WINTER– 15 EXAMINATIONS

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

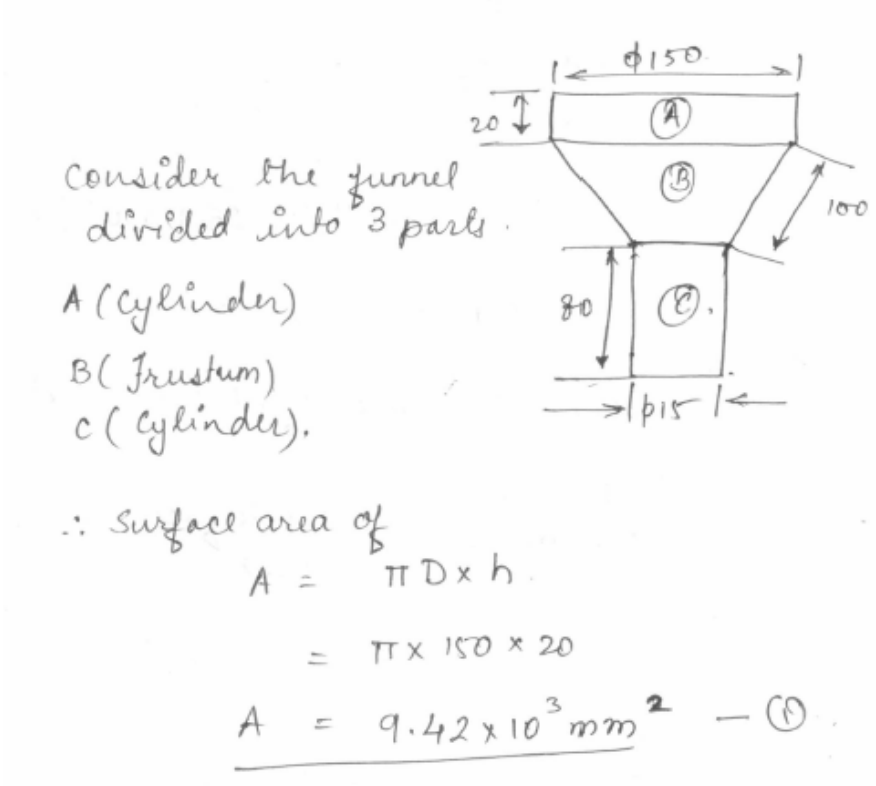
Important Instructions to examiners:

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
1.	**ATTEMPT ANY FIVE**	**(EACH 4M)**	**20M**
A.	**Define costing. State its objectives** **Ans.** Costing has been defined by Institute of Cost and Works Accountants, England as: " The technique and process of ascertaining costs" It is the determination of an actual cost of an article, after adding different expenses incurred in various departments. Objectives: a. To determine cost of article b. To determine cost of incurred during each operation c. To provide information to ascertain selling price of product d. To supply info for detection of wastage e. It helps in reducing total cost of manufacturing f. It suggests, changes in design, when cost is higher g. To help formulating the policies h. To provide info for economic consideration for purchasing new machines i. To help management in decision making j. To facilitate preparation of estimate for tender k. To compare actual cost with estimated cost.	**2M for Def.** **0.5M for each obj.(any 4)**	**4M**
B.	**Why overhead costs are to be controlled? Explain.** **Ans.** **2. Control on Overheads** To run the business efficiently, it is very essential to have strict control on the overheads. Prime cost of product does not vary much from industry to industry for the same product, it is the overhead charges which are much responsible. If these are minimised, cost can be controlled to a large extent. For this purpose following steps must be taken : (*i*) A set procedure for determining the total overhead charges of different departments should be followed and charges of each department should be compared whether they are in excess or not. (*ii*) Keep control on the indirect labour force. (*iii*) Simplification and set procedure for accounts and all administrative, work is required to be done. (*iv*) As far as possible less work should be got done during extra hours.	**1M for each pt.**	**4M**
C.	**What are the various causes of depreciation?** **Ans.** Following are the major causes of depreciation i. Depreciation due to wear and tear. Everybody knows that when any machinery performs work, wear and tear of certain components takes place. Cost	**0.5M for enlisting point (any 4)**	**4M**

	incurred due to this is value of depreciation due to wear and tear ii. Depreciation due to physical decay. There are certain items in a factory, such as, insulation of material, furniture, electric cables, poles, buildings, chemicals and vessels etc., which get decay because of climatic condition. This reduction in value is depreciation due to physical decay iii. Accidental depreciation. Accident may occur due to some wrong operation or some loose component or some other cause, which result in heavy damage. The depreciation due to this is accidental depreciation. iv. Depreciation due to deferred maintenance and neglect. If proper maintenance is not done as recommended by manufacturer, then the value of the machine or vehicle may be reduced and depreciation value because of this is called depreciation due to deferred maintenance and neglect. v. Inadequacy. Inadequacy means reduction in efficiency of an asset. This may result in the production. Also if the demand of the product increases there is a need for bigger or another machine of similar size. This cost is called depreciation due to inadequacy. vi. Depreciation by obsolescence. If new machinery comes in market, better and cheaper than existing one, hence the existing machinery has to be replaced to withstand market competition. This is called as depreciation by obsolescence.	**0.5M for explanation of each pt. (any 4)**	
D.	**Write the importance and use of estimating.** **Ans.** Accurate estimating is very necessary to compete in the market and be sure whether manufacturing of a particular article will be profitable or not. Both over and under estimating are dangerous. Accurate estimating should be done by staff of estimating department which must be well qualified, trained and experienced in this department. Use of estimating. i. To help factory owner in deciding manufacturing and selling policies. ii. To help in filling tenders. iii. To decide the amount of overheads iv. To decide about wage rates of workers after making 'time study'. v. It helps to decide whether a particular material should be purchased from the market or manufactured.	**2M for importance. 2M for using (any 2)**	**4M**

