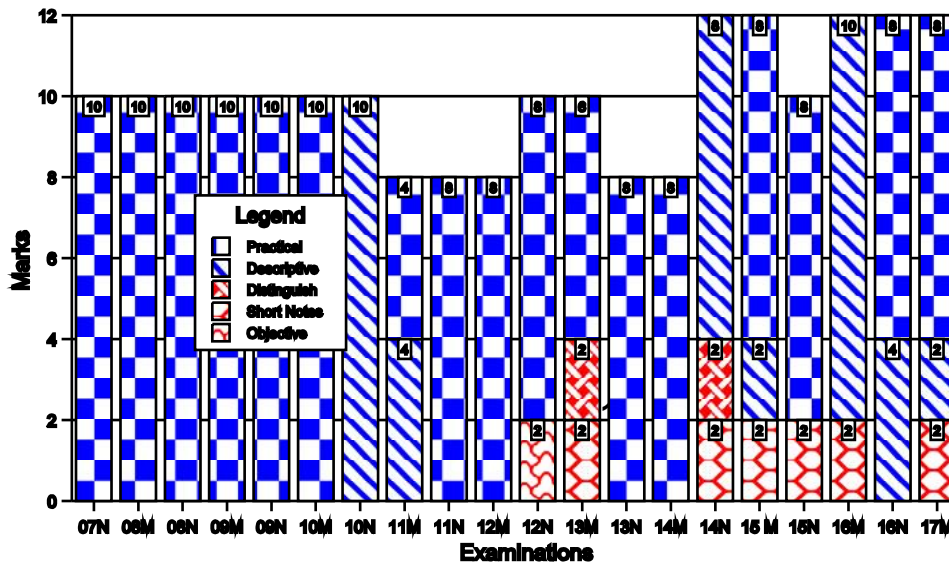


CHAPTER	
<b>1</b>	<b>Business Process Management &amp; IT</b>
<b>THIS CHAPTER COMPRISES OF</b>	
☞ Introduction ☞ Business Process Management ☞ Overview of Business Processes and Process Flow ☞ Classification of Business Processes ☞ Theories of Process Management ☞ BPM Implementation ☞ Accounting Systems Automation ☞ Impact of IT on BPM and Risks of failure of IT ☞ Approaches to Mapping Systems.	

Marks of Objective, Short Notes, Distinguish Between, Descriptive & Practical Questions



**▶ OBJECTIVE QUESTIONS**

**2012 - Nov [7]** Describe briefly terms:

(iii) System Flow Chart

(2 marks)

**Answer:**

**System Flowchart:**

- System flowchart depicts the electronic flow of data and processing steps in Information systems.
- It is used by System Analysts to describe the data flow and operations for a data processing cycle.
- It defines the broad processing in the organizations.
- It shows the origin of data, filing structure, processing to be performed, output that is to be generated and necessity of any offline operation.

**▶ SHORT NOTES**

**2013 - May [7]** Write short note on the following:

(ii) Program Debugging

(2 marks)

**Answer:**

*Please refer 2010 - Nov [7] (c) on page no. 18*

**2014 - Nov [7]** Write short note on the following:

(b) Total Quality Management (TQM)

(2 marks)

**Answer:**

**Total Quality Management(TQM):** Total Quality Management is a management mechanism designed to improve a product or process by engaging every stakeholder and all members of an organization as well as the customers and aims at improving the quality of the products produced and the process utilized. TQM ultimately aims at complete customer satisfaction through ongoing improvements.

**2015 - May [7]** Write short note on the following:

(a) Radical Redesign

(2 marks)

**Answer:**

**Radical Redesign:** Radical redesign means to reinvent. This describes that processes are redesigned or reinvented to achieve major improvement. It is something more than enhancing or improving. Rather it is a process to achieve dramatic improvement in critical, contemporary measures of performance such as cost, quality, service and speed. BPR also advocates it through its Clean Slate Approach i.e. starting afresh and redesigning the processes afresh. It states “Whatever you were doing in the past is all wrong. Do not get biased by it or reassemble, the new system is to be redesigned afresh.”

**2015 - Nov [7]** Write short note on the following:

(b) Entity-Relationship Diagram

(2 marks)

**Answer:**

**Entity Relationship Diagram:** Entity relationship diagram is a data modeling technique that creates a graphical representation of the entities and the relationships between entities within an information system. Entity-Relationship Diagrams repeatedly bring into play symbols to symbolize three dissimilar types of informations. The Symbols are:

- (i) Boxes
- (ii) Diamonds
- (iii) Ovals.

