Ans.: **i) Cost of Packing:** Packing for products may be of the following three types :

1. Primary Packing which is necessary for the production and convenient handling of the product, e.g. ink cannot be sold without a container. The cost of such packing is treated as part of direct materials cost.

2. Cost of packing which facilities transportation of product to distant places and in protecting those against damage or loss in transit is treated as distribution cost. If each article packed separately packing cost is direct otherwise it is treated as overhead.

3. Fancy packing meant to attract customers is a form of an advertisement, the cost is treated as an advertisement expense and selling overhead.

ii) Bad Debts :

Some accountants are of the option that bad debts are financial losses and thus excluded from cost accounts. If, however, bad debts are included in cost, it should be treated as selling overhead to the extent it is regarded as normal in the course of business. It means the abnormal bad debt must not be included in cost books.

iii) Research Costs :

The following are the various methods of treating these costs in accounts:

Situation	Treatment
i. Cost of research relating to manufacturing activities	It should be treated as part of Production overheads
ii. Cost of research relating General management administration	It sould be treated as part of Administration overheads.
iii. Cost of research relating to marketing activities	It should be treated as part of Selling & Distribution overheads
iv. Cost of research relating to a particular product.	It should directly be charged to that particular product.
v. Other situations	It should be treated as deferred revenue loss and should eb charged to Costing Profit & Loss Account over a period.

iv) Insurance :

Insurance Premium for	Treatment
(a) Direct Materials	It is treated as part of direct material cost.
(b) Indirect Materials and factory fixed assets like Building, Plant & Machinery	It is treated as part of Production overheads
(c) Fixed Assets of Administration Department	It is treated as part of Administration overheads
(d) Fixed assets of Sales Department	It is treated as part of Selling overheads.

v) Sales Promotion Expenses (Advertisement) :

Advertisement for sales promotion is a selling overhead. When advertisement is for individual products, it should be allocated to the products concerned. On the other hand, when a common advertisement is for more than one product, the cost should be apportioned on the basis of sales turnover or any other suitable basis. Heavy advertisements, the benefits of which is derived over years, should be deferred and charged to the goods sold in the future periods.

vi) After Sale Service :

Type of Cost of After Sales Service	Treatment
i. Cost of free repairs and free replacement of defective parts and components	It is treated as part of Production Overheads
ii. Cost of replacement of parts and components damaged in transit.	It is treated as part of Distribution overheads.

vii) Fringe benefits :

Industrial workers usually enjoy certain benefits in addition to their wages, salaries and other allowances. These benefits, known as fringe benefits, are costs incurred by the employers which are not related to the quantity of work done by workers. Fringe Benefits

include canteen benefits, maternity leave pay, holiday pay, retiring benefits like pension and gratuity, medical employer's contribution to provident fund, bonus, etc.

The cost of these benefits is allocated to respective departments, or alternatively apportionment is made on the basis of wages paid or the number of workers.

viii) Inspection Cost :
Inspection department is a service department and its total cost is apportioned to production departments on the basis of services rendered. The time spent by the staff of Inspection Department in each department is an appropriate basis for this purpose.

ix) Data Processing Unit :
Data Processing is a service activity. Thus, this cost should be apportioned to various departments like production, administration and sales on the basis of relative service rendered to various departments. The various basis of distribution may be :
a) Number of cards punched and processed
b) Number of reports processed
c) Man hours or computer hours

x) Bonus Paid to Employee (Profit Sharing) :
Profit sharing bonus is payable out of profit and is thus an appropriation of profit. It should thus be excluded from costs. In India, under the Payment of Bonus Act, a minimum bonus is payable to employees irrespective of profit or loss. The amount of such minimum bonus payable should therefore, be treated as an overhead and any bonus paid over and above this should be treated as an appropriation of profit and excluded from cost. Some cost accountants prefer to treat the entire amount of bonus as overhead and apportion it to various departments on the basis of wages of each department.

Q.11. What are the pre-requisites of good method of absorption of overheads ?
Ans.: A good method of absorption of production overheads should possess the following characteristics :
1. It should be simple to understand and easy to adopt.
2. It should take into consideration the time factor.
3. It should distinguish between the work done by skilled workers and work done by unskilled workers.
4. It should distinguish between the work done by manual labour and the work done by machine.
5. It should not cause very much under/over absorption of overheads.
6. It should be economical to use.

Q.12. Define various capacity levels :
Ans.: 1. **Maximum or Installed or Theoretical or Rated Capacity :** It refers to the maximum possible production that can be achieved if there is no loss of operating time. For example – if a manufacturing unit works for 8 hours in a day, maximum capacity is 365 days x 8 hours per day i.e. 2,920 hours.

2. **Practical or Operating Capacity :** It refers to the possible production that can be achieved taking into consideration the normal loss of capacity or account of repairs, maintenance, holidays, stock taking, etc. For example – a manufacturing unit works 8 hours in a day for six days in a week and remains closed for 18 hours for festival holidays, in such a case the practical capacity is computed below :

Maximum capacity (365 days x 8 hours)		2,920 hours
Less : Sundays (52 x 8)	416 hours	
Holidays (18 x 8)	144 hours	560 hours
		2,360 hours

3. **Normal Capacity :** It refers to average capacity utilization computed over a period of time. For example, taking into consideration the capacity utilization of last 3 years, if we come to the conclusion that normal output achieved in a year is 12,000 units and 6 units are produced in 1 hour, normal capacity utilization in a year is 12,000 / 6 = 2,000 hours.

4. **Actual Capacity :** It refers to the capacity actually achieved during a given period.

PRACTICAL QUESTIONS FOR REVISION

Q.1. A cement factory sells cement in four zones – North, South, East and West. Below is the information relating to sales, transportation and stock of cement.

Zones	Sales (₹ in Crore)	No. of Salesmen	Per salesman Distance (kms.)	Advertisement Budget (%)	Average Stock (₹ in Crore)
North	10	50	1,000	30%	3
South	5	20	2,000	25%	1
East	6	30	2,500	25%	2
West	4	20	1,500	20%	1

Expenses incurred during the previous year are as follows :

Salaries of sales representatives	56,00,000
Travelling allowances of sales representatives	1,95,000
Advertisement cost	5,00,000
Godown rent	3,50,000
Insurance on out-station stocks	70,000
Commission on sales	25,00,000
Carriage outward	4,10,000
Total selling distribution overheads	₹ 96,25,000

Distribute different selling and distribution overheads to each zone on appropriate basis and compute selling overhead rate as a percentage to sales for each zone.

[Ans.: 3.82%, 3.48%, 4.13% and 3.97%].

Q.2. You are given the following overheads relating to a factory :

Factory Rent ₹ 48,000; Power ₹ 23,000; Depreciation ₹ 1,00,000; Store Room Expenses ₹ 30,000; Indirect Material ₹ 60,000; Canteen subsidy ₹ 25,000; Indirect Labour ₹ 90,000; Employer's contribution towards ESI ₹ 50,000; Light ₹ 18,000. Factory supervision ₹ 75,000.

Following are specific cost details relating to its five departments A, B, C, P and Q of which A, B and C are production departments and P and Q are service departments :

	Production Departments			Service Departments	
	A	B	C	P	Q
Area (Sq. mts.)	2,000	1,000	500	800	500
Hours worked	1,000	1,000	1,000	500	500
Horse Power of Machine	80	80	30	40	40
Traceable overheads (₹)	50,000	80,000	30,000	20,000	25,000
Value of Plant (₹)	4,00,000	3,00,000	1,00,000	1,50,000	50,000
Direct Material (₹)	1,00,000	1,50,000	1,50,000	1,60,000	40,000
Direct Labour (₹)	2,00,000	1,00,000	1,00,000	30,000	20,000
No. of workers	800	700	500	200	300
No. of Material Requisitions	500	300	1,000	800	400
Light Points	100	30	25	15	10

Depreciation is charged on straight line basis. Overheads of service department P are to be shared by A, B, C and Q in the ratio of 5:3:7:5 and that of department Q are to be shared by A, B, C and P in the ratio of 1:2:3:4.

[Ans.: A ₹3,49,720; B ₹3,05,738; C ₹3,18,542. Depreciation has been apportioned on the basis of value of machines.

Q.3. A company has three production department A, b and C and two service departments X and Y. The following information is available regarding various expenses :

Power	₹ 2,400	Maintenance of buildings		₹ 2,400
Rent	4,200	Fire precaution service		1,200
Canteen	3,000	Insurance on assets		1,000
Personnel Deptt.	3,000	Depreciation (10% of capital value)		
Time Office	1,000			

	Production Departments			Service Department	
	A	B	C	X	Y
Area (sq. metres)	₹ 4,000	₹ 4,000	₹ 3,000	₹ 2,000	₹ 1,000
K.W. hours	2,000	2,200	800	750	250
No. of workers	900	1,200	300	400	200
Capital value of assets ('000) ₹	50	60	40	30	20

The services of X and Y departments are used by the other departments in the following proportion :

	A	B	C	X	Y
X	25%	30%	25%	–	20%
Y	40%	20%	30%	10%	--

Calculate total overheads of production departments after reapportioning service department overheads.

[Ans.: A ₹13,553; B ₹14,958 and C ₹9,690]

Q.4. In a factory, there are two service departments P and Q and three production departments A, B and C. In April, the primary distribution is:

A ₹ 6,50,000   P ₹ 1,20,000
B ₹ 6,00,000   Q ₹ 1,00,000
C ₹ 5,00,000

P is Personnel Deptt. and Q is Stores Deptt. Other information is as follows :

	A	B	C	P	Q
Number of Employees	30	40	15	10	15
Direct Material Cost (₹)	4,00,000	3,00,000	2,50,000	50,000	60,000

Prepare a statement showing the distribution of the two service department expenses to three production departments under the "Repeated Distribution Method" and Simultaneous Equation Method.

[Ans.: A ₹7,35,340; B ₹6,86,045; C ₹5,48,615]

Q.5 A company has three production cost centers A, B and C and two services cost centers X and Y. Costs allocated to service centers are required to be apportioned to the production centers to find out cost of production of different products. It is found benefit of service cost centers is also received by each other along with the production cost centers. Overheads costs as allocated to the five cost centers and estimates of benefit of service centers received by each of them are as under :

Cost Centres	Overhead costs as allocated (₹)	Estimates of benefits received from service centers (%)	
		X	Y
A	80,000	20	20
B	40,000	30	25
C	20,000	40	50
X	20,000	–	5
Y	10,000	10	–

Required : Work out final overhead costs of each of the production departments including reapportioned cost of service centers using (a) Continuous distribution method and (b) Simultaneous equation method.

[Ans.. A ₹ 86,533, B ₹ 49,196; C ₹ 34,271]

Q.6 A company has 3 production departments A, B and C and two service departments X and Y. The following data are extracted from the records of the company for a particular given period:

(A)

		(₹)
(i)	Rent and rates	25,000
(ii)	General lighting	3,000
(iii)	Indirect wages	7,500
(iv)	Power	7,500
(v)	Depreciation on machinery	50,000
(vi)	Sundries	50,000

(B) Additional data, department-wise

	Total	Departments				
		A	B	C	X	Y
Direct wages (₹)	50,000	15,000	10,000	15,000	7,500	2,500
Horsepowers of machines used	150	60	30	50	10	–
Cost of machinery (₹)	12,50,000	3,00,000	4,00,000	5,00,000	25,000	25,000
Production hours worked	–	6,226	4,028	4,066	–	–
Floor space used (Sq. mtr.)	10,000	2,000	2,500	3,000	2,000	500
Lighting points (Nos.)	60	10	15	20	10	5

(C) Service department's expenses allocation

	A	B	C	X	Y
X	20%	30%	40%	–	10%
Y	40%	20%	30%	10%	–

You are required to : (a) Compute the overhead rate of production departments using the repeated distribution method; and (b) hence, determine the total cost of a product whose direct material cost and direct labour cost are respectively ₹250 and ₹ 150 and which would consume 4 hours, 5 hours and 3 hours in departments A, B and C respectively.

[Ans. (a) ₹ 7.50, B ₹ 11.25, C ₹ 15 (b) ₹ 531.25]

Q.7 A textile mills has two production departments, "spinning" and "Weaving" and two service departments, S_1 and S_2 Total costs of operating the two service departments, their outputs and quantum of service rendered to other departments are as follows :

	From service departments	
	S_1	S_2
	30%	25%
To Spinning	20%	35%
Weaving	–	40%
S_1	50%	–
S_2		

Total Cost as per Primary Distribution summary :
→ Spinning ₹ 2,00,000   → Service Deptt. S_1 = ₹ 1,20,000
→ Weaving ₹ 3,00,000   → Service Deptt. S_2 = ₹ 2,60,000

Prepare Secondary Distribution summary.

Ans. Total amount of Spinning Deptt. = ₹3,84,000
Total amount of Weaving Deptt. = ₹ 4,96,000

Q.8. Meerut Manufacturing Company makes several product lines which are processed through three production departments X, Y and Z.

The relevant data for a year are as follows :

	Factory Overhead (including share of service department)	Direct Labour Hours	Direct Labour Cost
Department X	1,24,000	80,000	1,60,000
Department Y	2,30,000	1,15,000	2,41,500
Department Z	5,46,000	1,05,000	1,99,500

Production records at the end of the year indicated the following for the product line 'Krish'.

Units produced   20,000

	Deptt. X	Deptt. Y	Deptt. Z
Prime Cost	₹ 45,000	₹ 10,500	₹ 59,500
Direct Labour hours	10,000	5,000	30,000

You are required to :
a. Calculate the departmental and plant-wide, over-head rte based on direct labour hours;
b. Compute the cost of 'Krish' line for the year by using (i) Plant-wide rate and (ii) departmental rates; and
c. Comment on the results.

[Ans.: (a) ₹1.55 (X); ₹2 (Y); ₹5.20(Z); ₹3 (Plant-wide);

(b) (i) ₹2,50,000; (ii) ₹2,96,500;

(a) Plant-wide rate leads to under-absorption of overheads by ₹46,500].

Q.9. In a machine shop, the machine hour rate is worked out at the beginning of a year on the basis of a 13 week period which is equal to three calendar months. The following estimates for operating a machines are relevant :

Total working hours available per week	48 hours
Maintenance time included in the above	2 hours
Setting up time included in the above	2 hours

Cost details :

Operator's wages (per month)	₹ 650
(Supervisory salary (per month)	
(Common supervisor for 3 machines)	₹ 1,500
W.D.V. of machine (depreciation at 12%)	₹ 1,80,000
Repairs and maintenance (per annum)	₹ 16,000
Consumable stores (per annum)	₹ 30,000
Rent, rates and taxes (for the quarter apportioned)	₹ 5,000

Power consumed is @ 2 units per hour @ ₹ 3 per unit. Power is required for productive hours only. Setting up time is part of productive time but no power is required for setting up jobs.