E.	**How machine time is calculated for turning operations?** **Ans.** 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 F = Feed/rev. and, $S = \frac{\pi DN}{100}$ m/min $N = \frac{100S}{\pi D}$ r.p.m. As we know that feed/min = r.p.m. × feed/rev. and time taken to turn unit length $= \frac{1}{\text{feed/min}}$ min. therefore , Time taken to turn L meter length $= \frac{L}{\text{Feed/rev.} \times \text{r.p.m}}$. $T = \frac{L}{F \times N}$ min.	**0.5M each step**	**4M**
F.	**What are the factors affecting welding cost and welding cost estimation?** **Ans.** There are certain factors which affect largely on the welding cost. These factors are as follows. i. Time required for handling and setting the job and equipment in correct position ii. Time required for fixing fixtures. iii. Rest and fatigue time allowance. iv. Excessive welding. v. When excessive current is used, welding cost also increases.	**1M for each point (any 4)**	**4M**
G.	**What is 'blank layout' in sheet metal shop? Explain.** **Ans.** For preparing an article, layout is required to be done on the sheet metal first. For this purpose an outline of the object is drawn or scratched on the sheet metal directly. Sheet is cut in accordance with layout and then different other operations are performed on it to give required shape of the article. At the time of layout allowances must be kept for different operations like, raising, wiring, jointing, hemming etc.	**4M**	**4M**
H.	**Define wages and incentives** **Ans.** Wages: these are the payments made by the employer for the efforts put in by the worker in the production. These are the	**2M for each**	**4M**

	payments made for the services rendered by the labour. Incentives: It is something that encourages a worker to put in more productive efforts voluntarily. Mostly, workers are not willing to exert themselves to produce anywhere near their full capacity unless their interest in work is created by some kind of reward. This is called incentive.		
2.	**ATTEMPT ANY TWO**	**8M each**	**16M**
A.	**Ans.**  Consider the funnel divided into 3 parts. A (Cylinder) B (Frustum) C (Cylinder). ∴ Surface area of $A = \pi D \times h$ $= \pi \times 150 \times 20$ $A = 9.42 \times 10^3 \text{ mm}^2$ — (1)	**2M each step**	**8M**

∴ Surface area of B $= \pi(r+R)\,l$.

$= \pi\left(\frac{150}{2} + \frac{15}{2}\right) \times 100$

$B = 25.91 \times 10^3\ mm^2$ — (2)

∴ Surface area of C $= \pi D \times h$

$= \pi \times 15 \times 80$

$C = 3.76 \times 10^3\ mm^2$ — (3)