KZ - 1		Knowledge Zone
1.	<b>Boxes</b>	Boxes are commonly used to represent entities. An entity may be a 'physical object' such as a house or a car, an 'event' such as a house sale or car service or a 'concept' such as a customer transaction or order. The entity is represented by a rectangle and labeled with a singular noun.
2.	<b>Diamonds</b>	Diamonds are normally used to represent relationship. A relationship is an association that exists between two entities for e.g., Instructor teaches class or student attends class. Most relationships can also be stated

<b>7.4</b>	■	<b>Solved Scanner IPCC Gr. II Paper - 7A</b>
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		inversely. For e.g. Class is taught by instructor. The relationships on an Entity-Relationship Diagram are represented by lines drawn between the entities involve in the association.
<b>3.</b>	<b>Ovals</b>	Ovals are used to represent attributes.
		<p><b>A relationship is an association that exists between two entities.</b></p> <ul style="list-style-type: none"> <li>• <b>There are four types of relationships:</b> <ol style="list-style-type: none"> <li>(1) One to one relationship</li> <li>(2) One to many relationship</li> <li>(3) Many to one relationship</li> <li>(4) Many to many relationship.</li> </ol> </li> </ul>

**2016 - May [7]** Write short note on the following:

(a) Six Sigma

(2 marks)

**Answer:**

**Six Sigma:**

- Six Sigma is a management driven, scientific methodology for product and process improvement which creates break through in financial performance and customer satisfaction.
- It is an integrated, broad based, enterprise wide quality control program and not restricted to manufacturing. Six Sigma is about identifying and taking action to reduce the errors and rework that cost time, money, opportunities and customers. It translates that knowledge into opportunities for business growth.

**2017 - May [7]** Write short notes on the following:

(a) Business Process Re-engineering

(2 marks)

<b>► DISTINGUISH BETWEEN</b>
------------------------------

**2013 - May [6]** (a) Distinguish between “Condition Stub” and “Condition Entries” in a Decision Table. (2 marks)

**Answer:**

	Condition Stub	Condition Entry
1.	Condition stub is the upper left quadrant of a decision table containing the condition subject.	Condition entry is the upper right quadrant of a decision table containing set of alternatives for the conditions in the condition stub.
2.	Condition stub lists out the conditions or comparison that could exist in a program. It reflects the possible states of input-data to be tested in a program.	Condition entries indicate which conditions are being met or answer the question in the condition stub.

**2014 - Nov [1] {C}** Answer the following question in brief:

(a) Differentiate between flow-chart and data flow diagram. (2 marks)

**Answer:**

*Please refer KZ - 6 on page no. 55*

### DESCRIPTIVE QUESTIONS

**2010 - Nov [5]** What do you mean by term flow chart? Draw a program flow chart to find the sum of first 50 odd numbers. (2 + 6 = 8 marks)

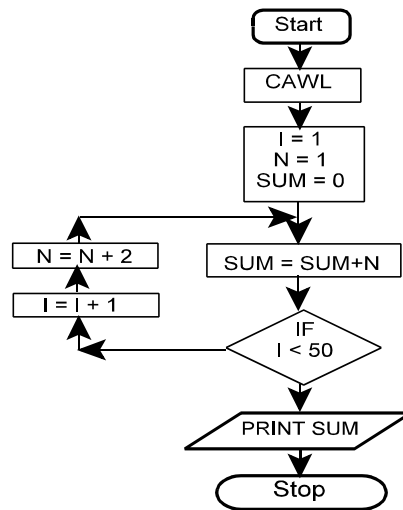
**Answer :**

- *Flowchart* is a diagram that shows sequence of steps required to solve a particular problem.
- It is a logical flow of steps which shows sequence of operations of a program by using symbols and inter-connectivity lines. It is like a blueprint that shows the general plan and essential details of the proposed structure.
- It allows the programmer to compare different approaches and alternatives on paper and often shows inter-relationships that are not immediately apparent.

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■ Solved Scanner IPCC Gr. II Paper - 7A

The required flowchart to find the sum of first 50 odd numbers is drawn below :



Where CAWL means Clear All Working Locations

**2010 - Nov [7]** Answer the question:

(c) What is Program debugging ? Explain it briefly.

(2 marks)

**Answer :**

**Program Debugging :** It is a process of finding errors in program and rectifying them by using diagnostic routine before putting the program into use. There is a real necessity to debug a program, i.e. to cleanse it from errors. For this purpose, the programmers device a set of test data transactions to test the various alternative branches in the program. The results got from the computer are compared with one derived manually prior to computer processing. When the results do not match for any reason, the programmer then verifies the flowchart and coding sheet to hunt for the bugs. This process is called program debugging.

**2011 - May [5]** (b) Explain the necessity of the decision table. Discuss the different parts of the decision table.

(4 marks)

**Answer:**

**Necessity of a Decision Table**

- A decision table is used to represent conditional logic by creating a list of tasks depicting business level rules.

- Decision tables can be used when there is a consistent number of conditions that must be evaluated and assigned a specific set of actions to be used when the conditions are finally met.
- The purpose of a decision table is to structure logic by generating rules derived from the data entered in the table itself.
- A decision table lists causes (business rule condition) and effects (business rule action and expected results), which are represented through the use of a matrix where each column represents a unique combination.
- If there are rules within a business that can be expressed through the use of templates and data then a decision table is one technique that can be used to accomplish this. Each row of a decision table collects and stores its data separately and then combines the data with a specific or customized template to generate a rule.

**Different Parts of Decision Table**

*Please refer KZ - 2 on page no. 47*

**2014 - Nov [2]** (a) What are the various key factors to be considered in implementing Business Process Management (BPM) in an enterprise?