The operator and supervisor are permanent. Repairs and maintenance and consumable stores are variable.

You are required to : (a) work out the machine hour rate. (b) work out the rate for quoting to the outside party for utilizing the idle capacity in the machine shops assuming a profit of 20% above variable cost.   [Ans : (a) ₹48.13; (b) 40.80].

Q.10. Total overheads of a factory are ₹ 4,46,380. Based on normal working of the factory, overheads were recovered from production at ₹ 1.25 per hour. The actual hours worked were 2,93,104. How would you proceed to close the books of accounts when 7800 units were produced of which 7,000 units were sold and in addition 200 equivalent units were in work-in-progress ?

On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency. Also give the profit implication of the method suggested.

[Ans.: *Under-absorption due to increase in cost = ₹40,000 and due to inefficiency = ₹40,000].*

Q.11. The budget of a machine shop for a year is as follows :

Normal working week	42 hours
Number of machines	15
Hours spent on maintenance in a week (Normal loss)	5 hours per machine
Estimated annual overhead	₹ 5,55,000
Estimated direct wages rate	₹ 3 per machine hour
Number of working weeks in a year	50

The actuals in respect of a 4 week period are :

Overhead incurred	₹ 49,000
Wages paid	7,500
Machine hours operated	2,400

Calculate (i) the overhead rate per machine hour for the year and (ii) the amount of under or over-absorption of overhead and wages in respect of the 4 week period.

[Ans : *(i) ₹20, (ii) Under-absorbed overheads ₹1,000 and wages ₹300].*

Q.12. For the year 2012 - 2013 an organization budgeted output of 50,000 units and overheads of ₹ 7,00,000. Actual output was equivalent to 60,000 units and actual overheads were ₹ 8,00,000. It was decided to absorb overheads on per unit of output basis. Of the total output 48,000 units were sold during the year. Unsold stock of finished output was 8,000 units and there was work-in-progress of 10,000 units, each unit approximately 40% complete. Calculate : (i) Overhead absorption rate, (ii) Extent of over or under absorption, (iii) Supplementary rate, and (iv) Accounting entry for dealing over or under absorption.

[Ans : *(i) ₹14 per unit; (ii) ₹40,000 (over-absorption) (iii) ₹0.667;*
 (iv) Overheads A/c.   Dr. 40,000
 To cost of Sales 48,000 × 0.667 = 32,000.

$$To\ WIP\ A/c.\ 10,000 \times \frac{40}{100} \times 0.667 = 2,667$$

To Finished stock 8,000 × 0.667 = 5,333].

Q.13. From the following particulars, calculate the overheads allocable to Production departments : P & Q. There are also two service departments S₁ and S₂. S₁ renders service worth ₹ 6,000 to S₂ and the balance to P & Q as 3 : 2, S₂ renders to service to P & Q as 9 : 1.

	P	Q	S₁	S₂
Floor Space (Sq. ft.)	2,500	2,000	500	500
Assets (₹ in lakh)	5	2.5	1.5	0.5
H.P. of Machines	500	250	200	50
No. of workers	100	50	50	25
Light & Fan Points	50	30	20	20

Expenses & Charges:	₹		₹
Depreciation	95,000	Rent, Rates & Taxes	18,000
Insurance	7,600	Power	10,000
Canteen Expenses	5,400	Electricity	2,400

[Ans : Deptt. P (₹92,926) and Deptt. Q (₹45,474)]

Q.14. In an engineering factory, the following particulars have been extracted for the year ended 31-12-2001. Compute the departmental overhead rate for each of the production departments, assuming that overheads are recovered as a percentage of direct wages:

Particulars		Production Departments			Service Departments	
		A	B	C	X	Y
Direct Wages	(₹)	30,000	45,000	60,000	15,000	30,000
Direct Material	(₹)	15,000	30,000	30,000	22,000	22,500
Staff number		1,500	2,250	2,250	750	750
Electricity	(kwh.)	6,000	4,500	3,000	1,500	1,500
Assets value	(₹)	60,000	40,000	30,000	10,000	10,000
Light points		10	16	4	6	4
Area (Sq. metres)		150	250	50	50	50

The expenses for the period were:

	₹		₹
Power	1,100	Depreciation	30,000
Lighting	200	Repairs	6,000
Stores overhead	800	General overhead	12,000
Welfare to Staff	3,000	Rent and Taxes	550

Apportion the expenses of Service dept. Y according to direct wages and those of Service dept. X in the ratio of 5:3:2 to the Production departments.

[Ans : Deptt. A 169.99%, Deptt. B 101.8%, Deptt. C 77.24%]

Q.15. A Ltd. has three Production departments P_1, P_2 & P_3 and two Service departments S_1 and S_2. The following data are extracted from the records of the company for a particular given period:

	₹		₹
Rent and rates	25,000	Power	7,500
General lighting	3,000	Depreciation on machinery	50,000
Indirect wages	7,500	Sundries	50,000

Other Information:

	P_1	P_2	P_3	S_1	S_2
Direct wages (₹)	15,000	10,000	15,000	7,500	2,500
H.P. of machines used	60	30	50	10	–
Cost of machinery (₹)	3,00,000	4,00,000	5,00,000	25,000	25,000
Floor space (sq. ft.)	2,000	2,500	3,000	2,000	500
No. of light points	10	15	20	10	5
Production hours worked	6,226	4,028	4,066	–	–

Expenses of the Service departments S_1 and S_2 are apportioned as below :

	P_1	P_2	P_3	S_1	S_2
S_1	20%	30%	40%	–	10%
S_2	40%	20%	30%	10%	–

You are required to:

(a) Compute overhead rate per production hour of each production department.

(b) Determine the total cost of Product x which is processed for manufacture in department P_1 P_2 and P_3 for 4 hours, 5 hours and 3 hours respectively, given that its direct material cost is ₹ 250 and direct labour cost is ₹ 150.

[Ans. (a) ₹7.5 , 11.25 and 15 (b) ₹ 531.25]

Q.16. XYZ Ltd. has three Production departments P, Q and R and two Service departments X and Y. The following pertain to them:

Direct wages (₹)	P	Q	R	X	Y
Worked hours	3,000	2,000	3,000	1,500	195
Value of machine (₹)	3,070	4,475	2,419	–	–
HP of machines	60,000	80,000	1,00,000	5,000	5,000
Light points	60	30	50	10	–
Floor space (sq. ft.)	10	15	20	10	5
	2,000	2,500	3,000	2,000	500

The following figures are extracted

	₹		₹
Rent	5,000	Indirect wages	1,939
Lighting	600	Depreciation on machines	10,000
Power	1,500	Sundries	9,695

Find overhead recovery rate per hour for production departments, if X's expenses are distributed to P, Q, R and Y in the ratio of 2 : 3 : 4: 1 and Y's expenses are distributed in the ratio 4 : 2 : 3 : 1 to P, Q, R and X respectively. Use repeated distribution method

(Ans. ₹ 3, ₹ 2 and ₹ 5.03)

Q.17. The particulars relating to four machines are as follows:

Machine Numbers

		I	II	III	IV
Cost	(₹)	50,000	40,000	30,000	20,000
Area Occupied	(Sq. ft.)	500	450	300	250
Light points		10	8	6	4
No. of Workers		20	15	8	7
Direct Wages	(₹)	1,500	1,200	1,000	500
Horse Power to Machines		25	20	16	14
Consumable Stores	(₹)	100	80	75	50

The Expenses incurred were as follows :

	(₹)
Rent and Taxes	600
Lighting	140
Depreciation	2,800
Repair & Maintenance	700
Power	375
Indirect Wages	5040
Consumable Stores	305
Canteen Expenses	100
General Expenses	420

(a) Compute the machine hour rate for a month of 25 working days with 8 working hours on an average. (Ans. ₹ 18.575, 14.95, 11.855 and 7.02)

(b) Calculate the cost of production of one units of Product A, if the material cost is ₹ 10 Labour cost – ₹ 20 and if processed for 1 hour , 2 hours, 3 hours and 4 hours in Machines I, II, III and IV. (Ans. ₹ 142.12)

Q.18. A machine shop of a factory has 3 cost centers having distinct sets of machines. The following estimates are available for the year 2001.

	Total for the factory ₹	Centre I ₹	Centre II ₹	Centre III ₹
Direct Wages	1,60,000	50,000	50,000	60,000
Share of service expenses	5,000	1,000	1,500	2,500
Power	10,000			
Repairs and Maintenance	13,000			
Insurance	3,900			
Rent	3,000			
Lighting	1,800			

	14,400			
Indirect wages	20,000		75,000	1,50,000
Labour Welfare Expenses	3,25,000	1,00,000	240	360
Value of Machines		120	10	20
Floor Area (Sq. Feet)		10	6,000	10,000
Power of Motor (H.P.)		5,000	10	18
Machine hours		12		
No. of Workers				

Machine are depreciated at 10% p.a.

(a) Compute a suitable machine hour rate of overhead absorption for each of machine centre. (Ans. ₹ 6, 4.42 and 4.71)

(b) Job No. 201 passes through all the above three cost centers and the required in each centre is-

Centre I – 4 hours, Centre II-3 hours, Centre III –8 hours

What price should the company quote for Job No. 201 to yield a profit of 25% on cost if its direct materials and direct labour are estimated at ₹ 500 and ₹ 300 respectively and other expenses are 20% on works cost. (Ans. ₹ 1,412.41)

Q.19. The following expenses have been incurred in respect of a shop having 4 identical machines:

Rent and rates	₹ 6,000 p.a.
Power consumed by the shop @ 10 paise per unit	₹ 4,800 p.a.
Repairs	₹ 1,000 p.a.
Lighting for the shop	₹ 800 p.a.
Attendants two each getting	₹ 60 p.m.
Supervision salary	₹ 600 p.m.
Lubricants etc.	₹ 100 p.a.
Depreciation per machine (Variable Cost)	₹ 600 p.a.

Each machine consumes 10 units of power in an hour.

You are required to calculate the machine Hour rate. (Ans. ₹ 4.95)

Q.20. Compute machine hour rate from the information given below pertaining to a particular machine.

	(₹ p.a.)
Rent of the department (space occupied by the machine is one fifth of the deptt.)	780
Lighting (number of light points in the department is 12, two light points on the machine)	288
Insurance etc.	36
Cotton waste, oil etc.	60
Salary of foreman (one fourth of the forman's time is occupied by the machine and the remainder equally upon other two machines)	6,000

The cost of the machine is ₹ 9,200 and has estimated scrap value of ₹ 200.

It is assumed from past experience that:

(i) The machine will work for 1,800 hours per annum.

(ii) It will incur expenditure of ₹ 1,125 in its working life in respect of repairs and maintenance.

(iii) It consumes 5 units of power per hour at the cost of 6 paise per unit.

(iv) The working life of the machine will be 18,000 hours. (Ans. ₹ 1.86)

Q.21. The following information is made available form the costing records of a factory:

(i) The original cost of the machine

Estimated life

Residual value   ₹ 1,00,000

10 years

₹ 5,000

Factory operators for 48 hours per week-52 weeks in a year.

Allow 15% towards machine maintenance downtime.

5% may be allowed as setting up time.

(ii) Electricity used by the machine is 10 units per hour at a cost of 50 paise per unit.

(iii) Repairs and maintenance cost is ₹ 500 per month.

(iv) Two operators attend the machine during operation along with two other machines.

Their total indirect wages, including fringe benefits, amount to ₹ 5,000 per month.

(v) Other overheads attributable to the machine are ₹ 10,431 per year.

Using the above data, calculate machine hour rate. **(Ans. ₹ 27.95)**

Q.22. From the following information compute machine hour rate:

Cost of the machine ₹ 44,000.

Scrap value ₹ 4,000.

Rent for the workshop ₹ 25,000 per annum.

General lighting for the workshop ₹ 160 per month.

Power consumption 20 units per hour @ ₹ 20 for every 100 units.

Administrative expenses allocated to the machine ₹ 4,000 per annum.

Repairs and maintenance 75% of depreciation.

Workshop supervisor's salary ₹ 3,000 per month.

Estimated working time per year 50 weeks of 40 hours each.

Setting up time which is regarded as productive time 200 hours per year. No power is used.

Effective life of the machine 10 years. Depreciation is a variable cost.

The machine occupies $1/4^{th}$ area of the workshop. The supervisor is expected to devote $1/3^{rd}$ of his time in supervising the machine. **(Ans. ₹ 18.47)**

Q.23. The following information relates to the activities of a production department of a factory for a month:

	₹
	1,80,000
Direct Material Consumed	1,50,000
Direct wages	1,26,000
Factory overheads chargeable to the department	12,000 hours
Labour hours worked	10,000 hours
Machine hours worked	

The relevant data relating to one order carried out in the department during the period are as follows:

	(₹)
Material Consumed	30,000
Direct wages	24,750
Labour hours worked	1,650 hours
Machine hours worked	1,200 hours

Compute Factory overhead rates of recovery and the amount of overhead chargeable to the order by the following methods:

(i) Direct Material Cost percentage;

(ii) Direct Labour Cost percentage;

(iii) Labour Hour rate;

(iv) Machine Hour rate.

(Ans. (i) ₹ 21,000 (ii) ₹ 20,790 (iii) ₹ 17,325 (iv) ₹ 15,120

Q.24. Budgeted and actual data for the first half year of operations of S.V. Ltd. were as follows:

	₹		₹
Direct labour hours	68,000	Overhead : Fixed	37,400
Direct wages	42,500	Variable	64,600
Actual Data (January to June):			
Direct labour hours	65,000	Overhead : Fixed	38,700
Direct wages	45,500	Variable	65,800

The existing method of absorbing overhead is by a direct wages percentage rate. A proposal has been made to change the overhead absorption to a direct labour hour rate analysed into fixed and variable overhead.

You are required for the period January to June to calculate under the new proposal (i.e., using direct labour hour rates of absorption) :

(i) the budgeted direct labour hour rates of overhead absorption for fixed and variable overheads; (ii) the absorbed overhead; (iii) the over or under absorbed overheads.

Q.25. For the year 2012 - 2013 an organisation budgeted output of 50,000 units and overheads of ₹ 7,00,000. Actual output was equivalent to ₹ 60,000 units and actual overheads were ₹ 8,00,000. It was decided to absorb overheads on per unit of output basis. Of the total output 48,000 units were sold during the year. Unsold stock of finished output was 8,000 units and there was work-in-progress of 10,000 units, each unit approximately 40% complete. Calculate : (i) Overhead absorption rate, (ii) Extent of over or under absorption (iii) Supplementary rate, and (iv) Accounting entry for dealing over or under absorption.