Total Surface area $= A + B + C$

$= (9.42 \times 10^3) + (25.91 \times 10^3) + (3.76 \times 10^3)$

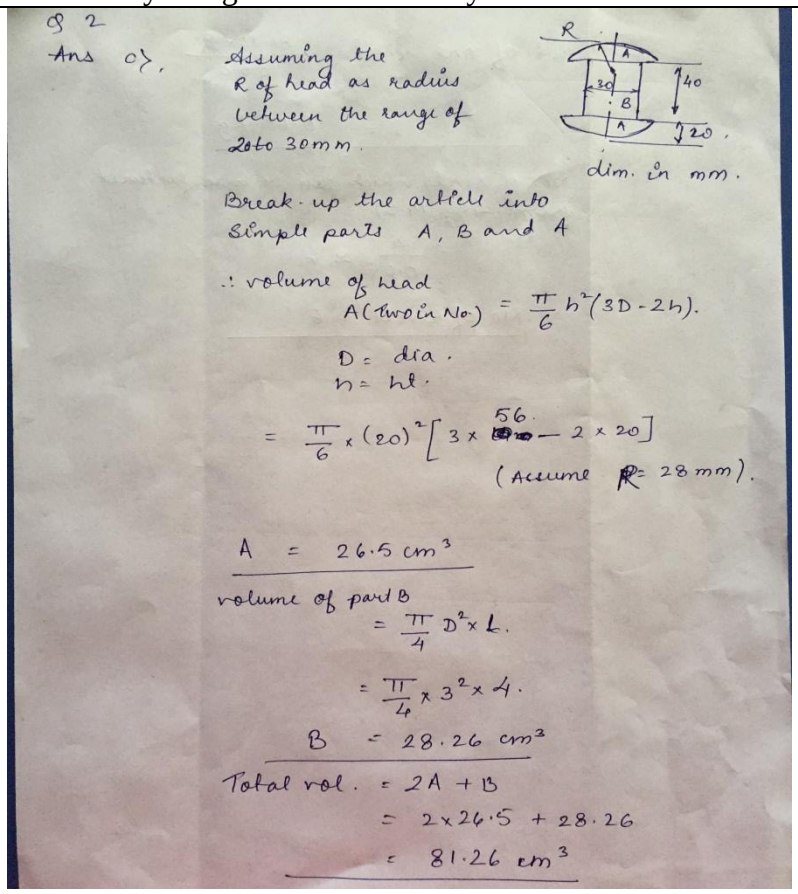
$= 39.09 \times 10^3\ mm^2$

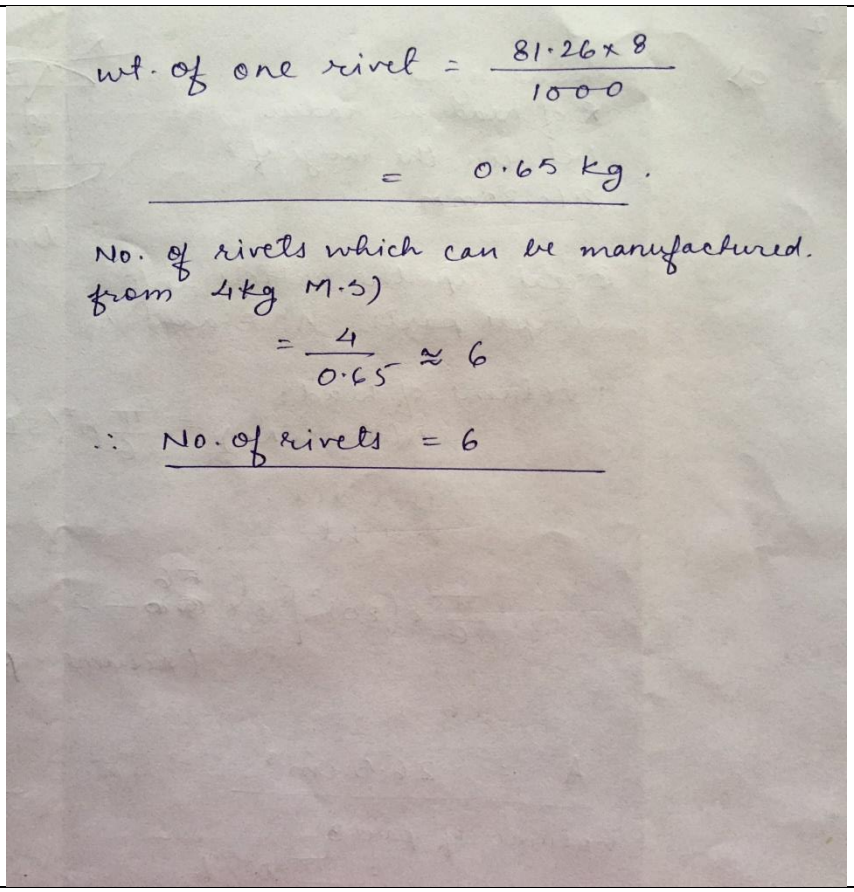
As the thickness of MS sheet is 2mm.

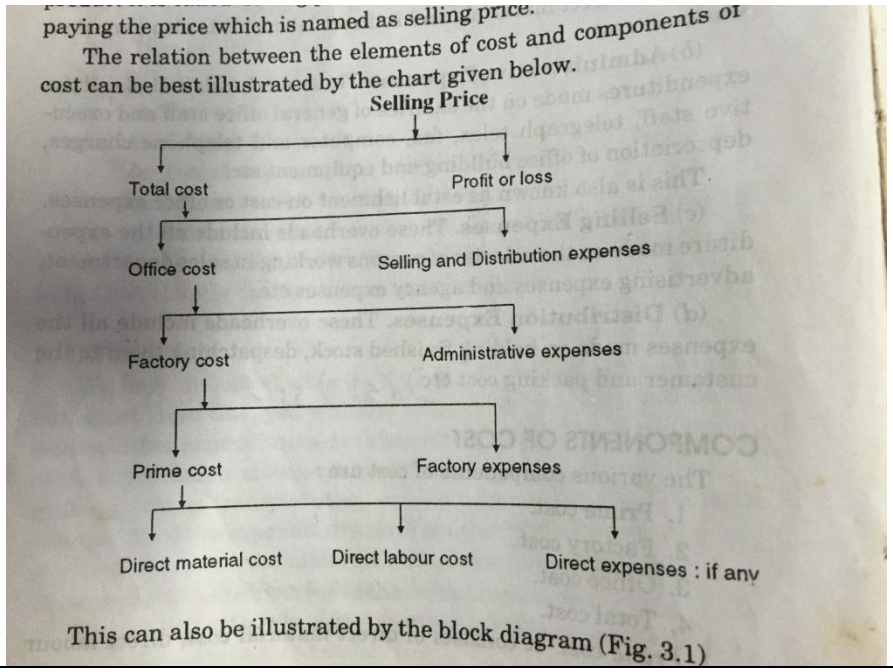
∴ Total vol. of material = Total surface area × thickness