(4 marks)

**Answer:**

Various key factors to be considered in implementing Business Process Management (BPM) in an enterprise are as follows:

<b>Factors</b>	<b>Key Considerations</b>
<b>Scope</b>	A single process, a department, the entire company.
<b>Goals</b>	Process understanding, Process Improvement, Process Automation/ Optimization and Process re-engineering.
<b>Methods to be used</b>	Six Sigma, BPM Life Cycle Method, TQM, Informal methods.
<b>Skills Required</b>	Consultants, Train Employees, Formal Certification, Basic Education, Existing Skill sets.

**7.8**■ **Solved Scanner IPCC Gr. II Paper - 7A**

<b>Tools to be used</b>	White-Boards, Sticky Notes, Software for Mapping, Documenting, Software for Simulation, Comprehensive BPMS.
<b>Investments to Make</b>	Training, Tools, Time.
<b>Sponsorship/Buy-in Needed</b>	Executive Level, Department Level, Process Owner Level, Employee Level.

**2014 - Nov [2]** (b) What are the major reasons for failure of Business Process Management System (BPMS)? (4 marks)

**Answer:**

**Reason for Failure of BPMS:**

1. The consumer is often confronted with poor customer service due to broken processes, inefficient processes and manual processes- that is the customer is often confronted (challenged) with the silos of the organisation.
2. The same consumer is becoming more and more demanding with respect to delivery time and also demanding higher quality of the products or services.
3. The product or service is becoming more and more personalized supported by increased customer services.
4. Inadequate investment in ongoing training for involved personnel and deficient executive involvement.
5. Breakdown in gap analysis due to deficient project management.
6. Inefficient corporate policy protecting the integrity of data in BPMS.

**2015 - May [1] {C}** Answer the following question in brief:

- (a) What are the key benefits of Business Process Automation (BPA)? (2 marks)

**Answer:**

*Please refer KZ - 9 on page no. 61*

**2016 - May [1] {C}** Answer the following question in brief:

- (a) Advantages of using E-R Diagram. (2 marks)



**Answer:**

**Entity Relationship Diagram:**

Entity relationship diagram is a data modeling technique that creates a graphical representation of the entities and the relationships between entities within an information system. Entity-Relationship Diagrams repeatedly bring into play symbols to symbolize three dissimilar types of informations.

The Symbols are:

- (i) Boxes
- (ii) Diamonds
- (iii) Ovals.

**Advantages of using Entity-Relationship (E-R) Diagram are as follows:**

- ER Modeling is simple, graphical and easily understandable. It is represented in business users' language and it can be understood by non-technical specialist.
- Intuitive and helps in Physical Database creation/design.
- Can be generalized and specialized based on needs.
- Gives a higher level description of the system.

**2016 - May [2]** (a) Describe any four reasons why documentation is important to Information Systems. (4 marks)

**Answer:**

Information System is defined as the processed data for decision making. The information system shall be used to derive data for the organization. Documentation includes the flowcharts, narratives and other written communications that describe the inputs, processing and outputs of an Accounting Information System. It describes the logical flow of data within a computer system and the procedures that employees must follow to accomplish application tasks.

**Some of the reasons why documentation is important to Information Systems are as follows:**

1.	<b>Documentation helps to understand how the system works</b>	In computerized systems, the processing is electronic and invisible. Therefore, documentation is required to help employees understand how a system works, assist accountants in designing controls for it,
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**7.10**■ **Solved Scanner IPCC Gr. II Paper - 7A**

		demonstrates to managers that it will meet their information needs, and assists auditors in understanding the systems that they test and evaluate.
<b>2.</b>	<b>Documentation helps to develop new system</b>	Documentation helps system designers develop new systems in much the same way that blueprints help architects design building. Well written documentation and related graphical systems-design methodologies play key roles in reducing system failures and decreasing the time spent correcting.
<b>3.</b>	<b>Documentation helps in documenting business processes</b>	Understanding business processes can lead to better systems and better decision. Documentation helps managers better understand how their businesses operates. It also helps them to analyze as to what is missing from critical organizational activities, and how to improve core business activities effectively and efficiently.
<b>4.</b>	<b>Documentation helps in Auditing Information System</b>	Documentation helps depict audit trails. It helps auditors determine the strengths and weaknesses of a system's controls and thus the scope and complexity of audit of Information System.

**2016 - May [2]** (b) Discuss the types of Data Flow Diagrams (DFDs). Also briefly mention the major components of DFD. (4 marks)

**Answer:**

**Types of Data Flow Diagrams (DFDs)**

There are two types of Data Flow Diagrams:

1. Logical Data Flow Diagram.
2. Physical Data Flow Diagram.

1.	<b>Logical Data Flow Diagram</b>	A logical DFD focuses on the business and how the business operates. It describes the business events that take place and the data required and produced by each event. The logical model reflects the business.
2.	<b>Physical Data Flow Diagram</b>	A physical DFD shows how the system will be implemented. The physical model depicts the system.

