material issued from store: To find out the cost of the materials issued from the stores on demand is called valuation of material issued from store. Differentiation between average price method and fixed price method AVERAGE PRICE METHOD: In this method avg. cost of the material is charged for the product. The two methods commonly used are; 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. FIXED PRICE METHOD: 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.	**1m** **$1^{1/}{}_{2}$ mark** **$1^{1/}{}_{2}$ mark**	**4M**
f	Procedure of job order costing: Job order costing or job costing is a system for assigning manufacturing costs to an individual product or batches of products. Generally, the job order	**4m**	**4M**

	costing system is used only when the products manufactured are sufficiently different from each other. In a job-order costing system, jobs are accounted for using the job-order cost sheet. The process involves the following steps: 1) Identification of the job 2) Tracing direct costs to the job 3) Identifying the indirect costs i.e. manufacturing overheads and finding the cost allocation base for each cost. 4) Applying the indirect costs to the job using the pre-determined allocation rate. 5) Finding total cost by summing up all the cost components. 6) Closing the under/over-applied manufacturing overheads to cost of goods sold/income statement. 7) Calculating revenue and profit.		
6	solve any 4	**4 x 4**	**16**
a	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 formulaes to arrive at the material cost because experience has shown that material cost is about 25% to 65% of the total production cost.	**4m**	**4M**
b	The following are thecharacteristics of process cost accounting: 1.The output consists of product which are homogenous. 2. Production is carried on in different stages (each of whichis called a process) having a continuous flow, 3. Production takes plae continuously except in case where the plant and machinery are shut down for maintainace etc. Output is uniform and all unit are identical during each process. It would not be possible to trace the identity of any particular lot of output to any lot of input. 4. The input will pass througn two or more processes before it takes the shape of the output. The output of each process becomes the input for the next process until the final product is obtained,with the last process giving the final product. 5. The output of a process (except the last) may also be saleable in which case the process may generate some profit. 6. The input a process (except the first) may be capable of being acquired from the outside sources. 7. The output or a process is tranfered to the next process generally at cost to the process. It may also be transferred at market price to enable checking efficiency of operation in comparsion to the market conditions. 8. Normal and abnormal losses may arise in the process.	**4m for any 4 points**	**4M**

<table>
<tr><td>c</td><td>Material costing:
It involves ascertaining all the expenses incurred on materials, starting from purchase to the time till the material is ready for issue. These expenditures may include;
i) Cost of material purchased
ii) Procurement cost
iii) Inventory carrying cost
iv)Material handling cost
v) Material loss
vi)Indirect expenses
vii) Scrap and surplus
Overhead costing:
All expenses other than direct material and labor that occur in a concern are called expenses. These are of two types; Direct and Indirect expenses. The indirect expenses are called Overheads or On-cost that may be classified as – i) Factory expenses, ii) Administrative expenses and iii) Selling and distribution expenses. Most of these overheads are found out from various records, but some charges require good knowledge and experience of the estimator. Some such charges are;
• Depreciation
• Obsolescence
• Interest on capital
• Idleness
• Repairs and maintenance</td><td>2m

2m</td><td>4M</td></tr>
<tr><td>d</td><td>Machine time calculation for turning operation:
It is operation of metal removal in which job is rotated against a tool.
Let S = Cutting speed on m/min
D = Dia of job to be turned in cm
N = Revolution of the job/min.
F = feed/rev.
<table>
<tr><td></td><td colspan="8">Operation (Cutting speeds are in m/min)</td></tr>
<tr><td>Matl</td><td>Turning and boring</td><td>Drilling</td><td>Reaming</td><td>Treading</td><td>Taping</td><td>Milling</td><td>Shaping sloting,and planing</td><td>Grinding</td></tr>
<tr><td>Aluminium</td><td>300</td><td>120</td><td>120</td><td>30</td><td>45</td><td>200</td><td>25</td><td>20</td></tr>
<tr><td>Brass /Gun metal</td><td>50</td><td>50</td><td>25</td><td>30</td><td>20</td><td>40</td><td>12</td><td>22</td></tr>
<tr><td>Mild steel</td><td>30</td><td>25</td><td>12</td><td>25</td><td>5</td><td>20</td><td>20</td><td>15</td></tr>
<tr><td>Cast iron</td><td>20</td><td>15</td><td>10</td><td>20</td><td>7</td><td>50</td><td>10</td><td>12</td></tr>
</table></td><td>4m</td><td>4M</td></tr>
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	<table><tr><td>Cu</td><td>30</td><td>50</td><td>15</td><td>30</td><td>20</td><td>40</td><td>10</td><td>22</td></tr></table> S= πDN/100 m/min Therefore, N=100S/ πD rpm As we know that feed/min = rpm X Feed/rev and Time taken to turn unit length = 1/ Feed/min min Therefore, time taken to turn L metre length = L/(Feed/min) = L/(feed/rev X rpm) Hence, T= Length of job to be turned/(feed/rev X rpm) i.e. T = L / F X N min		
e	Major Causes of Obsolescence: (a) Changes in product design. (b) Rationalisation. (c) Connibalisation. (d) Faulty Planning and Forecasting (e) Faulty Purchase Practices (f) Other Reasons Major Causes of surpluses 1. Over-ordering. 2. Faulty planning, forecasting and purchasing 3. Reduced performance may lead to reduced production and hence less consumption. 4. Defective codification. 5. Faulty store-keeping and record-keeping. 6.Bying for longer period than required.	**2m for any 4 points** **2m**	**4M**
f	Procedure of sheet metal shop estimation involves: i) Estimation of time Before proceeding to actual operation, strip is to be picked up.entered in the the dies andprocedss is started,these preparation itemsa generally require 15sec for small stripes to 30sec for heavy strips.This preparation time of 15 to 30sec os equally divided among the balnks in each strip. Actual operations, are generally performed on presees, either having automatic feeding arrangement or manual feedmg. In automatic feeding all he strokes of the ram are utilised for blanking.While in hand feeding nearly 40% of the strokes are generally missed. After blanking operation is. over 10 to 15 sec per strip are required for collecting the blanks and disposing the bridges, 10 to 15% calculated as above, generally added, for fatigue and personal needs etc.to get esttmated time. ii) Estimating for inserting, piercing, ejecting, etc. After the blanks are prepared each of the balnks 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: 2 to 5 sec for small components. 6 to 8 sec for medium components(of size say between 25 cm X 25 cm to	**$1^{1}/_{2}$ marks** **$1^{1}/_{2}$ marks**	**4M**

	50cm x 50cm) 8 to 10 sec for large size components. To pierce a hole in acomponent generally 2 sec are taken.Ejection or removal of the component after operation is over generally takes 10sec. If it is done manually and 2sec if it is done on automatic machine. iii)Capacity for Power press: For capacity calucation purpose power presses can be divided into two categories: (i) The shaft of which is driven (by gearing or belts)from one end; (ii)The shaft of which is driven from both the ends.	**1 mark**	