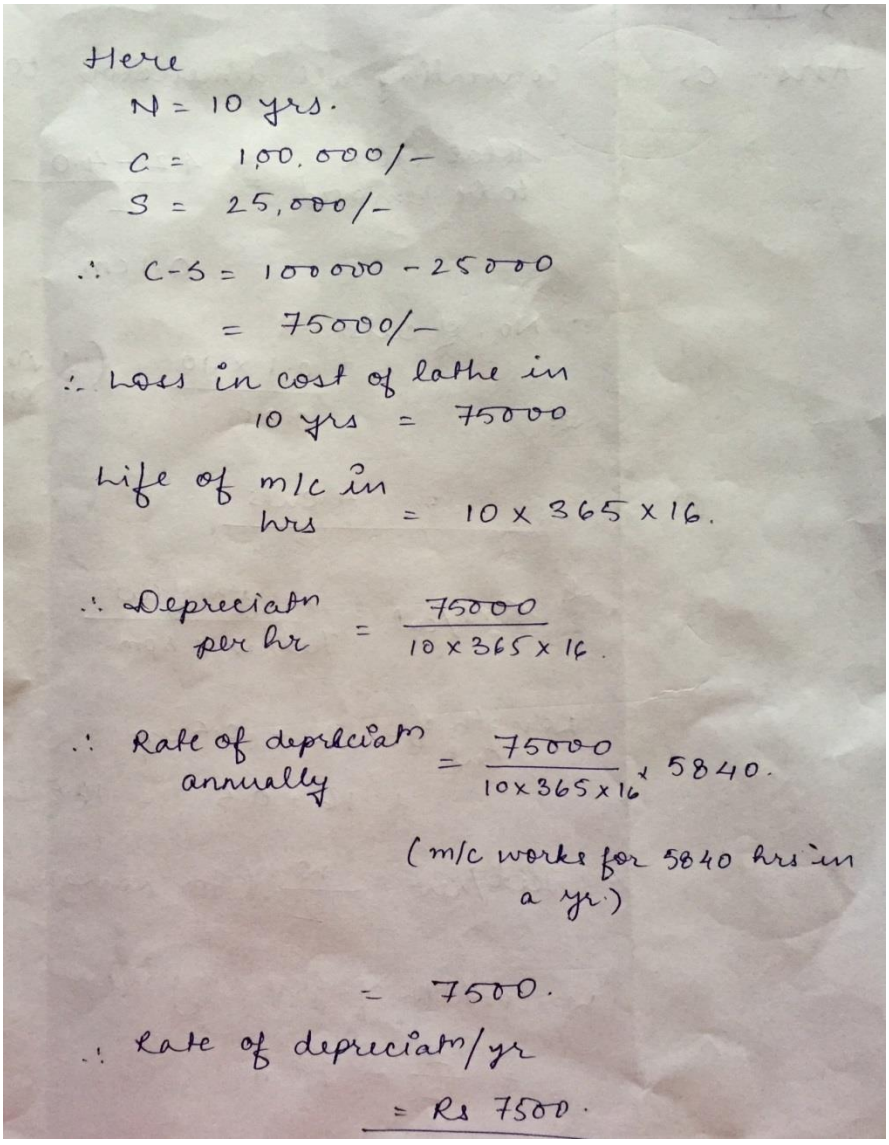
$= 39.09 \times 10^3 \times 2$

Total vol. of material $= 78.18 \times 10^3\ mm^3$

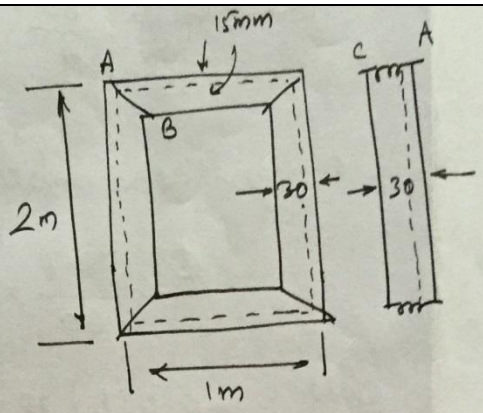
B.	**Explain the steps in estimation of erection costs.** **Ans.** i. To find out the cost of the direct material used for installation or erection purpose. This also involves in-direct expenditure on material handling equipment such as ropes, chains, splices, jigs etc. ii. To find out the labour involved 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.	**8M**	**8M**
C.	**Ans.** 	**2M for each step**	**8M**