Q.26. AT Ltd. an engineering company having 25 different types of automatic machines, furnishes the following data for 1994–95, in respect of machine 'B':

1. Cost of the Machine

Life 10 years

₹ 5,000

2. Overhead Expenses are

	₹
Factory Rent	50,000 p.a.
Heating and Lighting	40,000 p.a.

	CA R. K. MEHTA

Supervision

Reserve Equipment for Machine B — 1,50,000 p.a.

Area of the Factory — 5,000 p.a.

Area occupied by Machine 'B — 80,000 sq. ft.

Power cost 50 paise per hour while in operation. — 3,000 sq. ft.

3. Wages of operator is ₹ 24 p.r day of 8 hours including all fringe benefits. He attends to one machine when it is under set up and two machines while under operation.

4. Estimated production hours — 3,600 p.a.

Estimated set up time — 400 hours p.a.

Prepare a schedule of comprehensive machine hour rate and find the cost of the following jobs:

	Job 1102	Job 1308
Set up time (Hours)	80	40
Operation time (hours)	130	160

(Ans. Comprehensive Machine hours rate ₹ 7.84 (Set-up) and ₹ 6.84 (operating)

Q.27. The following information relates to the activities of a production department for a certain period in a factory:

	₹
Material used	72,000
Direct wages	60,000
Hours of machine operation	20,000
Direct Labour hours worked	24,000
Overheads chargeable to the department	48,000

On one order carried out in the department during the period, the relevant data were:

Materials used	₹ 4,000
Labour hours	1,650
Direct wages	₹ 3,300
Machine hours	1,200

Prepare a comparative statement of cost of this order by using the following three methods of recovery of overheads:

(i) Direct Labour-Hour Rate Method; (Ans. 10,600)

(ii) Direct Labour Cost Rate Method; and (Ans. 9,94)

(iii) Machine Hour Rate Method. (Ans. ₹ 10,180)

Q.28. Your company uses an integrated accounting system and applies overheads on the basis of "pre-determined" rates. The following are the figures form the Trial Balance as at 31-3-2005:

	₹
Manufacturing overheads	4,26,544 Dr.
Manufacturing overheads applied	3,65,904 Cr.
Work-in-progress	1,41,480 Dr.
Finished goods stock	2,30,732 Dr.
Cost of goods sold	8,40,588 Dr.

You are required to show the profit implications under the following two methods,

(i) Write off to profit and loss account.

(ii) Adjustment to cost of sales and inventories of WIP and finished goods.

Q.29. Calculate machine-hour rate for recovery of overheads for a machine from the following information :

Cost of machine is ₹ 25,00,000 and estimated salvage value is ₹ 1,00,000. Estimated working life of the machine is 10 years. Annual working hours are 3,000 in the factory. The machine requires 400 hours per annum for repairs and maintenance. Setting-up time of the machine is 156 hours per annum to be treated as productive time. Cost of repairs and maintenance for whole working life of the machine is ₹ 3,50,000. Power used 15 units per hour at a cost of ₹ 5 per unit. No power is consumed during maintenance and seting-up time. The cost of a chemical required for operating the machine is ₹ 9,880 per annum. Wages of an operator is ₹ 4,000 per month. The operator devoted one-third of his time to the machine. Annual insurance charges 2 per cent of the cost of machine.

Light charges for the department is ₹ 2,500 per month, haivng 48 points in all, out of which only 8 points are used at this machine. Other indirect expenses chargeable to the machine are ₹ 6,500 per month.

Ans. Productive Machine Hours = 2,600 and Machine Hour Rate = ₹ 237.38

Q.30. Calculate the comprehensive Machine-hour Rate of a machine from the following :
(i)   Cost of the machine ₹ 25 lakhs, having a scrap value of ₹ 1 lakh after 10 years.
(ii) The machine will be operated for three shifts of 7 hrs. each for 300 working days in a year of which 300 hrs. will be utilized for repairs and maintenance.
(iii) Wages payable : ₹ 8,000 p.m. for an operator and ₹ 3,000 p.m. for a helper for every shift, ₹ 16,000 p.m. to one supervisor per shift for the department accommodating four machines including the above machine.
(iv) Other details :

Power consumption :	25 uriis @ ₹ 4.80 per unit
Repairs and Maintenance:	₹ 30,000 per annum.
General lighting and heating:	₹ 4,000 p.m. for the whole department having four machines.
Insurance :	₹ 18,000 per machine per annum
Rent	₹ 3,000 p.m. for the department.

Ans. Comprehensive Machine Hour Rate = ₹ 261.50

Q.31. In a factory department, the cost of a machine is ₹ 11,500. It is expected that it will work for about 20,000 hours and its scrap value is estimated at ₹ 1,500. The rent of factory department is ₹ 400 per month and 25% of the area of the department is utilised for conducting the oepration of the machine. One foreman and one attendant are employed on a salary of ₹ 200 and ₹ 100 per month respectively, to work on two machines of similar type. The other expenses of the month are as under in the department :

Light charges for the factory department is ₹ 160 having 32 points in all, out of which 8 points are used for both these machines. Power used for this machine ₹ 160; indirect labour for both machines ₹ 100; and repair and renewal for this machine is ₹ 40.

You are require dto find out the machine hour rate for one month (four weeks) when it is expected to work for 40 hours a week.

Ans. Machine Hour Rate = ₹ 3.75

Solutions to Revisionary Problems

Answer to Q. No. 1 : Statement Showing Apportionment of Selling Overheads (₹)

Particulars	Basic of Apport.	Total	North	South	East	West
Salaries of sales Representatives	Number of salesmen (5:2:3:2)	56,00,000	23,33,334	9,33,333	14,00,000	9,33,333
Travelling allowances	Salesmen x Kms. (10:8:15:6)					
Advertisement cost	Given share (6.5:5:4)	1,95,000	50,000	40,000	75,000	30,000
Godown rent	Stock value (3:1:2:1)	5,00,000	1,50,000	1,25,000	1,25,000	1,00,000
Insurance on stocks	Stock value (3:1:2:1)	3,50,000	1,50,000	50,000	1,00,000	50,000
Commission on sales	Sales (10:5:6:4)	70,000	30,000	10,000	20,000	10,000
Carriage outward	Salesmen x Kms. (10:8:15:6)	25,00,000	10,00,000	5,00,000	6,00,000	4,00,000
		4,10,000	105.128	84.103	1,57,692	63,077
Total		96,25,000	38,18,462	17,42,436	24,77,692	15,86,410

Selling Overheads as % to sales = $\dfrac{\text{Apportioned overheads}}{\text{Zonal Sales}} \times 100$ 3.82%   3.48%   4.13%   3.97%

Answer to Q. No. 2 :

Primary Distribution Summary

Particulars	Basic of Distribution	Total ₹	Production Deptts. A	B	C	Service Deptts. P	Q
Factory Rent	Area sq. mts 20 :10:5:8 :5	48,000	20,000	10,000	5,000	8,000	5,000
Power	Horse Power × Hours 8 : 8 : 3 : 2 : 2	23,000	8,000	8,000	3,000	2,000	2,000
Depreciation	Value of Machine 40 : 30 : 10 : 15 : 5	1,00,000	40,000	30,000	10,000	15,000	5,000
Store Room Expenses	No. of Requisitions 5 : 3 : 10 : 8 : 4	30,000	5,000	3,000	10,000	8,000	4,000
Indirect Material	Direct Material 10 : 15 : 15 : 16 : 4	60,000	10,000	15,000	15,000	16,000	4,000
Canteen Subsidy	No. of workers 8 : 7 : 5 : 2 : 3	25,000	8,000	7,000	5,000	2,000	3,000
Indirect Labour	Direct Labour 20 : 10 : 10 : 3 : 2	90,000	40,000	20,000	20,000	6,000	4,000
Employer's Contribution to E.S.I	Direct Labour 20 : 10 : 10 : 3 : 2	50,000	22,222	11,111	11.111	3,334	2,222
Light	Light points 100 : 30 : 25 : 15 : 10	18,000	10,000	3,000	2,500	1,500	1,000
Factory Supervision	No. of Workers 8 : 7 : 5 : 2 : 3	75,000	24,000	21,000	15,000	6,000	9,000
Traceable overheads		2,05,000	50,000	80,000	30,000	20,000	25,000
Direct Materials		2,00,000				1,60,000	40,000
Direct Labour		50,000				30,000	20,000
		9,74,000	2,37,222	2,08,111	1,26,611	2,77,834	1,24,222

Secondary Distribution Summary

	A	B	C	P	Q
As per Primary Distribution	2,37,222	2,08,111	1,26,611	2,77,834	1,24,222
Expenses of Deptt. P re-distributed to Deptts. A, B, C and Q (5 : 3 : 7 : 5)	90,978	54,587	1,27,371	(3,63,914)	90,978
Expenses of Deptt. Q re-distributed to Deptts. A, B, C and P (1 : 2 : 3 : 4)	21,520	43,040	64,560	86,080	2,15,200
	3,49,720	3,05,738	3,18,542		

8.34

Assume, total overheads of

→ Deptt. P = ₹ x

↳ Deptt. Q = ₹ y

Hence $x = 2,77,834 + \frac{4}{10} y$

and $y = 1,24,222 + \frac{5}{20} x$

Now, $x = 2,77,834 + \frac{4}{10}\left(1,24,222 + \frac{5}{20} x\right)$

Solving, we get x = 3,63,914 and y = 2,15,200

Answer to Q. No. 3 :

Overheads	Basis of Apportionment	Production Departments Total ₹ 2,400	A ₹ 800	B ₹ 880	C ₹ 320	Service Departments X ₹ 300	Y ₹ 100
Power	K.W. hours 0 : 22 : 8 : 7.5: 2.5	4,200	1,200	1,200	900	600	300
Rent	Area 4 : 4 : 3 : 2 : 1	3,000	900	1,200	300	400	200
Canteen	No. of workers 9 : 12 : 3 : 4 : 2	3,000	900	1,200	300	400	200
Personnel Dept.	No. of workers 9 : 12 : 3 : 4 : 2	1,000	300	400	100	133	67
Time Office	No. of workers 9 : 12 : 3 : 4 : 2	2,400	600	720	480	360	240
Maintenance	Capital value 5 : 6 : 4 : 3 : 2	1,200	300	360	240	180	120
Fire Precaution	Value of assets 5 : 6 : 4 : 3 : 2	1,000	250	300	200	150	100
Insurance	Value of assets 5 : 6 : 4 : 3 : 2						
Depreciation	Value of assets	20,000	5,000	6,000	4,000	3,000	2,000
Total		38,200	10,250	12,260	6,840	5,523	3,327

Secondary Distribution (Repeated Distribution Method)

	Production Departments A ₹	B ₹	Service Departments C ₹	X ₹	Y ₹
As per Primary Distribution	10,250	12,260	6,840	5,523	3,327
Distt. of OHs of Deptt X 5 : 6 : 5 : - : 4	1,381	1,657	1,381	-5,523	1,105
Dist. of OHs of Deptt Y 4 : 2 : 3 : 1 : -	1,773	886	1,330	443	-4,432
Dist. of OHs of Deptt X 5 : 6 : 5 : - : 4	111	133	111	-443	88
Dist. pf OHs of Deptt Y 4 : 2 : 3 : 1 : -	35	18	26	9	-88
Dist. of OHs of Deptt X 5 : 6 : 5 : : 4	2	3	2	-9	2
Dist.of OHs of Deptt Y	1	1			-2
Overheads charged to Production Deptts.	13,553	14,958	9,690		

Answer to Q. No. 4 :

Overheads of Personnel Deptt. are apportioned in the ratio of number of employees and that of Stores Deptt. in the ratio of Direct Material cost as follows :

Service Department Department	Production Department A	B	C	P	Service Q
P	30%	40%	15%	-	15%
Q	40%	30%	25%	5%	-

Overheads Distribution – Repeated Distribution Method

Expenses	Production Departments			Service Departments	
	A	B	C	P	Q
	₹ 6,50,000	6,00,000	5,00,000	1,20,000	1,00,000
Apportionment of P's expenses 6 : 8 : 3 :- : 3	36,000	48,000	8,000	-1,20,000	18,000
Apportionment of Q's expenses 8 : 6 : 5 : 1 : -	47,200	35,400	29,500	5,900	-1,18,000
Apportionment of P's expenses 6 : 8 : 3 : - : 3	1,770	2,360	885	-5,900	885
Apportionment of Q's expenses 8 : 6 : 5 : 1 –	1,000 354	266	221	44	-885
Apportionment of P's expenses 6 : 8 : 3 : - : 3	13	17	7	-44	7
Apportionment of Q's expenses (Approx.) 8 : 6 : 5	3	2	2	–	-7
Total	7,35,340	6,86,045	5,48,615	–	–

Simultaneous Equation Method

Let X be the total overhead of P department :

$X = 1,20,000 + .05\ Y$ ....(i)

Substituting value of Y in equation no. (i)

$X = 1,20,000 + 0.05\ (1,00,000 + .15\ X)$

Or $.9925\ X = 1,25,000$

Let Y be the total overhead of Q department

$Y = 1,00,000 + .15\ X$ .... (ii)

Or $X = 1,20,000 + 5,000 + .0075\ X$

Or $X = \dfrac{1,25,000}{.9925} = .1,25,945$

Substituting value of X in equation no. (ii)

$Y = 1,00,000 + .15\ (1,25,945) = -1,00,000 + 18.892 = 1,18,892$

Apportionment of Overheads of Service Departments

	Production Departments			Service Departments	
	A ₹	B ₹	C ₹	P ₹	Q ₹
Departmental expenses (Given)	6,50,000	6,00,000	5,00,000	1,20,000	1,00,000
Apportionment of overheads of P Deptt. 6 :8 : 3 : - : 3	37,783	50,378	18,892	-1,25,945	18,982
Apportionment of overheads of Q Deptt. 8 : 6 : 5 : 1 : -	47,557	35,667	29,723	5,945	-1,18,892
	7,35,340	6,86,045	5,48,615	–	–

Answer to Q. No. 5: Computation of apportionment of Service Centres Overhead to Production Centres under :

(a) Continuous Distribution Method   ₹

A	B	C	X	Y
80,000	40,000	20,000	20,000	10,000
4,000	6,000	8,000	(20,000)	2,000
2,400	3,000	6,000	600	(12,000)
120	180	240	(600)	60
12	15	30	3	(60)
1	1	1	(3)	–