**Major Component of DFD:** *Please refer KZ - 5 on page no. 50*

**2016 - Nov [6]** (a) What is a Data Flow Diagram. Explain the four major components of a Data Flow Diagram. (4 marks)

**Answer:**

*Please refer KZ - 5 on page no. 50*

**2017 - May [1] {C}** Answer the following in brief:

(a) Write any two principles of Business Process Management. (2 marks)

### ► PRACTICAL QUESTIONS

**2007 - Nov [4]** An electric supply company charges the following rates from its consumers :

No. of unit consumed	Charges/unit (₹)
For the first 200 units	2.50
For the next 300 units	3.50
Over 500 units	5.00

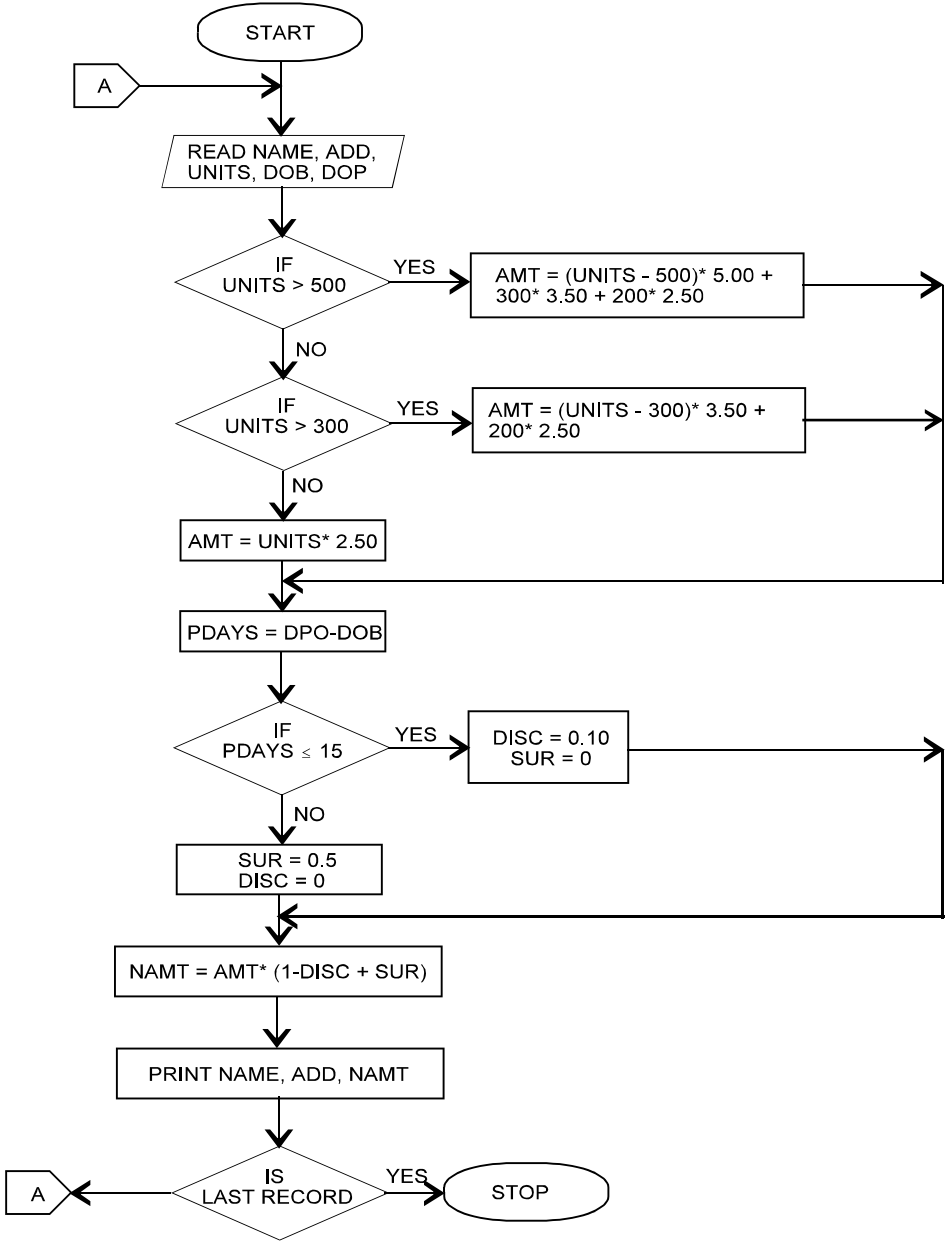
Computer database of the company has the following information :

- Consumer Name
- Address
- Unit consumed
- Bill date
- Payment date

If the consumer pay his bill within 15 days from the bill date, 10% discount is given. If he makes the payment after 15 days from the bill date, 5% surcharge is levied. Draw a Flow chart to calculate the net amount of the bill for each consumer and print it. (10 marks)

7.12 ■ Solved Scanner IPCC Gr. II Paper - 7A

Answer :



**2008 - May [4]** A bicycle shop in a city hires bicycles by the day at different rates for different models as given below :

Model No.	Hire rate per day (₹)
Model No. 1	14.00
Model No. 2	12.00
Model No. 3	10.00

In order to attract customers, the shopkeeper gives a discount on the number of days a bicycle is hired for. The policy of discount is as given below :

No. of days	Discount rate (%)
1-5	0.00
6-10	8
11 and over	15

For every bicycle hired, a deposit of ₹ 30.00 must be paid.