			
3.	**ATTEMPT ANY TWO**	**8M each**	**16M**
A. i.	**What are the characteristics of process cost accounting?** **Ans.** 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. viii. Normal and abnormal losses may arise in the process	**1M for each pt. (any 4)**	**4M**
A.ii.	**Explain job order and process order costing.** **Ans.** Job order processing: this is used by the manufacturers who make special orders, customized products or standard products	**2M for each**	**4M**

	produced in batches. Process costing: It is used by manufacturers who mass produce large qualities of identical units in a continuous flow. Both systems determine a product cost by measuring the amt. of direct materials and direct labor used and allocating over-head cost. These costs are allocated using over-heads rate. Both systems maintain perpetual inventory records with subsidiary ledgers for materials, work in process and finished goods.		
B.i	**How to calculate selling price of a product?** **Ans.** paying the price which is named as selling price. The relation between the elements of cost and components of cost can be best illustrated by the chart given below.  This can also be illustrated by the block diagram (Fig. 3.1)	**0.5M for one**	**4M**
B.ii	**Differentiate between Costing and estimating.** **Ans.** Although estimating and costing both are required to decide the price of product, even then the two are different. i. 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 expenses. ii. Estimation requires a highly technical knowledge hence an engineer is required. Whereas costing is done by accountants iii. 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. But costing tells after manufacture about the profitability of the product.	**2M for each pt (Any 2)**	**4M**
C.	**List the methods of evaluating materials issued from stores. Explain any one method.** **Ans.** To find out the cost of materials issued from stores several methods are used. Following are some of the important methods, which are :	**4M for enlisting methods**	**8M**

	i. First-in-first-out method ii. Last-in-first-out method iii. Average price method iv. Fixed price method v. Actual cost method vi. Current value cost vii. Inflated price method EXPLAIN ANY ONE METHOD OUT OF ABOVE 7	**4M for explanation of any 1 method**	
4.	**ATTEMPT ANY TWO**	**8M each**	**16M**
A.	**Ans.**  Here N = 10 yrs. C = 1,00,000/- S = 25,000/- ∴ C-S = 100000 - 25000 = 75000/- ∴ Loss in cost of lathe in 10 yrs = 75000 Life of m/c in hrs = 10 x 365 x 16. ∴ Depreciatn per hr = 75000 / 10 x 365 x 16. ∴ Rate of depreciatn annually = 75000 / 10x365x16 x 5840. (m/c works for 5840 hrs in a yr.) = 7500. ∴ Rate of depreciatn/yr = Rs 7500.	**2M each step**	**8M**

B.	**Explain in brief.** **Ans. i. Qualities required by the estimator** 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 iii. He should have good knowledge for use of proper tools, jigs and fixtures. iv. He must have good knowledge of market prices v. He must have good knowledge about the wage rates. vi. Should have knowledge about different allowances. vii. Should have good knowledge about cutting speeds, feeds and depths of cuts for different materials. viii. Must be well qualified and trained technical person. Able to suggest new methods. ix. He must know official account classification. x. Must know the procedure of "time and motion study" xi. Should also have knowledge about business matters. xii. Must co-operate with other departments. **ii. Estimating procedure.** Following are the steps. i. Production planning dept. decides the requirements and specification of products. ii. Production planning dept. makes drawings iii. To decide the accuracy and finish required iv. Prepare list of components v. To decide which component is to be manufactured or procured form outside vi. Determine the material cost. vii. Determine the time required by various dept. viii. Determine labor cost considering the wage rate allowed ix. Determine the prime cost x. Determine factory overheads xi. Determine administrative overheads. xii. Determine packing and delivery charges etc. xiii. Then calculate the total cost xiv. To decide the profit and add in total cost xv. To decide the discount allowed distributor xvi. To decide delivery time in consultation with production dept.	**1M for each pt. (Any 4)** **0.5M for each pt. (8 pts.)**	**4M** **4M**

5.	ATTEMPT ANY TWO	8M each	16M
A.	 Consider the frame as shown in fig. Let us consider all welding is done only on one corner. welding is done on portion AB and AC. length AB = $\frac{30}{\sin 45^\circ}$ = 42.4 mm. Length AC = 30 mm. ∴ length of welding on one corner on one side = 42.4 + 30 = 72.4 mm. = 7.24 cm. ∴ length of welding on 4 corner on both sides = 7.24 × 4 × 2 = 57.9 cm ≈ 0.58 m as welding speed = 4m/hr.	1M each step	8M

∴ Time req. $= \frac{60}{4} \times 0.58 = 8.7 \text{ min}$

i) Oxygen consumptn @ $0.4 m^3/hr$

$= \frac{8.7}{60} \times 0.4 = 0.058 m^3$

cost = 0.058×20 = ~~Rs 00.58~~/-

= Rs 1.16/-

ii) Acetylene consumptn

$= \frac{8.7}{60} \times 0.4$

$= 0.058 m^3$.

cost = 0.058×100

= Rs 5.8/-

iii) Length of filler rod @ $3.4 m^3/m$

$= 3.4 \times 0.58$

$= 1.972 m$.

wt. of filler rod = (assuming density 7gm/cc)