(b) Simultaneous equation Method

$x = 20,000 + 5\%\ y$ .... (1)

$y = 10,000 + 10\%\ x$ .... (2)

By substituting equation (2) in equation (1)

$x = 20,000 + 0.05\ (10,000 + 0.10x)$

$= 20,000 + 500 + 0.005x$

$$x - 0.005x = 20,500$$
$$0.995x = 20,500$$
$$x = 20,500/0.995 = 20,600$$
$$y = 10,000 + (0.10 \times 20,600) = 12,060$$

Distribution Overheads of Service Centres to Production Centres

(₹)

Particulars	Production Centres		
	A	B	C
As per Primary Distribution	80,000	40,000	20,000
Share of x (₹ 20,600 distributed in the ratio of 20%, 30% and 40%)	4,120	6,180	8,240
Share of y (₹ 12,060 distributed in the ratio of 20%, 25%, and 50%)	2,412	3,015	6,030
Distribution of residual amount	1	1	1
Total Overheads	86,533	49,196	34,271

Answer to Q. No. 6 : Determination of Total Cost of Product

(₹)

Direct Material				250.00
Direct Labour				150.00
Prime cost				400.00
Overheads	Deptt. A	(4 hrs. × ₹ 7.50)	30.00	
	Deptt. B	(5 hrs. × ₹ 11.25)	56.25	
	Deptt. C	(3 hrs. × ₹ 15.00)	45.00	131.25
Total Cost of Product				531.25

Statement showing computation of overhead rate of production departments using the repeated distribution method

₹

Particulars of Expenses	Basic of Apportionment	Total	Production Deptts.			Service Deptts.	
			A	B	C	X	X
Direct Wages	Direct	10,000	—	—	—	7,500	2,500
Rent and Rates	Floor Space	25,000	5,000	6,250	7,500	5,000	1,250
General Lighting	Lighting Points	3,000	500	750	1,000	500	250
Indirect Wages	Direct Wages	7,500	2,250	1,500	2,250	1,125	375
Power	H.P.	7,500	3,000	1,500	2,500	500	—
Depreciation	Value of Asset	50,000	12,000	16,000	20,000	1,000	1,000
Sundries	Direct Wages	50,000	15,000	10,000	15,000	7,500	2,500
	Total	1,53,000	37,750	36,000	48,250	23,125	7,875
Redistribution of Service Deptts.							
Overheads to Production Deptts.			4,625	6,937	9,250	(23,125)	2,313
X 2:3:4:-:1			4,075	2,038	3,056	1,019	(10,188)
Y : 4:2:3:1:-			204	306	407	(1,019)	102
			41	20	31	10	(102)
			2	3	5	(10)	—
Total Overheads of Production Departments (i)			46,697	45,304	60,999	—	—
Production hours (ii)			6,226	4,028	4,066		
Overhead rate of Production Departments (i)/(ii)			7.50	11.25	15.00		

Answer to Q. No. 7 : Determination of Total Cost of Product

Let the total cost of service deptt. S_1 be 'x'

Let the total cost of service deptt. S_2 be 'y'

$$x = ₹ 1,20,000 + 40\% \text{ of } y$$
$$y = ₹ 2,60,000 + 50\% \text{ of } x$$
$$x = 1,20,000 + 0.40\ y \ ..... (1)$$
$$y = 2,60,000 + 0.50\ x \ ..... (2)$$
$$x = 1,20,000 + 0.40\ (2,60,000 + 0.50x)$$
$$x = 1,20,000 + 1,04,000 + 0.20x$$
$$x - 0.20x = 2,24,000$$
$$0.80x = 2,24,000$$
$$x = 2,24,000/0.80 \qquad = 2,80,000$$
$$y = ₹ 2,60,000 + (0.50 \times ₹ 2,80,000) = ₹ 4,00,000$$

Secondary Distribution Summary

Particulars	Basis	Spinning	Weaving	S_1	S_2
As per Primary Distribution		2,00,000	3,00,000	1,20,000	2,60,000
Expenses of Deptt. S_1 to be absorbed by Spinning, Weaving and S_2	30 : 20 : 50	84,000	56,000	(2,80,000)	1,40,000
Expenses of Deptt. S_2 to be absorbed by Spinning, Weaving and S_1	25 : 35 : 40	1,00,000	1,40,000	1,60,000	(4,00,000)
		3,84,000	4,96,000		

Answer to Q. No. 8:

(a) Departmental Overheads Rates are calculated on the basis of direct labour hours as under :

$$\text{Direct Labour Hour Rates for Departments} = \frac{\text{Overheads of the Department}}{\text{Direct Labour Hours in the Department}}$$

For $X = \dfrac{1,24,000}{80,000} = ₹\ 1.55$; for $Y = \dfrac{2,30,000}{1,15,000} = ₹\ 2.00$; for $Z = \dfrac{5,46,000}{1,05,000} = ₹\ 5.20$.

Plant-wide overhead rate is based on total factory overheads and total direct labour hours for plant as a whole, i.e., for all the three departments together :

$$= \frac{\text{Aggregate Overheads}}{\text{Aggregate Direct Labour Hours}} = \frac{9,00,000}{3,00,000} = ₹\ 3$$

(b) Cost of "Krish" Line Using Departmental Rates

Cost of Departments	X	Y	Z	Total Cost of 20,000 units
	45,000	10,500	59,500	1,15,000
Prime Cost				1,81,500
Add . Factory Overheads	15,500			
10,000 × ₹ 1.55		10,000		
5,000 × ₹ 2			1,56,000	
30,000 × ₹ 5.20			2,15,500	2,96,500
Factory Cost	60,500	20,500		

Computation of Cost of "Krish" Line using Plant-wide Rate'

Prime Cost (Total)   ₹ 1,15,000

Add : Factory overheads :

X 10,000 hrs + Y 5,000 hrs + Z 30,000 hrs i.e., 45,000 hrs. X ₹ 3   1,35,000

Factory Cost   2,50,000

(c) In case departmental rates are used total absorbed factory overheads are ₹ 1,81,500. With plant-wide rate, absorbed over heads are ₹ 1,35,000. Thus, under absorption of overheads by ₹ 46,500 results due to the use of plant-wide rate.

Answer to Q. No. 9 :

Total hours in 13 weeks (13 x 48)	=	624 hours
(-) Unproductive time (Maintenance) (13 x 2)	= (-)	26 hours
Productive hours		598 hours

[Setup time = 13 x 2 = 26 hours, Working time = 572 hours]

(a) Computation of Machine Hour Rate

	Per Quarter			
Quarterly Fixed Charges				
Rent, rates and taxes	₹ 5,000			
Supervision 1,500 × 3 × 1/3	1,500			
Operator's wages	1,950			
Total fixed charges per quarter	8,450			
Effective hours (48 – 2) × 13 = 598				14.13
Fixed costs per hour 8,450 ÷ 598				
Quarterly Variable Costs :	₹	₹		
Power : 2 units / hr.x ₹3/unit x 572 hrs.	3,432	5.74		
Repairs and maintenance :	4,000	6.69		
Consumable stores :	7,500	12.54		
Depreciation : $\dfrac{12 \times 1,80,000}{100 \times 4}$	5,400	9.03		
Total Variable Cost	20,322			34.00
Total cost and Machine hour rate	28,772			48.13

Depreciation has been considered as variable cost.

(b) Quotation for Outside Parties

Variable cost per hour	34.00
Add : 20% profit	6.80
Minimum rate to be quoted for machine use	₹ 40.80 per hour

Note : No additional fixed cost will be incurred for utilising the idle capacity.

Answer to Q. No. 10 :

	₹
Factory overheads actually incurred	4,46,380
Less : Overheads recovered from production (2,93,104 hrs × ₹ 1.25)	3,66,380
Unabsorbed overheads	₹ 80,000

Reasons for under absorption :

(i) Under absorption due to increase in cost of indirect material and indirect labour = 50% of ₹ 80,000 = ₹ 40,000

(ii) Under absorption due to factory inefficiency = 50% of ₹ 80,000 = ₹ 40,000

Treatment of unabsorbed overheads in Cost Accounts :

(i) Under absorption of ₹ 40,000 due to increase in cost of indirect material and indirect labour should be charged to total output by using supplementary rate.

Supplementary rate = $\dfrac{\text{Unabsorbed Overheads}}{\text{Total Output}}$ = $\dfrac{₹\,40,000}{7,800\text{ units} + 200\text{ units}}$ = ₹ 5 per unit

Unabsorbed overheads should be charged to cost of sales, finished goods and work-in-progress in the ratio of number of units as below :

Cost of Sales A/c (7,000 units × ₹ 5)	Dr.	₹	35,000
Finished Goods Stock A/c (800 units × ₹ 5)	Dr.	₹	4,000
Work-in-Progress at the end A/c (200 units × ₹ 5) Dr.		₹	1,000
To Factory Overhead Control A/c		₹	40,000

Thus, debit to cost of sales by ₹ 35,000 will reduce profit for the period by ₹ 35,000. Increase in the value of closing stock of Finished Goods by ₹ 4,000 and of work-in-progress by ₹ 1,000, both being credit side items will increase profit by ₹ 5,000. The net effect, therefore, will be reduction in profit by ₹ 30,000.

(ii) Unabsorbed overheads of ₹ 40,000 due to factory inefficiency may be regarded as abnormal loss and therefore, should be debited to Costing Profit & Loss A/c.

Answer to Q. No. 11 : (a) Computation of Overheads Rate per Machine Hour :

Number of machines	15
Effective hours per machine (42 – 5) per week	37
Number of actual working weeks in the year	50
Effective hours per year for 15 machines 15 × 37 × 50	27,750
Estimated annual overheads	₹ 5,55,000
Overheads rate per machine hour 5,55,000 ÷ 27,750 =	₹ 20

(b) Computation of the Amount of Under/Over Absorption

(i) Overheads absorbed = (Hours operated × Overhead rate) = 2,400 × 20	₹	48,000
Overheads incurred	₹	49,000
Under absorption = ₹ 49,000 – ₹ 48,000	₹	1,000
(ii) Wages absorbed = (Hours operated × Labour rate) = 2,400 × 3	₹	7,200
Wages paid	₹	7,500
Wages under absorbed = ₹ 7,500 – ₹ 7,200	₹	300

Answer to Q. No. 12 :

(i) Overhead Absorption Rate = $\dfrac{\text{Budgeted Overheads}}{\text{Budgeted Output}}$ = $\dfrac{7,00,000}{50,000}$ = ₹ 14 per unit

Absorbed overheads = Actual output × Overhead Absorption Rate = 60,000 × 14 = ₹ 8,40,000

(ii) Over absorption = Absorbed Overheads – Actual Overheads = 8,40,000-8,00,000=₹ 40,000

(iii) Supplementary Rate (Negative) = $\dfrac{\text{Over Absorption}}{\text{Actual Output}}$ = $\dfrac{40,000}{60,000}$ = Re. $\dfrac{2}{3}$ = Re.0.667

(iv) Accounting Entry :

Overhead Control A/c	Dr.	40,000	
To Cost of Sales A/c (48,000 × 0.667)			32,000

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To Work-in-Progress A/c (10,000 × (40 ÷ 100) × 0.667)	2,667
To Finished Stock A/c (8,000 × 0.667)	5,333

(Adjustment for over absorption)

<u>Answer to Q. No. 13 :</u> (a) Statement showing overhead distribution of Production Departments

(₹)

Particulars	Basis of Apportionment	Total	Production depts.		Service Depts.	
			P	Q	S_1	S_2
			50,000	25,000	15,000	5,000
Depreciation	Assets	95,000	4,000	2,000	1,200	400
Insurance	Assets	7,600	2,400	1,200	1,200	600
Canteen expenses	No. of workers	5,400	8,182	6,546	1,636	1,636
Rent, Rats & Taxes	Floor Space	18,000	5,000	2,500	2,000	500
Power	H.P. of Machines	10,000	1,000	600	400	400
Electricity	Light, Fan Points	2,400				
Total		1,38,400	70,582	37,846	21,436	8,536
Secondary Distribution of Service Depts. Overhead to Production Depts. P & O: S_1 : ₹ 6,000 to S_2 and balance ₹ 15,346 to P & Q in the ratio 3 : 2			9,262	6,174	(21,436)	6,000
S_2 : 9 : 1			13,082	1,454	–	(14,536)
			92,926	45,474		

<u>Answer to Q. No. 14 :</u>   Overhead Distribution Statement

Particulars	Basis	Production Departments			Service Departments	
		A	B	C	X	Y
Direct Material		–	–	–	22,000	22,500
Direct Wages		–	–	–	15,000	30,000
Power	Kwh.	400	300	200	100	100
Lighting	No. of Points	50	80	20	30	20
Stores	Direct Materials	100	200	200	150	150
Welfare to Staff	No. of staff	600	900	900	300	300
Depreciation	Value of Asset	12,000	8,000	6,000	2,000	2,000
Repairs	Value of Asset	2,400	1,600	1,200	400	400
Rent & Taxes	Floor Area	150	250	50	50	50
General overhead	Direct Wages	2,000	3,000	4,000	1,000	2,000
Total		17,700	14,330	12,570	41,030	57,520
Service Dept., overhead: "X" Dept.	5:3:2 Wages Ratio	20,515	12,309	8,206	(-41,030)	
"Y" Dept.	30:45:60	12,782	19,173	25,565		(-57,520)
		50,997	45,812	46,341	–	–

Departmental overhead rate based on wages

$$= \frac{\text{Overhead}}{\text{Direct Wages}} \times 100$$

Dept A $= \dfrac{50,997}{30,000} \times 100 = 169.99\%$

$$Dept\ B = \frac{45,812}{45,000} \times 100 = 101.8\%$$

$$Dept\ C = \frac{46,341}{60,000} \times 100 = 77.24\%$$

Answer to Q. No. 15 : I. Primary Distribution

Statement showing overhead rate of Production Departments (using repeated distribution method) (₹)

Particulars	Basis of Apportionment	Total	Production Depts.			Service Depts.	
			P_1	P_2	P_3	S_1	S_2
Direct wages	Direct	10,000	–	–	–	7,500	2,500
Rent & Rates	Floor Space	25,000	5,000	6,250	7,500	5,000	1,250
General Lighting	Lighting Pont	3,000	500	750	1,000	500	250
Indirect Wages	Direct wages	7,500	2,250	1,500	2,250	1,125	375
Power	H.P.	7,500	3,000	1,500	2,500	500	–
Depreciation	Value of Assets	50,000	12,000	16,000	20,000	1,000	1,000
Sundries	Direct wages	50,000	15,000	10,000	15,000	7,500	2,500
Total		1,53,000	37,750	36,000	48,250	23,125	7,875