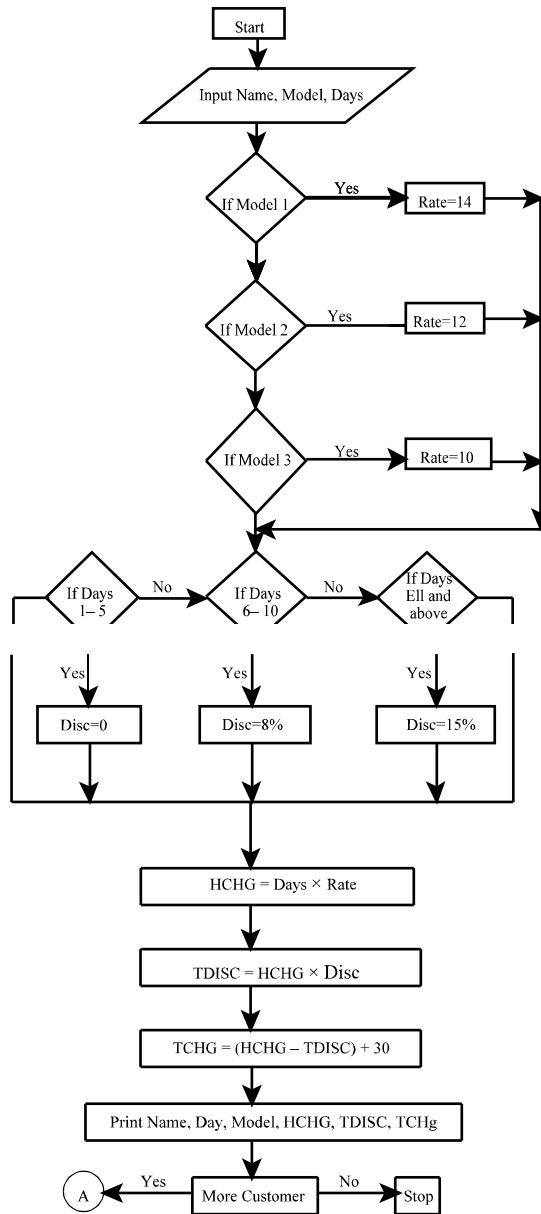
Develop a flow chart to print out the details for each customer such as name of the customer, bicycle model number, number of days a bicycle is hired for, hire charges, discount and total charges including deposits. (10 marks)

**Answer :**

**Please see answer on next page**

7.14

Solved Scanner IPCC Gr. II Paper - 7A



2008 - Nov [4] A Book publisher offers discount to customers on the basis of customer type and number of copies ordered as shown below :

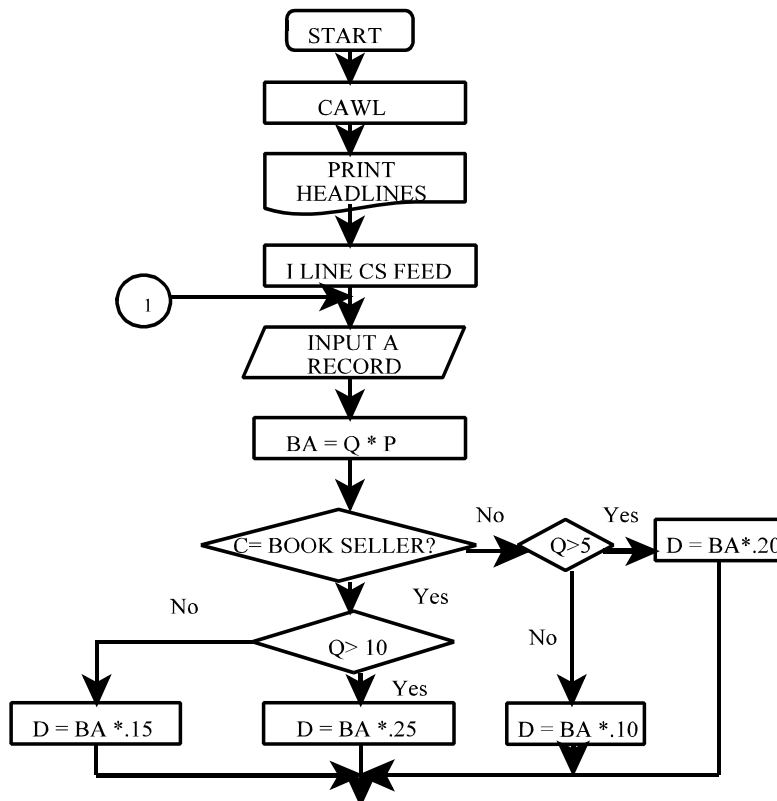
Customer type	Number of Copies Ordered	% of Discount
Book Seller	More than 10	25
	Less than or equal to 10	15
Library	More than 5	20
	Less than or equal to 5	10

Customer number, name , type, book number, number of copies ordered and unit price are given as input. Draw a flow chart to calculate the net amount of the bill for each customer and print it.

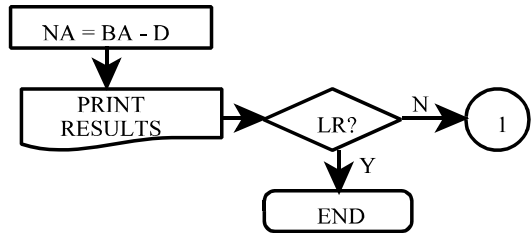
The above is to be carried out for 50 customers.