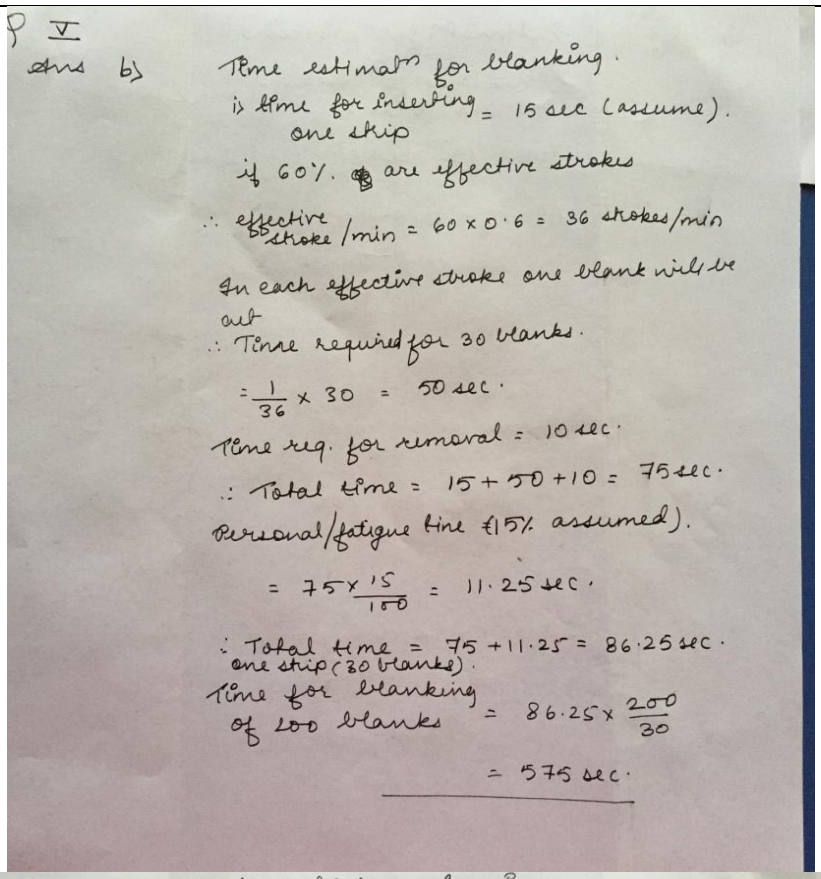
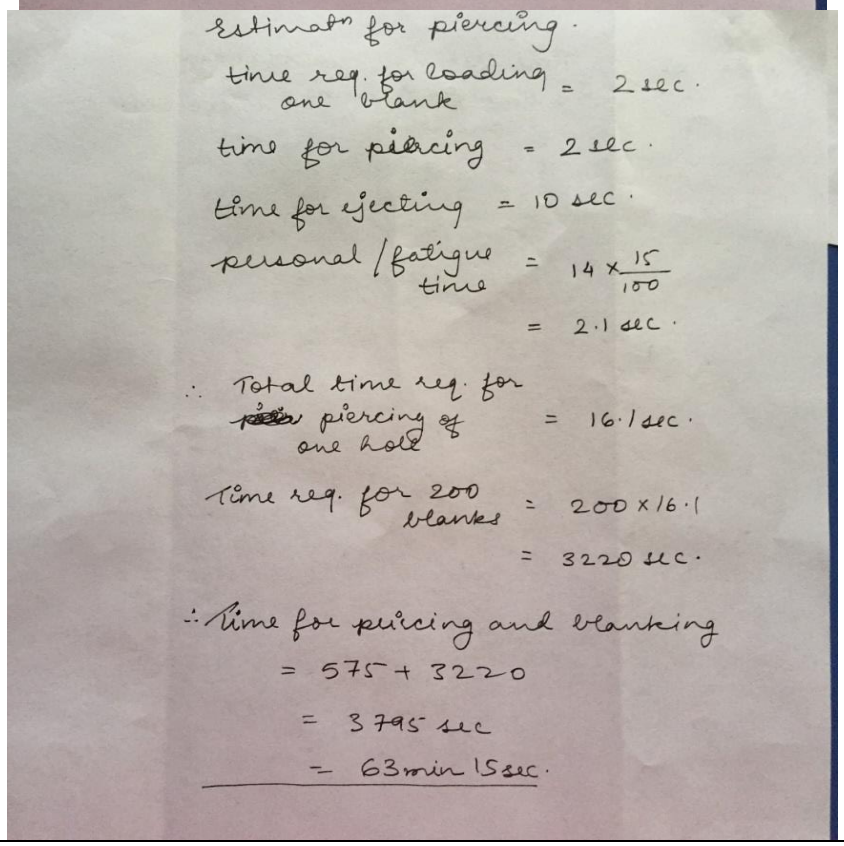
$= \frac{\pi}{4} (10.25)^2 \times 197.2 \times 7$

$= 0.067 kg$.

cost of filler rod = 25×0.067

= Rs 16.75/-

Total welding cost = 16.75 + 5.8 + 1.16 = Rs 23.71/- (B)

B.	Q V Ans b)  		**4M for blanking 4M for piercing**	**8M**

Time estimation for blanking.

i) time for inserting one strip = 15 sec (assume).

if 60% are effective strokes

∴ effective stroke/min = 60 × 0.6 = 36 strokes/min

In each effective stroke one blank will be cut

∴ Time required for 30 blanks.