II. Secondary Distribution
(₹)

Particulars	Production Departments			Service Departments	
	P_1	P_2	P_3	S_1	S_2
As per primary distribution	37,750	36,000	48,250	23,125	7,875
Re-distribution of Service Dept. overhead to Production Departments	4,625	6,937	9,250	(23,125)	2,313
$S_1 - 2:3:4:-:1$	4,075	2,038	3,056	1,019	(10,188)
$S_2 - 4:2:3:1:-$	204	306	407	(1,019)	102
	41	20	31	10	(102)
	2	3	5	(10)	–
	46,697	45,304	60,999	–	–
Total overhead of Production (i)	6,226	4,028	4,066		
Production hours (ii)	7.50	11.25	15.00		
Overhead Rate of Production Depts. (i)/ (ii)					

Determination of Total Cost of Product
(₹)

Direct Material		250.00
Direct Labour		150.00
Prime Cost		400.00
Add : Overheads Dept. P_1 (4 hrs. × ₹ 7.5)	30.00	
Dept.P_2 (5 hrs. × ₹ 11.25)	56.25	
Dept. P_3 (3 hrs. × ₹ 15.00)	45.00	131.25
Total cost of product		531.25

Answer to Q. No. 16 : Overhead Distribution Statement

Particulars	Basis	Total	Production Depts.			Service Depts.	
			P	Q	R	X	Y
Direct wages	–	1,695	–	–	–	1,500	195
Rent	Floor Space	5,000	1,000	1,250	1,500	1,000	250
Lighting	Light Points	600	100	150	200	100	50
Power	Horse Power	1,500	600	30	500	100	–
Indirect wages	Direct Wages	1,939	600	40	600	300	39
Depreciation	Machine Value	10,000	2,400	3,200	4,000	200	200
Sundries	Wages	9,695	3,000	2,000	3,000	1,500	195
		30,429	7,700	7,300	9,800	4,700	929
Secondary Distribution							
Servic0e Dept. X	2:3:4:1		940	1,410	1,880	(-4,700)	4780
Service Dept. Y	4:2:3:1		560	280	420	139	(-1,399)
Service Dept. X	2:3:4:1		28	42	55	(139)	14
Service Dept. Y	4:2:3:1		6	3	5	–	(14)
Total overhead (i)			9,234	9,035	12,160	–	–
Working hours (ii)			3,070	4,475	2,419	–	–
OH. Hour Rate(i)/(ii)			₹ 3	₹ 2	₹ 5.03	–	–

Answer to Q. No. 17 : (a) Statement showing Machine Hour Rate for each machine

Particulars	Basis of Apportionment	Total	I	II	III	IV
Rant & Taxes	Area occupied	600	200	180	120	100
Lighting	Lighting Point	140	50	40	30	20
Depreciation	Cost of Machinery	2,800	1,000	800	600	400
Repairs & Maintenance	"	700	250	200	150	100
Power	H.P.	375	125	100	80	70
Indirect wages	Direct wages	5,040	1,800	1,440	1,200	600
Consumable Stores	Consumable Stores	305	100	80	75	50
Canteen expenses	No. of workers	100	40	30	16	14
General expenses	Direct wages	420	150	120	100	50
Total overhead	(i)	10480	3,715	2,990	2,371	1,404
Working Hours	(ii)		200	200	200	200
Machine hour Rate	(i)/(ii)		18.575	14.95	11.855	7.02

(b) Cost of Production for one unit of Production

Direct Material		10.00
Direct Labour		20.00
Prime Cost		30.00
Add: Overheads		
Machine I	₹ 18.575 x 1hr.	18.575
Machine II	₹ 14.95 x 2 hrs.	29.90
Machine III	₹ 11.855 x 3 hrs.	35.565
Machine IV	₹ 7.02 x 4 hrs.	28.08
Total Cost of Production		112.12
		142.12

Answer to Q. No. 18 : (i) Statement showing computation of Machine Hour rate for each Centre
(₹)

Particulars	Basis of overhead Apportionment	Total	Production Centre		
			I	II	III
Share of Service exp.	Actual				
Power	H.P.	5,000	1,000	1,500	2,500
Repair & Maintenance	Value of Machinery	10,000	2,500	2,500	5,000
Insurance	Value of Machinery	13,000	4,000	3,000	6,000
Rent	Floor Area	3,900	1,200	900	1,800
Lighting	Floor Area	3,000	500	1,000	1,500
Indirect Wages	Direct wages	1,800	300	600	900
Labour Welfare Exp.	No. of Workers	14,400	4,500	4,500	5,400
Depreciation	10% of value of Machinery	20,000	6,000	5,000	9,000
		32,500	10,000	7,500	15,000
Total overhead	(i)	1,03,600	30,000	26,500	47,100
Machine Hours	(ii)		5,000	6,000	10,000
Machine Hour Rate	(i) / (ii)		6.00	4.42	4.71

(ii) Quotation Price for Job No.201

	(₹)
Direct Material	500.00
Direct Wages	300.00
Prime Cost	800.00
Production Overhead	
Centre I (₹ 6 × 4 hrs.) 24.00	
Centre II (₹ 4.42 × 3 hrs.) 13.26	
Centre III (₹ 4.71 × 8 hrs.) 37.68	74.94
Works Cost	874.94
Other Expenses (20% of Works Cost)	174.99
Total Cost	1,049.93
Profit (1/4 of 1,049.93)	262.48
Total	1,312.41

Answer to Q. No. 19 : Working Notes:
Computation of Machine hours used per annum:
Total power consumed = ₹ 4,800 p.a.
Power consumption rate per unit = ₹ 0.10 = 48,000 units
No. of units produced by the shop = $\frac{₹ 4,800}{₹ 0.10}$ = 12,000 units

Hence, for one machine $\frac{= 48,000 \text{ units}}{4 \text{ machines}}$

Each machine consume 10 units of power per hour, as such,

For 10 units – 1 hour
For 12,000 units – ?
$\frac{12,000 \text{ units} \times 1 \text{ hour}}{10 \text{ units}}$ = 1,200 hours

Thus each machine runs for 1200 hours per annum.

Computation of Machine hour Rate.

Particulars		Per annum	Per hour (₹)
Standing Charges			
Rent & Rates	(Rs,6,000 / 4 machines)	1,500	
Lighting	(₹ 800/4 machines)	200	
Attendants	(₹ 60 × 2 × 12 months) / 4 machines	360	
Supervisors Salary	(₹ 600 × 12 months) / 4 machines	1,800	
Total standing charges		3,860	
Standing charges per hour	(₹ 3,860 / 1200 hrs.)		3.22
Machines expenses			
Depreciation	(₹ 600/1200 hrs.)		0.50
Repairs	(₹ 1,000/4 machines)/ 1200 hrs.		0.21
Power	(₹ 4,800/4 machines) /1200 hrs.		1.00
Lubricants	(₹ 100/4 machines) 1200 hrs.		0.02
Machine hour rate			4.95

Answer to Q. No. 20:

Computation of Machine hour rate

Particulars		Per annum ₹	Per hour ₹
Standing charges			
Rent of the department	$\left(780 \times \dfrac{1}{5}\right)$	156	
Lighting	$\left(280 \times \dfrac{2}{12}\right)$	48	
Insurance etc.		36	
Cotton waste, oil etc.		60	
Foreman Salary	$\left(6,000 \times \dfrac{1}{4}\right)$	1,500	
	For 1,800 Hrs.	1,800	1.00
Variable expenses			
Depreciation = $\dfrac{\text{Cost} - \text{Scrap}}{\text{Working life of a machine}}$			
= $\dfrac{9,200-200}{18,000}$			0.50
Repairs and maintenance = $\dfrac{1,125}{18,000}$			0.06
Power (5 units × 0.06)			0.30
Machine hour rate			1.86

Answer to Q. No. 21: Computation of Machine Hour Rate

		(₹)
Fixed expenses		
Indirect wages of operators		20,000
Overheads		10,431
Depreciation $\dfrac{(1,00,000-5,000)}{10}$		9,500
Fixed expenses per hour (39,841 ÷ 1997)	Total	39,841
		19.95

Variable expenses	
Repairs and maintenance	3.00
Electricity (10 units @ 50 paise)	5.00
Machine hour rate	27.95

Calculation of productive hours

	(Hours)
Hours per year (48 × 52)	2,496
Less:15% maintenance time	374
Less: 5% for setting up time	125
Effective time	1,997

Answer to Q. No. 22 : Computation of Machine Hour Rate

Particulars	Per annum (₹)	Per hour (₹)
Standing Charges		
(i) Rent for workshop (25,000 ÷ 4)	6,250	
(ii) General lighting for the workshop (160 × 12/4)	480	
(iii) Administrative expenses	4,000	
(iv) Workshop supervisor's salary (3,000 × 12/3)	12,000	
Total standing charges	22,730	
Standing Charges per hour		11.37
Machine expenses		
(i) Depreciation $\dfrac{(44,000-4,000)}{10 \times 2,000}$		2.00
(ii) Repairs & Maintenance (75% of Depreciation)		1.50
(iii) Power* $\dfrac{(20 \times 20 \times 1800)}{100 \times 2,000}$		3.60
Machine Hour Rate		18.47

*Presumed that the machine does not take the current during set-up time.

Answer to Q. No. 23: Computation of factory overhead chargeable to the order

(i) Direct Material cost percentage

$$= \frac{\text{Amount of Factory Overheads}}{\text{Direct Material cost}} \times 100$$

$$= \frac{1,26,000}{1,80,000} \times 100 = 70\%$$

Amount of Overheads chargeable to the order

= 70% of ₹ 30,000 = ₹ 21,000

(ii) Direct Labour cost percentage

$$= \frac{\text{Amount of Factory Overheads}}{\text{Direct Labour Cost}} \times 100$$

$$= \frac{1,26,000}{1,50,000} \times 100 \qquad = 84\%$$

Amount of Overheads chargeable to the order

= 84% of ₹ 24,750 = ₹ 20,790

(iii) Labour Hour Rate

$$= \frac{\text{Amount of Factory Overheads}}{\text{No. of Labour Hours}}$$

$$= \frac{1,26,000}{12,000} = ₹ 10.50 \text{ per hour}$$

Amount of Overheads chargeable to the order = 1650 Labour hours × ₹ 10.50 = ₹ 17,325

(iv) Machine Hour Rate

$$= \frac{\text{Amount of Factory Overheads}}{\text{No. of Machine Hours}}$$

$$= \frac{1,26,000}{10,000} = ₹ 12.60 \text{ per hour}$$

Amount of Overheads chargeable to the order = 1200 Machine hours × ₹ 12.60 = ₹ 15,120

Answer to Q. No. 24:

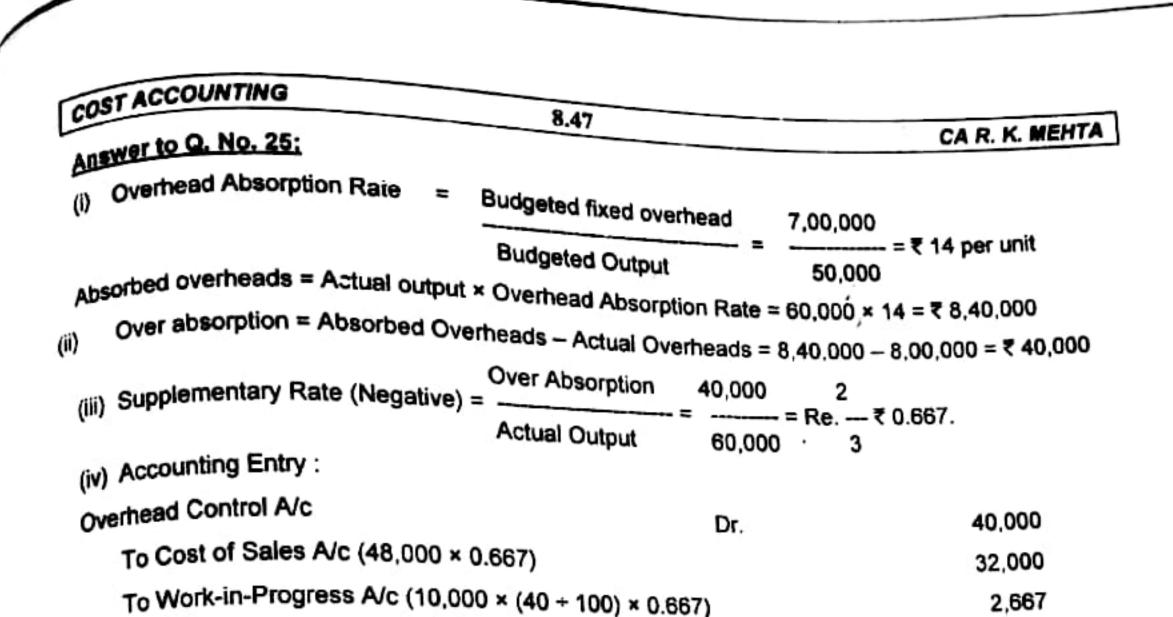|		
Budgeted fixed overhead absorption rate	=	$\frac{\text{Budgeted fixed overhead}}{\text{Budgeted direct labour hours}}$
	=	$\frac{₹ 37,400}{68,000 \text{ hours}}$ = Re.0.55 per labour hour
Budgeted variable overhead absorption rate	=	$\frac{₹ 64,600}{68,000 \text{ hours}}$ = Re.0.95 per labour hour
Absorbed fixed overheads	=	Actual direct labour hours × Fixed overhead rate = 65,000 × 0.55 = ₹ 37,50
Unabsorbed fixed overheads =		Actual fixed overheads − Absorbed fixed overheads = ₹ 38,700- ₹ 35,750 = ₹ 2,950 (under absorbed)
Absorbed variable overheads	=	Actual direct labour hours × Variable overhead rate = 65,000 × 0.95 = ₹ 61,750
Unabsorbed variable overheads	=	Actual variable overhead − Absorbed variable overhead = ₹ 65,800 − ₹ 61,70
	=	₹ 4,050 (under absorbed)
Total under absorption	=	₹ 2,950 + ₹ 4,050 = ₹ 7,000 (under absorbed).