(10 marks)

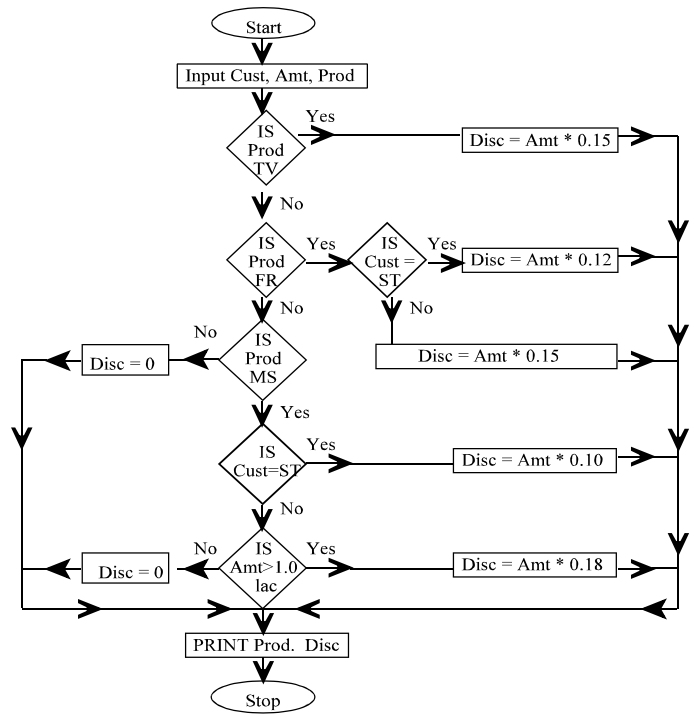
Answer :



**7.16** ■ **Solved Scanner IPCC Gr. II Paper - 7A**



**2009 - May [4]** Frame the problem for which the given Flowchart has been drawn. See the Abbreviations defined below :



**Cust.** : Customer, **Prod** : Product, **Amt** : Amount, **Disc** : Discount, **TV** : Television, **FR** : Fridge, **MS** : Music System, **ST** : Student (10 marks)

**Answer:**

The problem relates to 'Discount Policy' of a company engaged in selling electronic items.



Item	Category of customer	Discount
TV	All	15%
Fridge	Student	12%*
	Others	15%*
Music System	Student	10%*
	Others	18%**

\* irrespective of order value

\*\* subject to order value being more than ₹ 1 lakh.

**2009 - Nov [4]** (a) Write the output sequence (at least first five numbers) for the given flowchart, if  $N = 0$  is selected as the value for  $N$  as input.

(5 marks)

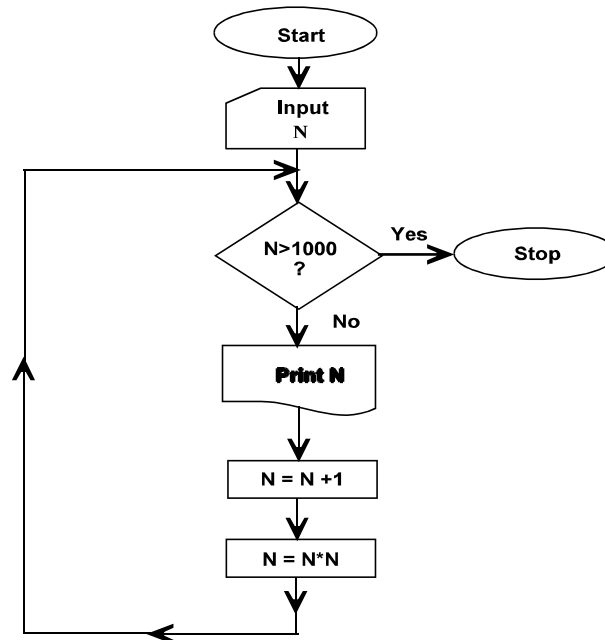
**Answer :**

If  $N = 0$  then the output sequence will be :

0 1 4 25 676

**2009 - Nov [4]** (b) If the statement " $N = N * N$ " in the computation box of the flowchart is modified as " $N = N * (N - 1)$ ". Write the output sequence (at least first five numbers) for the flowchart with  $N = 0$  as the input value for  $N$ .

(5 marks)



7.18

■ *Solved Scanner IPCC Gr. II Paper - 7A*

**Answer:**

If "N = N\* N" is modified as "N = N\* (-1)" with N = 0 as output, then the output sequence will be:

0 0 0 0 0

**2010 - May [4]** The Income-tax for the employees of an organization is calculated on the basis of their Gross Income and the Investments made by them, under Section 80CCC. The taxable income is calculated according to the following rules :

Taxable Income = Gross Income - Investments provided investments are less than 1 lac. Otherwise

Taxable Income = Gross Income - 1,00,000

Following rules are applied to calculate the Income-tax, on the Taxable Income :