$= \frac{1}{36} \times 30 = 50$ sec.

Time req. for removal = 10 sec.

∴ Total time = 15 + 50 + 10 = 75 sec.

Personal/fatigue time (15% assumed).

$= 75 \times \frac{15}{100} = 11.25$ sec.

∴ Total time = 75 + 11.25 = 86.25 sec.
one strip (30 blanks).

Time for blanking of 200 blanks $= 86.25 \times \frac{200}{30}$

$= 575$ sec.

Estimation for piercing.

time req. for loading one blank = 2 sec.

time for piercing = 2 sec.

time for ejecting = 10 sec.

personal/fatigue time $= 14 \times \frac{15}{100}$

$= 2.1$ sec.

∴ Total time req. for piercing of one hole = 16.1 sec.

Time req. for 200 blanks = 200 × 16.1

= 3220 sec.

∴ Time for piercing and blanking

= 575 + 3220

= 3795 sec

= 63 min 15 sec.

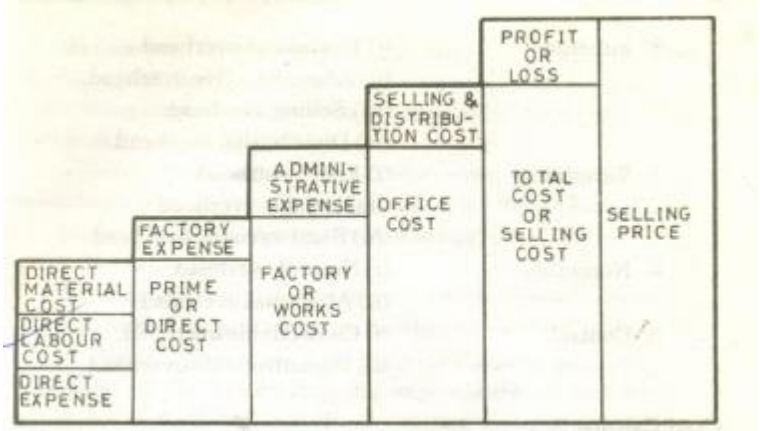
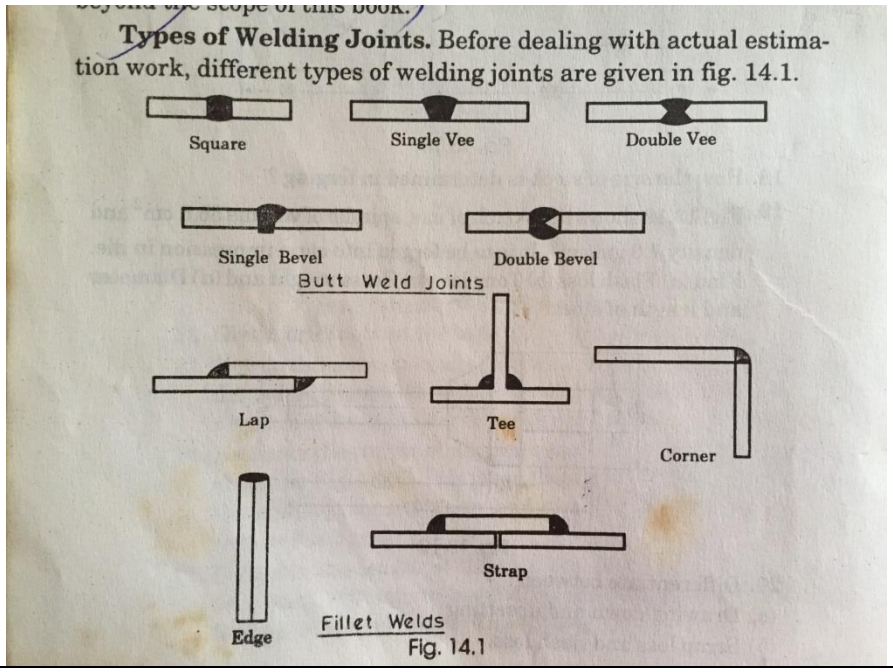
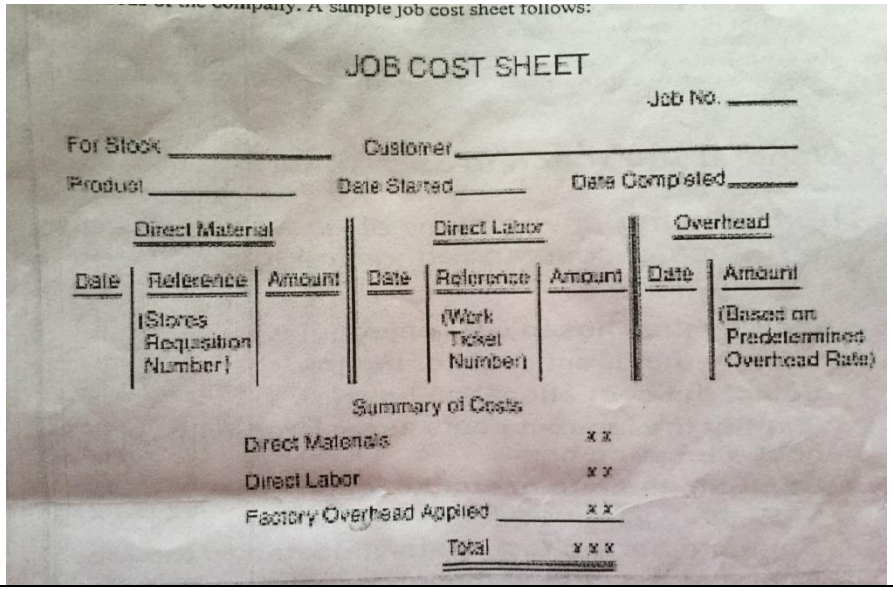
<table>
<tr><td>C.i.</td><td>What is material costing? Which are the expenses included in cost of material?
Ans. The cost which is calculated by finding the volume of the material and then multiplying it by the density of the same material. This is known as material costing. Material costing is about 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.
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.
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</td><td>2M for def.
2M for enlisting</td><td>4M</td></tr>
<tr><td>C.ii.</td><td>Block diagram ‘elements of cost and components of cost’
 