Answer to Q. No. 27:

(i) *Direct Labour-Hour Rate Method:*

Direct Labour Hour Rate

$$= \frac{\text{Overheads chargeable to the department}}{\text{Labour hours worked}}$$

$$= \frac{48,000}{24,000} = ₹2$$

(ii) *Direct Labour Cost Rate Method:*

Percentage of Direct Labour Cost

$$= \frac{\text{Overheads for the department}}{\text{Direct wages}} \times 100$$

$$= \frac{48,000}{60,000} \times 100 = 80\%$$

(iii) *Machine-Hour Rate Method:*

Machine Hour Rate

$$= \frac{\text{Overheads for the department}}{\text{Hours of machine operation}}$$

$$= \frac{48,000}{20,000} = ₹2.40.$$

COMPARATIVE STATEMENT OF COST OF ORDER

Particulars	Direct Labour Hour Rate (i) ₹	Direct Labour Cost Rate (ii) ₹	Machine Hour Rate (iii) ₹
Materials used	4,000	4,000	4,000
Direct Wages	3,300	3,300	3,300
Prime Cost	7,300	7,300	7,300
Factory Overheads:			
(i) @ ₹2 per hr. for 1,650 labour hrs.	3,300		
(ii) @ 80% of ₹3,300 Direct labour cost		2,640	
(iii) @ ₹2.40 for 1,200 Machine hours			2,880
Works Cost	10,600	9,940	10,180

Answer to Q. No. 28:

	₹
Actual overheads	4,26,544
Less: Overhead recovered	3,65,904
Overhead under-absorbed	60,604

(i) **Write off to profit and loss account :**

Accounting treatment :

Profit & Loss A/c.	Dr. 60,640	
To Overheads A/c.		60,640

The profit will reduce by ₹60,640.

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(ii) Adjustment to cost of sales and inventories

Cost of Sales A/c.	
Finsihed Goods Stock A/c.	Dr. 42,029
Work-in-Progress Stock A/c.	Dr. 11,537
To Overheads A/c.	Dr. 7,074
	60,640

$$\text{Supplementary Rate} = \left(\frac{60,640}{8,40,588 + 2,30,732 + 1,41,480}\right)$$

= 0.05 per rupee

Profit Implication

Adjustment in	Adjusted Amount	Profit Impact	
1. Cost of sales	8,40,588 × 0.05 = 42,029	Decrease by	₹ 42,029
2. Finished Goods	2,30,732 × 0.05 = 11,537	Increase by	₹ 11,537
3. WIP Stock	1,41,480 × 0.05 = 7,074	Increase by	₹ 7,074
		Decrease by	₹ 23,418

Ans. to Q.29.   **Productive Machine Hours**

Total hours in a year	=	3,000 hrs.
(-) **Un-productive time**		
Repairs & Maintenance	=	400 hrs.
Productive Time	=	2,600 hrs.

Productive Time is aggregate of -		
(1) Set-up time	=	156 hrs.
(2) Balance Working Time	=	2,444 hrs.
Total	=	2,600 hrs.

Computation of Machine Hour Rate

Particulars	Total	Per Machine Hr.
(A) **Standing Charges**		
1) Depreciation $\left(\dfrac{25,00,000 - 1,00,000}{10\,years}\right)$	2,40,000	
2) Insurance (2% of 25,00,000)	50,000	
3) Other Indirect Charges (6,500 × 12)	78,000	
4) Wages (4,000 × 12 × 1/3)	16,000	3,89,000/2,600
5) Lighting (2,500 × 12 × 8/48)	5,000	= 149.62
Total Standing Charges	3,89,000	
(B) **Machine Running Expenses**		13.46
1. Repairs (3,50,000/10)	35,000	3.80
2. Chemical	9,880	70.50
3. Power Cost	1,83,300	
(15 units/hr. x ₹ 5/unit) x 2,444 hrs.		237.38
Machine Hour Rate		

Ans. to Q. 30.

Total hours in a year		6,300 hrs.
(300 days x 7 hrs./day x 3 shifts)		
(-) Repairs & Maintenance	(-)	300 hrs.
Productive Machine Hours		6,000 hrs.

Computation of Machine Hour Rate

Particulars	Total	Per Machine Hr.
Standing Charges		
Repairs & Maintenance	30,000	
General Lighting (4,000 x 12/4)	12,000	
Insurance	18,000	
Rent (3,000 x 12/4)	9,000	
Depreciation $\left(\dfrac{25,00,000-1,00,000}{10}\right)$	2,40,000	
Wages to Helper (3,000 x 12 x 3)	1,08,000	
Wages to Supervisor $\left(\dfrac{16,000 \times 12 \times 3}{4}\right)$	1,44,000	
Total Standing Charges	5,61,000	5,61,000/6,000 = 93.50

Machine Running Expenses

1. Power 25 units/hr. x ₹ 4.8/unit		120.00
Simple Machine Hour Rate		213.50
(+) Direct Wages (Operator) per Machine Hour		48.00
(8,000 x 12 x 3/6,000 hrs.)		
Comprehensive Machine Hr. Rate		261.50

Ans. to Q. 31.

Total Machine Hours   =   40 hrs./week x 4 weeks
                       =   160 hrs.

Computation of Machine Hour Rate

Particulars	Total	Per Machine Hour
Standing Charges		
1. Rent (₹ 400 x 25/100)	100	
2. Lighting ($₹ 160 \times \dfrac{8}{32} \times \dfrac{1}{2}$)	20	
3. Indirect Labour ($₹ 100 \times \dfrac{1}{2}$)	50	
4. Salary to Foreman ($₹ 200 \times \dfrac{1}{2}$)	100	
5. Salary to Attendant ($₹ 100 \times \dfrac{1}{2}$)	50	320/160
Total Standing Charges	320	= ₹ 2
Machine Running Expenses		
1. Repairs and Renewals	40	0.25
2. Power	160	1.00
3. Depreciation $\left(\dfrac{11,500-1,500}{20,000 \text{ hrs.}} \times 160 \text{ hrs.}\right)$	80	0.50
Machine Hour Rate		3.75

STANDARD COSTING

Q.1. A company budgeted to produce 100 units of output using 1,000 kgs. of input. Actual production is 105 units by using 1.200 kgs. of input. Compute (1) Standard Quantity for Actual Output; and (2) Expected Output in Actual Input. (3) Input loss. (4) Output loss.

Q.2. As per budget, in order to produce 20 chairs, 300 cubic feet of timber is to be used which is budgeted to be purchased at ₹ 100 per cubic feet. Actually 16 chairs are produced using 250 cubic feet of timber purchased at ₹ 94 per cubic feet. Compute Direct Material Cost Variance.

Q.3.

	Actual	Standard
Price per kg.	₹ 14	₹ 15
Quantity	500 kgs.	600 kgs.

Compute Direct Material Cost Variance.

Q.4. In Q.3, if standard (budgeted) output is 100 units and actual output is 110 units, calculate D.M.C.V.

Q.5. Compute (1) D.M.C.V.; (2) D.M.P.V.; (3) D.M.U.V. from the following :

Standard output	100 units
Standard Material per unit	3 kgs.
Standard Price per kg.	₹ 2
Actual Output	80 units
Actual Price per kg.	₹ 2.5
Actual Material used	250 kgs.

Q.6. From the following particulars, compute : (a) Material cost variance; (b) Material price variance; and (c) Material usage variance :

Quantity of materials purchased	3,000 units
Value of materials purchased	₹ 9,000
Standard quantity of materials required per ton of output	30 units
Standard Rate of materials	₹ 2.50 per unit
Opening Stock of materials	Nil
Closing Stock of materials	500 units
Output during the period	80 tons

Q.7. Compute (a) Material Cost Variance; (b) Material Price Variance; (c) Material Usage variance, from the following data :

Standard :

Material for 70 units of finished products	100 kgs.
Price of material	₹ 1 per kg.

Actual :

Output	2,10,000 units
Material used	2,80,000 kgs.
Cost of material	₹ 2,52,000

Q.8. For making 10 units of a product, the standard material requirement is :

Material	Qty. (kgs.)	Rate per kg. (₹)
A	8	6
B	4	4

During December, 2012, 1,000 units of actual output was produced. The actual composition of material is as under :

Material	Qty. (units) *kg*	Rate per units (₹) *kg*
A	750	7
B	500	5

Compute (1) D.M.C.V.; (2) D.M.P.V.; (3) D.M.U.V.

Q.9. The following information is given to you :

Budgeted price	:	Chemical 'A' ₹ 2 per kg.
		Chemical 'B' ₹ 10 per kg.
Budgeted Mix	:	'A' 75% and 'B' 25%
Budgeted Yield	:	90%
Actual used	:	Chemical 'A' 2,200 kgs. for ₹ 4,620
		Chemical 'B' 800 kgs. for ₹ 7,800
Output	:	2,850 kgs.

Calculate DMCV, DMPV and DMUV.

Q.10. Compute Revised Standard Quantity :

Material	Standard	Actual	Standard Price
A	60 units	90 units	₹ 5
B	40 units	40 units	₹ 6

Also calculate Material Mix Variance

Q.11. A company budgets to use 60 kgs. of X and 40 kgs. of Y. The standard loss of production is 30%. The standard price of X is ₹ 5 per kg. and of Y is ₹ 10 per kg.

Actual Mix -   X – 80 kgs. @ ₹ 4.5 per kg.
           Y – 70 kgs. @ ₹ 8 per kg.

Actual Yield 115 kgs.
Calculate all Material Variances.

Q.12. The standard input to produce one unit of product is as follows :

Material A	60 kg	@ ₹ 15 per kg.	=	₹ 900
Material B	80 kg	@ ₹ 20 per kg.	=	₹ 1,600
Material C	100 kg	@ ₹ 25 per kg.	=	₹ 2,500
	240 kg.			5,000

During the month of April, 10 units were actually produced and consumption was as follows :

Material A	640 kg.	@ ₹ 17.50 per kg.	=	₹ 11,200
Material B	950 kg.	@ ₹ 18.00 per kg.	=	₹ 17,100
Material C	870 kg.	@ ₹ 27.50 per kg.	=	₹ 23,925
	2,460 kg.			52,225

Calculate :   (a) Material Cost Variance
       (c) Material Usage Variance
       (e) Material Yield Variance.

       (b) Material Price variance
       (d) Material Mix Variance.

Q.13. The standard specification for a batch of 500 units of output of a factory is as under :

Material	Input kgs.	Std. Price/kg.
A	250	4.00
B	200	3.00
C	100	2.00
D	50	1.00
Total	600	

In October, the factory obtained a production of 9,750 units of output for which 20 batches consisting of standard input of material were issued to the shop floor in the following ratio in the actual prices indicated against each :

Material	Ratio of Material issued %	Actual price Per kg.
A	60	5.00
B	20	2.50
C	10	2.25
D	10	0.75

Calculate all material variances.

Q.14. A company manufactured a product by mixing three raw materials. In a batch, for output of 100 units, 125 kgs. of input is used. In July, 2013, 60 batches of 125 kgs. each were processed to produce an output of 5,600 units. The following are the records for July, 2013.

Material	BUDGETED Mix %	Price/Kg. ₹	ACTUAL Mix %	Price/Kg. ₹	Raw Material Purchased (Kgs.)
A	50	20	60	21	5,000
B	30	10	20	8	2,000
C	20	5	20	6	1,200

Compute all Material Variances. Also calculate Material Price Variance at the time of purchase of raw material.

Q.15. A company produced an article by blending two basic raw materials. The following standards have been set up for raw material :

Material	Standard Mix	Standard Price per kg.
A	40%	₹ 4
B	60%	₹ 3

The standard loss in processing is 15%. During September, 2012, the company produced Actual output 1,700 units of finished output. The position of stock and purchases for the month of September, 2012 is as under :

Material	Stock on 01:09:2012 Kg.	Stock on 30:09:2012 Kg.	Purchase during September, 2012 Kg.	Cost ₹
A	35	5	800	3,400
B	40	50	1,200	3,000

Calculate all material variances assuming FIFO method of issue of materials.

Q.16. Calculate material price variance at the time of purchase and material usage variance at the time of consumption from the following :

	X		Y	
	Kgs.	₹	Kgs.	₹
Raw Material Purchased	2,000	4,000	5,000	6,250
Raw Material Issued to Factory	2,150	—	3,950	—
Opening Stock at Factory	300	—	1,000	—
Closing Stock at Factory	200	—	1,250	—

Standard Price ₹ 1.90 per kg. for 'X' and ₹ 1.30 per kg. for 'Y'.

Standard Usage of Input per unit of Output :

	Material 'X'	Material 'Y'
Product A	1 kg.	1 kg.
Product B	0.5 kg.	1 kg.

Output during the period :
  Product A – 1,130 units
  Product B – 2,550 units.

Q.17 A company makes plastic tiles of standard size $6"\times6"\times\frac{1}{8}"$. Compute material cost variances on the basis of following information:-
A standard mix containing below mentioned input is expected to produce 20,000 square feet of tiles $\frac{1}{8}"$ thickness.

Material	Quantity (kgs.)	Price per kg.
A	600	₹ 9
B	400	₹ 6.50
C	500	₹ 4

During a particular month 8 mixes were processed and actual material consumed were:

Material	Quantity (kgs.)	Price per kg.
A	5,000	₹ 8.50
B	2,900	₹ 6
C	4,400	₹ 4.50

The output actually obtained was 6,20,000 tiles.

Q.18. Compute (1) D.L.C.V.; (2) D.L.R.V.; (3) D.L.E.V. from the following :

Standard	Labour Rate	:	50 paise per hour
	Hours per unit	:	10
Actual	Unit produced	:	500
	Hours worked	:	6,000
	Actual Labour cost	:	₹ 2,400

Q.19. Compute all Labour Cost Variances :

Standard	wages :		
	Grade X	:	90 Labourers @ ₹ 2 per hour
	Grade Y	:	60 Labourers @ ₹ 3 per hour
Actual :			
	Grade X	:	80 Labourers @ ₹ 2.5 per hour
	Grade Y	:	70 Labourers @ ₹ 2 per hour

Budgeted hours per labourer   1,000
Actual hours per labourer   900
Budgeted production (gross)   5,000 units
Standard Loss   20%
Actual Loss   900 units.

Q.20.

Worker	STANDARD		ACTUALS	
	No. of Workers	Hourly wages Rate per labourer	No. of Workers	Hourly wages Rate per Labourers
Skilled	75			
Semi-skilled	45	60	70	70
Un-skilled	60	40	30	50
Completion of Job - Budgeted		30	80	20
- Actual				

Completion of Job - Budgeted - 30 hours
Actual - 32 hours

Compute all labour variances.