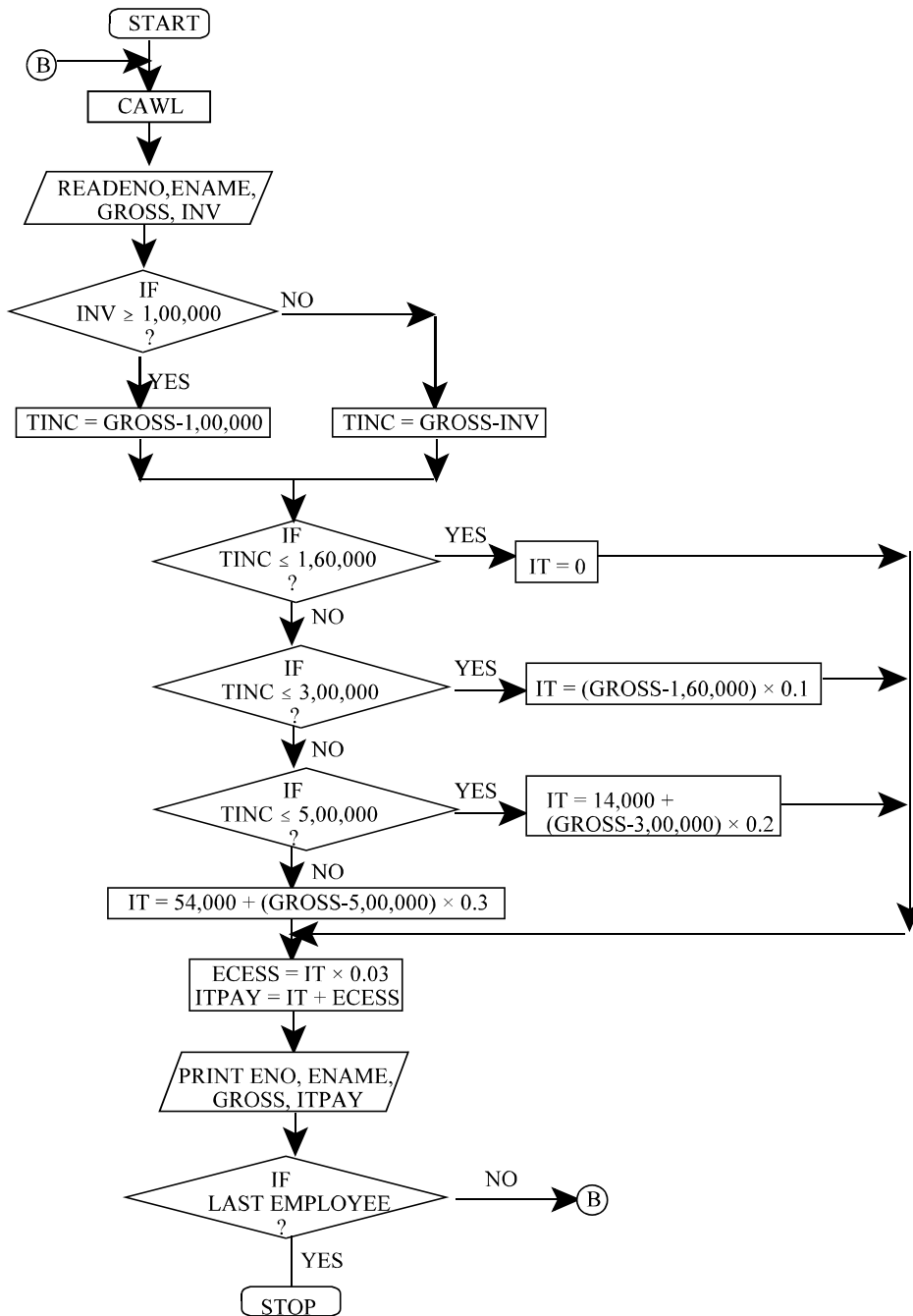
Taxable Income	Income-tax
(i) 0 - 1,60,000	Nil
(ii) 1,60,001 - 3,00,000	10%, on the excess of 1,60,000
(iii) 3,00,001 - 5,00,000	14,000 + 20% on the excess of 3,00,000
(iv) 5,00,001 - and above	54,000 + 30% on the excess of 5,00,000

Also an educational cess of 3% of Income-tax is levied on all the employees, irrespective of the income.

Employee number, Name, Gross Income, Investment amount is given as input. Draw a flow chart to calculate the Income-tax payable by each employee. (10 marks)