Fig. 3.1. Block diagram to illustrate the relation between 'Elements of Cost' and 'Components of Cost'.</td><td>4M</td><td>4M</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>6.</td><td>ATTEMPT ANY FOUR</td><td>4M each</td><td>16M</td></tr>
<tr><td>A.</td><td>Differentiate between depreciation and obsolescence
Ans.
<table>
<tr><td>Depreciation</td><td>Obsolescence</td></tr>
<tr><td>i. Efficiency and value of machine or asset reduces with the lapse of time during use this is called depreciation</td><td>i. Reduction in the value of existing machinery or asset due to new and better invention or design of equipment or process etc.</td></tr>
<tr><td>ii. Some money is set aside yearly from profits so</td><td>ii. It is difficult to provide on-cost on obsolescence, because</td></tr>
</table></td><td>2M for each pt.</td><td>4M</td></tr>
</table>

	equipment can be replaced with new one. | no one can say when change in machinery is coming. iii.generally money is kept aside known as 'sinking fund' | iii.the life of the machine is considered less to avoid major effect of obsolescence		
B.	**Explain different forging losses.** **Ans.** Various losses in forging are as follows. i. Tong loss: while forging, some length of stock is required for holding the job in tong. This length is an extra length and is known as tong loss. ii. Scale loss: the outer surface of the hot metal is generally oxidized and when hammering is done oxidized film is broken and falls down in form of scale. Hence it is called scale loss iii. Flash loss: It is the surplus material which comes out between the two meeting surface of dies. For getting finished product this has to be trimmed off. iv. Shear loss: in sawing operation, some material is always lost. This loss is taken to be 5% of net wt. v. Sprue loss: The portion of metal between the length held in tong and the material in die is called sprue. This is also a metal loss.	**1M for each (any 4)**	**4M**
C.	**How machining timing for milling operation is determined?** **Ans.** $$Time\frac{required}{cut} = \frac{length\ of\ cut}{\frac{feed}{rev}} \times r.p.m.$$ where, $$length\ of\ cut = length\ of\ job + added\ table\ travel$$ $$\frac{feed}{rev}. = \frac{feed}{tooth} \times no.of\ teeth\ on\ cutter$$ $$R.P.M. = \frac{100S}{\pi D}$$ $$D = Dia\ of\ cutter$$ where, $$total\ time = \frac{length\ of\ cut}{feed/min} \times no.of\ cuts\ or\ index$$	**4M**	**4M**

D.	**Enlist the names and draw different types of welded joints?** **Ans.**  **Types of Welding Joints.** Before dealing with actual estimation work, different types of welding joints are given in fig. 14.1. Square Single Vee Double Vee Single Bevel Double Bevel Butt Weld Joints Lap Tee Corner Strap Edge Fillet Welds Fig. 14.1	**1M for each (with diag.)**	**8M**
E.	**Explain estimation procedure used in sheet metal work.** **Ans.** Estimation of time. Before proceeding to actual operation, strip is to be picked up, entered in dies and process is started, these preparation items generally require 15 sec for small strips to 30 sec for heavy strips. Actual operations are generally performed in presses, either having automatic feeding arrangement or manual feeding. After blanking operation is over 10 -15 sec per strip are required for collecting the blanks and disposing the bridges.	**4M**	**4M**
F.	**Explain job cost sheet.** **Ans.**  JOB COST SHEET Job No. _____ For Stock _____ Customer _____ Product _____ Date Started _____ Date Completed _____ Direct Material | Direct Labor | Overhead Date | Reference (Stores Requisition Number) | Amount | Date | Reference (Work Ticket Number) | Amount | Date | Amount (Based on Predetermined Overhead Rate) Summary of Costs Direct Materials x x Direct Labor x x Factory Overhead Applied _____ x x Total x x x	**1M each**	**4M**