Q.21. Compute (1) D.L.C.V.; (2) D.L.R.V.; (3) D.L.E.V.; (4) I.T.V. from the following :

Standard	Time	:	15 hours per unit
	Cost	:	₹ 3 per hour
Actual	Production	:	500 units
	Hours	:	8,000 (which includes 200 idle hours)
	Labour cost	:	₹ 24,800

Q.22. A gang of workers usually consists of 10 men, 5 women and 5 boys. They are paid at standard hourly rate of ₹ 1.25, ₹ 0.80 and ₹ 0.70 respectively. In the normally working week of 40 hours the gang is expected to produce 1,000 units of output.

In certain week, the gang consisted of 13 men, 4 women and 3 boys. Actual wages were paid at ₹ 1.20, ₹ 0.80 and ₹ 0.65 respectively. Two hours were lost due to idle time and 960 units were produced. Calculate various labour variances.

Q.23. The standard output of 'X' is 25 units per hour in a manufacturing department of a company employing 100 workers. The Standard wage rate per labour hour is ₹ 6.
In a 42 hour week, the department produced 1,040 units of 'X' despite 5% of the time paid was lost. The hourly rate actually paid were ₹ 6.20, ₹ 6 and ₹ 5.70 respectively to 10, 30 and 60 workers. Compute relevant variances.

Q.24. From the particulars given below, compute : Material Price Variance; Material Usage Variance, Labour Rate Variance; Idle Time Variance and Labour Efficiency Variance.
One tonne of materials input yields a standard output of 1,00,000 units. The standard price of material is ₹ 20 per kg. Number of employees engaged is 200. The standard wage rate per employee per hour is ₹ 6. The standard hourly output per employee is 100 units. The actual quantity of material used is 10 tonnes and the actual price paid is ₹ 21 per kg. Actual output obtained is 9,00,000 units. Actual number of hours are 50 and actual rate of wages paid is ₹ 6.50 per hour. Idle time paid for and included in above time is ½ hour.

Q.25. Actual variable overheads ₹ 10,000 Budgets variable overheads ₹ 12,000 Budgeted roduction 500 units. Actual production 460 units Actual hours 200 Standard time for one unit 30 minutes. Compute all variable overhead variances.

Q.26.

	Budget	Actual
Fixed Overheads (₹)	5,000	6,000
Hours	2,000	2,500
Production (units)	1,000	1,100

Compute all fixed overhead variances.

Q.27. Budgeted overhead are ₹ 2,25,000 budgeted overhead rate ₹ 5 per hour. Actual hours worked are 52,000, whereas 51,000 hours should have been spent. Actual overhead rate ₹ 4.9 per hour. Compute overhead variances.

Q.28. Given (a) Overhead Cost Variances ₹ 1,400 (A); (b) Overhead Volume Variances ₹ 1,000 (A); Budgeted hours 1,000; (c) Budgeted Overheads ₹ 6,000; (d) Actual Overhead Rate ₹ 8 per hour.

Required :
1. Overhead Budget Variances
2. Actual Overhead incurred
3. Actual hours
4. Capacity variance
5. Efficiency variance
6. Standard hours for actual output.

Q.29.

	Budgeted	Actual
Fixed Overheads (₹)	10,000	12,000
Output (units)	2,000	2,100
Standard hours per unit	10	—
Actual hours	--	22,000

Compute :
1. FO Cost Variances
2. Expenditure Variances
3. Volume Variances
4. Capacity Variances
5. Efficiency Variances.

Q.30. Vinak Ltd. has furnished you the following information for the month of August, 2012 :

	Budgeted	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed Overhead	₹ 45,000	50,000
Variable Overhead	₹ 60,000	68,000
Working days	25	26

Calculate variable and fixed overhead variances.

Q.31. The following information is available from the cost records of Company for February, 2012 :

	₹
Material purchased : 20,000 pieces	88,000
Material consumed : 19,000 pieces	
Actual wages paid for 4,950 hours	24,750
Factory Overhead incurred	44,000
Factory Overhead Budgeted	40,000
Units produced 1,800	

Standard Rates and prices are :
Direct Material Rates ₹ 4 per piece
Standard Input 10 pieces per unit
Direct Labour Rates ₹ 4 per hour
Standard requirement 2.5 hours per unit
Overhead ₹ 6 per labour hour.

Required : (a) Show the Standard Cost Card; (b) Compute all Material, Labour and Overhead Variances for February, 2012.

Q.32. The details regarding a food product manufactured by ABC Company for a particular period are as follows :

Standard Cost (for one unit)

Direct Materials	10 kgs. at ₹ 1.50	Rs. 15
Direct Wages	5 hours at ₹ 8.00	₹ 40
Fixed Overheads	5 hours at ₹ 10.00	₹ 50
Total Standard Cost		₹ 105

Actual Cost – Direct Materials ₹ 6,435, and Direct Wages ₹ 16,324.

Analysis of Variances indicated the following :

Direct Materials	Price ₹ 585 (Adverse)	Usage ₹ 375 (Favourable)
Direct Wages	Rate ₹ 636 (Favourable)	Efficiency ₹ 360 (Adverse)
Fixed Overheads	Expenditure ₹ 400 (Favourable)	Volume ₹ 750 (Favourable)

Calculate the following items –

1. Actual Output Units	7. Labour Hours Allowed
2. Actual Price of Material per kg.	8. Amount of Fixed Overhead Incurred
3. Actual quantity of Materials Consumed	9. Amount of Fixed Overhead Absorbed
4. Quantity of Raw Materials Allowed	10. Fixed Overhead Capacity Variance
5. Actual Wage Rate per Labour Hour	11. Fixed Overhead Efficiency Variance
6. Actual Labour Hours worked.	12. Budgeted Output Units

Q.33. TQM Ltd. has furnished the following information for the monthending 30th June,2012 :

	Original Budget	Actual
Units produced and sold	80,000	72,000
Sales	3,20,000	2,80,800
Direct Material	80,000	73,600
Direct Wages	1,20,000	1,04,800
Variable Overhead	40,000	37,600
Fixed Overhead	40,000	39,200
Total Cost	2,80,000	2,55,200

The Standard Costs of the product are as follows :

Particulars	Per Unit
Direct Material (1 kg at ₹ 1 per kg)	₹ 1.00
Direct Wages (1 hour at ₹ 1.50 per hour)	₹ 1.50
Variable Overhead (1 hour at ₹ 0.50 per hour)	₹ 0.50
Fixed Overhead (1 hour at ₹ 0.50 per hour)	₹ 0.50

Actual results for the month showed that 78,400kg. of material were used and 70,400 labour hours were recorded.

Required :

1. Prepare a statement for the month showing standard cost for actual output and compare with actual results.
2. Calculate Material, Labour, Variable Overhead and Fixed Overhead Variances.

Q.34. A Company operates standard cost system. The following are the details of actual production, costs and variances for November, 2012.

Production and cost (actuals)		Cost variances	
Production	10,000 units	Direct material – Price	₹ 5,000 (F)
Direct materials (1,05,000 kg)	₹ 5,20,000	Direct materials – Usage	₹ 25,000 (A)
Direct labour (19,500 hrs.)	₹ 3,08,000	Direct labour – Rate	₹ 15,500 (A)
Variable Overheads	₹ 4,10,000	Direct labour – Efficiency	₹ 7,500 (F)
		Variable Overheads	₹ 10,000 (A)

Prepare Standard Cost Statement.

Q.35 ZED Ltd. has a standard costing system for its single output. Their standard cost for 1unit is as follows :

	₹
Material : 1 kg. @ ₹ 10	10.00
Labour : 0.4 hous @ ₹ 20 per hour	8.00
Variable factory overhead : @ ₹ 10 per standard direct labour hour	4.00
Fixed factory overhead : @ ₹ 5 per standard direct labour hour	2.00
	24.00

The following operating data were taken for May, 2012 :
(i) 500 units were manufactured.
(ii) Budgeted 220 direct labour hours.
(iii) 520 kgs. of material @ ₹ 11.00 was consumed.
(iv) 190 labour hours @ ₹ 19.00 were used.
(v) Actual variable factory overhead : ₹ 2,090.
(vi) Actual fixed factory overhead : ₹ 1,150

You are required to calculate the different cost variances.

Q.36. Vikas Limited had adopted a Standard Costing System. The standard output for a period is 10,000 units. The standard cost per unit is given below :

	₹
Direct Materials (6 kgs at ₹ 3 per kg.)	18.00
Direct Labour (6 hours at ₹ 2 per hour)	12.00
Direct Expenses	2.00
Factory Overheads :	
Variable	1.00
Fixed	1.20
Administrative Overheads (Fixed)	1.20
	35.40
Profit per unit	4.60
Selling Price per unit	40.00

Production and sales during the period was 7,200 units. The following are the variance worked out at the end of the period :

	Favourable (₹)	Adverse (₹)
Direct Materials		
Price Variance	–	8,500
Usage Variance	2,100	–
Direct Labour		
Rate Variance	–	8,000
Efficiency Variance	6,400	–
Factory Overheads		
Variable expenditure variance	800	–
Fixed expenditure variance	800	–
Fixed volume variance	–	3,360

Administrative Overheads	Favourable (₹)	Adverse (₹)
Expenditure variance	--	800
Volume variance	--	3,360

Required :
(1) Standard Cost for Actual Output; (2) Actual Cost for Actual Output.

Q.37. A firm has budgeted sales of 20,000 units of X at a price of ₹ 10 and 30,000 units of Y at a price of ₹ 6 per unit. Actual sales for the period are 35,000 units of X at ₹ 9 and 25,000 units of Y at ₹ 8 per unit. Compute sales variances.

Q.38. From the following, calculate profit variances –

Budgeted				Actual		
Product	Units	S.P./ Unit	Cost / Unit	Product	Units	S.P./ Unit
X	800	₹ 15	₹ 10	X	1,500	₹ 14
Y	1,200	₹ 20	₹ 12	Y	1,000	₹ 21

IMPORTANT THEORETICAL QUESTIONS

Q.1. Write short notes on the following :

(i) Standard Cost; (ii) Standard Costing; (iii) Variance Analysis.

Ans.: (i) Standard Cost :

It means the pre-determined cost of future, i.e. what should be the cost in future period under a given set of operating conditions. Standard cost is important because it is the ideal cost to be incurred and it is also the base for comparison with actual cost. The comparison of standard cost with actual cost is essential because it helps us to ascertain the difference between the expected cost and actual cost so that appropriate corrective actions can be taken in future to prevent such difference.

(ii) Standard Costing :

In the meaning of standard costing, following elements are included :

a) Determine of standard cost for each elements of costs (Materials, Labour and Overheads).

b) Comparison of actual cost with the standard cost, the difference between the two is termed as variance.

c) Analysis of variances to ascertain the reason of variances.

d) Presentation of information to the appropriate level of management so that remedial steps may be taken.

(iii) Variance Analysis :

It is a process of analyzing, variances by sub-dividing total variances in such a way that the management can assign responsibility for below standard performance.

Variance analysis is very important because with the help of it, we can ascertain those variance which are controllable and steps can be taken to reduce such variations. A detailed analysis of controllable variances are helpful to ascertain :

1. the amount of variance

2. the causes of variance

3. the person responsible for variance; and

4. the corrective action to be taken.

Q.2. Distinguish between standard cost and estimated cost.

Ans.: (1) Estimated cost is in the nature of cost 'will be' whereas standard cost is in the nature of cost 'should be;'

(2) Estimated costs are calculated by adjusting past figures to possible future changes. Standard costs are however calculated on scientific basis.

(3) Standard cost are meant for control purposes which is not the case with estimated costs.

(4) Standard costing is used by a firm which has adopted standard costing system, whereas estimated cost is used by a firm which has adopted historical system of ascertaining costs.

Q.3. Distinguish between Standard Costing and Budgetary Control.

Ans. (1) Budget is a projection of financial accounts whereas standard cost is a projection of Cost Account.

(2) Budget covers the operations of the business as a whole and, therefore, it is extensive in nature.

(3) Budgets are prepared for different functions of business, *e.g.* Sales, Production, Purchase, *etc.* whereas standard costs are ascertained for each elements of cost. *E.g.* Material, Labour and Overheads.

(4) Budgets are meant to be used for forecasting requirement of financing , material labour *etc*. Standards on the other hands, tells what the costs 'should be'.

(5) Budgetary control is possible in parts whereas standard costing technique has to be applied in full.

Besides above mentioned joints of differences, there are some principles which are common to both standard costing and budgetary control. They are :

1. Setting up the target performance

2. Measurement of actual performance

3. Comparison of actual performance with the target performance

4. Analysis of variances between actual and standard performance

5. Taking corrective actions, wherever necessary.

Q.4. Briefly explain various types of standards.

Ans.: 1. Basic Standard : These are long term standards and remains unchanged for a long period of time.

2. Ideal Standards : These are the standards to be attained under the most favourable conditions possible.

3. Normal Standards : Such standards are based on average performance in the past. They are attainable under the normal conditions.

4. Attainable Standards : These are the standards which can be achieved with reasonable efforts. They are based on practical considerations and they are also called the expected or practical standards.

5. Loose or Lax Standards : When the standards are deliberately set below efficiency level to show favourable variances, they are called the loose or lax standards.

6. Revised Standards : When the standards are changed to correspond with the current conditions, they are called the revised standards.

7. Current Standards . Standards set for the current period are known as current standard.

Q.5. What are the major factors to be kept in view in deciding whether or not to investigate variances in budgetary control and standard cost systems ?

Ans.: 1. **Cost Benefit Analysis :** Investigation involves some costs of its own and a decision to investigate can be taken only when it is found that the financial benefits is more than the cost of investigation.

2. **Amount of Variance :** A limit can be set which will decide whether variance should be investigated or not. For example, a variance of 5% of ₹ 5,000 may be considered worthy of investigation.

3. **Controllability :** Uncontrollable variances need not be investigated. For example, a material price variance due to imposition of additional taxes by Govt. need not be investigated. On the other hand, the controllable variances should be fully investigated if the amount of variance is above the limits prescribed.

Q.6. "Calculation of variances in standard costing is not an end in itself, but a means to an end". Discuss.

Ans.: It is generally understood that the purpose of standard costing is to compute the variances. In fact, the computation of variances can be termed as first step and the main purpose of management starts after computation of these variances. The management should act as early as possible to investigate the causes of variances. It is necessary because of following reasons :

1. It helps the management to place responsibilities for variances
2. Waste, scrap and losses, if not corrected immediately, continue to increase.
3. It prevents of re-occurrence of variances
4. To scientifically plan and take various important decisions for future course of business operation.

Hence, the end is the control aspect and the computation of variances is only a means to achieve this end.

REVISIONARY QUESTIONS

Direct Material Cost Variances

Q.1. The standard mix of a product is:

X	–	60 units @ 15 paise per unit
Y	–	80 units @ 20 paise per unit
Z	–	100 units @ 25 paise per unit
		240 units

10 units of the finished product should be obtained from this mix.
During the month of February, ten mixes were completed and the consumption was as under:

X	–	640 units @ 20 paise per unit
Y	–	960 units @ 15 paise per unit
Z	–	840 units @ 30 paise per unit
		2,440 units

Actual output was 90 units. Calculate all material variances.

Q.2. A certain insecticide is manufactured by mixing four chemicals A, B, C and D (filter) and processing the same. The standard cost data for the product is as follows:

Material	Quality (standard proportion)	Standard price/ kg (₹)
A	5 kg	200
B	20 kg	50
C	25 kg	20
D (filter)	50 kg	7
Total input	100 kg	
Loss in processing	5 kg	
	95 kg	

During April, 2012, 19,000 kg of insecticide was produced incurring actual cost as follows:

	₹
A = 1,010 kg	2,12,100
B = 4,200 kg	2,05,800
C = 4,800 kg	1,00,800
D = 10,200 kg	66,300

Calculate the following variances :
i.   Material cost variance
ii. Material price variance
iii. Material mix variance
iv. Material yield variance
v.   Material usage variance

Q.3 The standard cost of a certain chemical mixture was:
   60% of material A at ₹ 2,500 per tonne.
   40% of material B at ₹ 3,500 per tonne.
A standard loss of 10% is expected in production. Following materials were consumed during the period under consideration:
   115 tonnes of material A at ₹ 2,300 per tonne.
   85 tonnes of material B at ₹ 3,600 per tonne.
   Loss in production was 29 tonnes.
Calculate:
(a) Material price variance;
(b) Material usage variance;
(c) Material mix variance; and
(d) Material yield variance

Q.4 The standard cost of a chemical mixture 'AB' is:

   40% of material A at ₹ 400 per kg.

   60% of material B at ₹ 600 per kg.

A standard loss of 10% is anticipated in production.

The following particulars are available for the month of December, 2009:

   180 kg of material A has been used at ₹ 360 per kg.

   220 kg of material B has been used at ₹ 680 per kg.

The actual production of 'AB' is 369 kg.

Calculate:

(a) Material cost variance

(b) Material price variance;

(c) Material usage variance;

(d) Material mix variance;

(e) Material yield variance

Q.5 RS Ltd. has established the following standard mix for producing 9 tonnes of product Z

	₹
5 tonnes of material A at ₹ 7 per tonnes	35
3 tonnes of material B at ₹ 5 per tonnes	15
2 tonnes of material C at ₹ 2 per tonnes	4
	₹ 54

A standard loss of 10% of input is expected to occur. Actual input was as under:

53,000 tonnes of material A at ₹ 7 per tonnes.

28,000 tonnes of mat erial B at ₹ 5.30 per tonnes.

19,000 tonnes of material C at ₹ 2.20 per tonnes.

Actual output for a period was 92,700 tonnes of product Z.

Compute material cost variances.

Q.6 80 kgs. of material A at a standard price of ₹ 2 per kg. and 40 kg. of material B at a standard price of ₹ 5 per kg. were to be used to manufacture 100 kgs. of a chemical. During a month, 70 kgs. of material A priced at ₹ 2.10 per kg. and 50 kgs. of material B priced at ₹ 4.50 per kg. were actually used and the output of the chemical was 102 kgs. Find out the material variances.

Q.7 Tutu Ltd. manufacures a simple product, the standard mix of which is:

   Material A 60% at ₹ 20 per kg.

   Material B 40% at ₹ 10 per kg.

Normal loss in production is 20% of input. Due to shortage of Material A, the standard mix was changed. Actual results for March, 2009 were:

Material A	105	kg. at ₹ 20 per kg.
Material B	95	kg. at ₹ 9 per kg.
Input	200	kg.
Loss	35	kg.
Output	165	kg.

Calculate:

(i) Material Price Variance;

(ii) Material Usae Variance;

(iii) Material Mix Variance, and

(iv) Material Yield Variance

Direct Labour Cost Variances

Q.8 A company produces only one article, the prime cost standards for which have been established as follows:

	Per Completed Piece
Material 5 lbs. @ ₹ 4.20	₹ 21
Labour 3 hour @ ₹ 3.00	₹ 9

The production schedule for the month of July 2008 required completion of 5,000 pieces.
However, 5,120 pirces were actually completed.
Purchases for the month of July 2008 amounted to 30,000 lbs. of material at the total invoice price of ₹ 1,35,000. Production records for the month of July, 2008 showed the following actuals results:

Materials used	25,700 lbs.
Direct labour 15,150, hours	₹ 48,480

Calculate appropriate material and labour variances.

Q.9 The following information is gathered from the labour records of P Ltd. Payment for direct labour ₹ 20,000. Time card analysis shows that 9,000 hours were worked an production lines. Production reports for the period showed that 4,000 units have been completed, each having standard labour time of 1½ hours and a standard labour rate of ₹ 2 per hour. Calculate the labour variances.

Q.10 100 skilled workmen, 40 semi-skillled workmen and 60 unskilled workmen were to work for 30 hours to get a contract job completed. The standard hourly wages were ₹ 60, ₹ 36 and ₹ 24 respectively. The job was completed in 32 hours by 80 skilled, 50 semi-skilled and 70 unskilled workmen who were paid ₹ 65, ₹ 40 and ₹ 20 respectively as hourly wages. Find out the labour cost variance, labour rate variance, labour mix variance and labour efficiency variance.

Variable Overheads Variances

Q.11 The following data is given:

	Budget	Actual
Production (in units)	400	360
Man hours to produce above	8,000	7,000
Variable overheads (in rupees)	10,000	9,150

Calculate variable overhead variances.

Fixed Overheads Variances

Q.12 The following information is received from the books of a Company

Normal overhead rate	₹ 3/hr.
Actual hours operated	20,000
Allowed hous for actual production	21,000
Budgeted Overheads	₹ 70,000
Actual overheads	₹ 72,000

Calculate Fixed Overhead Variances.

Q.13 The following information is available from the records of a factory:

	Budget	Actual
Fixed overheads for May (₹)	5,000	6,000
Production in May (units)	1,000	1,050
Standard time per unit (hours)	10	—
Actual hours worked in May	—	11,000

Compute:
1. Fixed overhead cost variance
2. Expenditure variance
3. Volume variance
4. Capacity variance
5. Efficiency variance

Q.14 A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overheads are budged at ₹ 1,44,000 per month. The standard time requied to manufacture one unit of product is 4 hours.

In April, 2008, the company worked 24 days of 840 machines hours per day and produced 5,305 units of output. The actual fixed overheads were ₹ 1,42,000.

Compute:
1. Efficiency variance
2. Capacity variance
3. Calender variance
4. Expense variance
5. Volume variance
6. Total fixed overheads variance

Q.15 The following data have been colleced from the cost records of a unit for computing the various fixed overhead variances for a period:

Number of budgeted working days	25
Budged man-hours per day	6,000
Output (budgeted) per man-hour (in units)	1
Fixed overhead cost as budgeted	₹ 1,50,000
Actual number of working days	27
Actual man-hours per day	6,300
Actual output per man-hour (in units)	0.9
Actual fixed overheads incurred	₹ 1,56,000

Calculae fixed overheads variances:
(a) Expenditure variance
(b) Calender variance
(c) Capacity variance
(d) Efficiency variance
(e) Volume variance
(f) Fixed cost variance

Q.16. The standard cost card is as under :

	₹ Per Kg. of Finished Product
	20
Direct Material 2 kgs. @ ₹ 10 per kg.	60
Direct Labour 3 hours @ ₹ 20 per hour	90
Fixed Overhead (3 hrs. @ ₹ 30 / hr.)	170
Total	

Budgeted output for the period is 1,000 units

Actual production and cost data for a month are as under :

Actual Production :		1,400 units
→ Material		1,140 units
→ Labour		1,140 units
→ Overheads		₹ 32,000
Actual Direct Material Cost	(2,900 kgs.)	₹ 68,000
Actual Direct Labour Cost	(3,300 hours)	₹ 88,000
Actual Fixed Overhead		

You are required to work out the following variances :
(i) Material price and Usage Variances;
(ii) Labour rate and Efficiency Variances; and
(iii) Fixed Overhead Budget Variance.

Q.17. The details regarding a food product manufactured by ABC Co. for the last one week are as follows :

Standard Cost (for one unit)			
Direct Materials	10 kgs.	@ ₹ 1.50	15
Direct Wages	5 hours	@ ₹ 8.00	40
Fixed Overheads	5 hours	@ ₹ 10	50
			105

Actuals (for whole activity)
Direct Materials	₹ 6,435
Direct Wages	₹ 16,324

Analysis of Variances
Direct Materials
Price	₹ 585 (Adverse)
Usage	₹ 375 (Favourable)

Direct Wages (Labour)
Rate	₹ 636 (Favourable)
Efficiency	₹ 360 (Adverse)

Fixed overheads
Expenditure	₹ 400 (Adverse)
Volume	₹ 750 (Favourbale)

You are required to calculate :
(i) actual output units;
(ii) actual price of material per unit;
(iii) actual wage rate per labour hour;
(iv) the amount of fixed overhead incurred; and
(v) the production overhead efficiency variance.

Q.18. From the following data available in the books of a manufacturing concern, work out the fixed overhead variance analysed into various heads :

Budgeted output for the year	2,40,000 units
Budgeted fixed overheads for the year	₹ 4,80,000
Standard output per hour	100 units
Actual output for the month	17,000 units
Actual fixed overhead for the month	₹ 48,000

The company follows a budget year of 50 weeks with 48 hours per week. The month consists of 4 working weeks. Due to idle time, two hours are lost every week.

Due to erratic supply of raw materials, the company had to curtail its manufacturing operations to 5-day a week instead of six.

Q.19. The following details are furnished by a firm which employs standard costing for cost control :

Standard / Budget Data	Actuals for april, 2003	
Normal working hours p.m.= 2,000 hrs.	Hours worked	= 1,800
Standard time required/unit= 2 hours	Actual production	= 1,200 units
Variable overheads = ₹ 12/hour	Actual variable overheads = ₹ 25,000	
Budgeted fixed overhead = ₹ 80,000	Actual fixed overheads = ₹ 72,000	

You are required to calculate the following variances :
1. Variable overhead expenditure variance;
2. Variable overhead efficiency variance;
3. Variable overhead cost variance,
4. Fixed overhead expenditure variance;
5. Fixed overhead volume variance;
6. Fixed overhead capacity variance;
7. Fixed overhead efficiency variance;
8. Fixed overhead cost variance.

Q.20. SKF Industries makes use of standard costing to control its variable production cost. The standard cost of the product manufactured by the company is given below :

		₹
Direct material : 4 kg. @ ₹ 40 kg.		160
Direct Labour : 5 hrs. @ ₹ 16 hrs.		80
Variable overheads (5 hrs. @ ₹ 12/hr.)		60
		300

During a week, the firm manufactured 120 units of the product. The details of actual costs incurred were as follows :

Actual costs incurred :

Direct Material	:	500 kg. @ ₹ 38	
Direct Labour	:	Time recorded in Time Office :	620 hrs.
		Time spent on production	580 hrs.
		Actual wages paid	₹ 11,200
Variable overheads	:		₹ 7,500

Calculate the total cost variance.

Sales Variances

Q.21. From the following information about sales, calculate:
(a) Sales value variance
(b) Sales price variance
(c) Sales volume variance
(d) Sales mix variance
(e) Sales quantity variance

Products	Standard		Actual	
	Units	Rate (₹)	Units	Rate (₹)
A	5,000	5	6,000	6
B	4,000	6	5,000	5
C	3,000	7	4,000	8

Sales Margin Variances

Q.22. X Ltd. had budged the following sales for the month of August, 1912:

Product A: 800 units @ ₹ 100 per unit
Product B: 700 units @ ₹ 200 per unit

The actual sales for the month were as follows:

Product A: 900 units @ ₹ 100 per unit
Product B: 800 units @ ₹ 180 per unit

The cost per unit of products A and B wee ₹ 80 and ₹ 170 respectively.

You are required to compute the different variances to explain the difference beween the budgeted and actual profits.

Solutions to Revisionary Problems

Ans. to Q.1

	SP × SQAO	SP × RSQ	SP × AQ	AP × AQ
	M_1	M_2	M_3	M_4
X	0.15 × 540 = ₹ 81	0.15 × 610 = ₹ 91.50	0.15 × 640 = ₹ 96	0.20 × 640 = ₹ 128
Y	0.20 × 720 = ₹ 144	0.20 × 813 = ₹ 162.60	0.20 × 960 = ₹ 192	0.15 × 960 = ₹ 144,
Z	0.25 × 900 = ₹ 225	0.25 × 1,017 = ₹ 254.25	0.25 × 840 = ₹ 210	0.30 × 840 = ₹ 252
	₹ 450			

$DMCV = M_1 - M_4$

$X = 81 - 128 \quad = \quad$ ₹ 47 (A)

$Y = 144 - 144 \quad = \quad$ Nil

$Z = 225 - 252 \quad = \quad$ ₹ 27 (A)

                  ₹ 74 (A)

$DMPV = M_3 - M_4$

$X = 96 - 128 \quad = \quad$ ₹ 32 (A)

$Y = 192 - 144 \quad = \quad$ ₹ 48 (F)

$Z = 210 - 252 \quad = \quad$ ₹ 42 (A)

                  ₹ 26 (A)

$DMUV = M_1 - M_3$

$X = 81 - 96 \quad = \quad$ ₹ 15 (A)

$Y = 144 - 192 = \quad$ ₹ 48 (A)

$Z = 225 - 210 = \quad$ ₹ 15 (F)

                  ₹ 48 (A)

$DMMV = M_2 - M_3$

$X = 91.50 - 96 \quad = \quad$ ₹ 4.5 (A)

$Y = 162.60 - 192 = \quad$ ₹ 29.4 (A)

$Z = 254.25 - 210 = \quad$ ₹ 44.25 (F)

                  ₹ 10.35 (F)

$DMYV = M_1 - M_2$

$X = 81 - 91.50 \quad = \quad$ ₹ 10.50 (A)

$Y = 144 - 162.60 = \quad$ ₹ 18.60 (A)

$Z = 225 - 254.25 = \quad$ ₹ 29.25 (A)

                  ₹ 58.35 (A)

SQAO = Actual Output × Budgeted Input for 1 unit of Output

X = 90 × 6   =   540 units

Y = 90 × 8   =   720 units

Z = 90 × 10   =   900 units