**Answer :**

**Please see answer on next page**



**7.20****Solved Scanner IPCC Gr. II Paper - 7A****Terms used :**

ENO = Employee Number

ENAME = Employee Name

GROSS = Gross Income

INV = Investment made

TINC = Taxable Income

IT = Income Tax

ECESS = Education Cess

ITPAY = Total Income Tax payable

CAWL = Clear All Working Locations

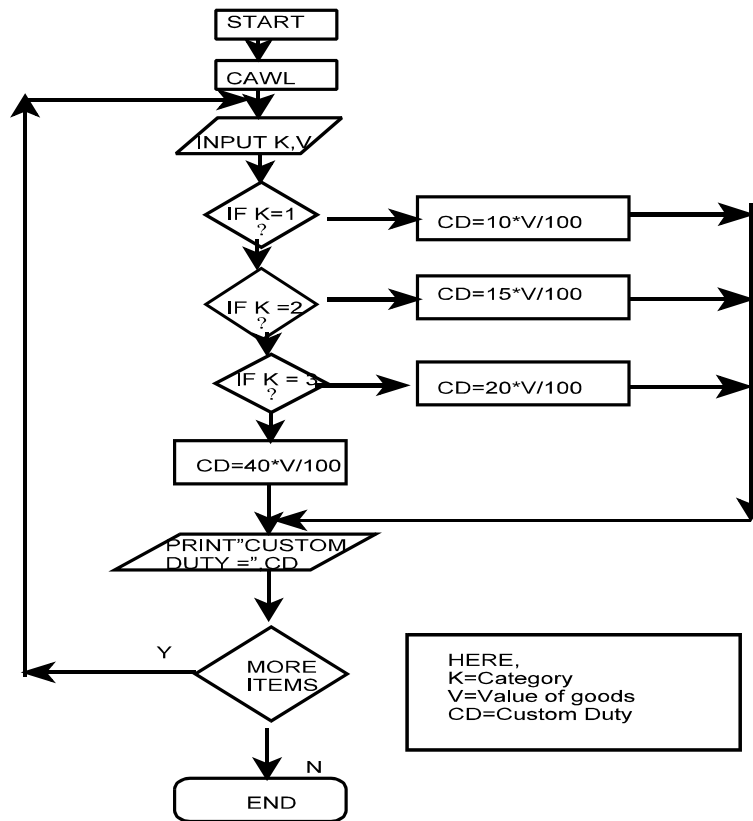
**2011 - May [5]** (a) For computing custom duty, the imported items are classified into 4 categories. The rate of duty to be levied on each category of items is given below :

<b>Category (K)</b>	<b>Class of goods</b>	<b>% custom duty on the value of goods (V)</b>
1	Food and beverages	10
2	Textile and leather goods	15
3	Heavy machinery	20
4	Luxury items	40

Draw a flowchart to compute the custom duty.

(4 marks)

**Answer :****Please see answer on next page**



2011 - Nov [6] A housing society having 400 members pay electricity bills at the following rates :

No. of units consumed	Charges/unit (₹)
For the first 200 units	2.65
For the next 300 units	3.90
Over 500 units	4.75

Surcharge @ 5% of the bill is to be added to the charges.

Draw a flow chart which will read the house number and the number of units consumed. Print the total charges with the house number and the units consumed. (8 marks)

7.22

■ Solved Scanner IPCC Gr. II Paper - 7A

Answer:

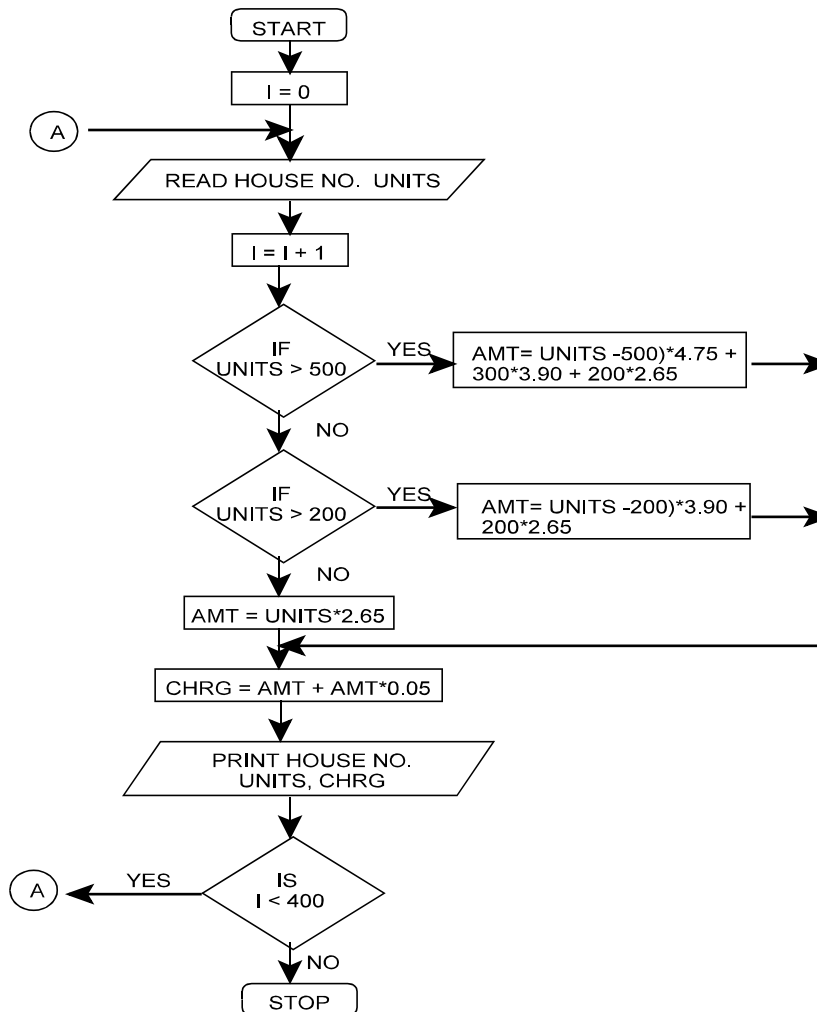
**Abbreviations used :**

House No. - House Number

Units - No. of units consumed

Amt - Amount

Chrg - Charges



2012 - May [6] For the flow chart given below:

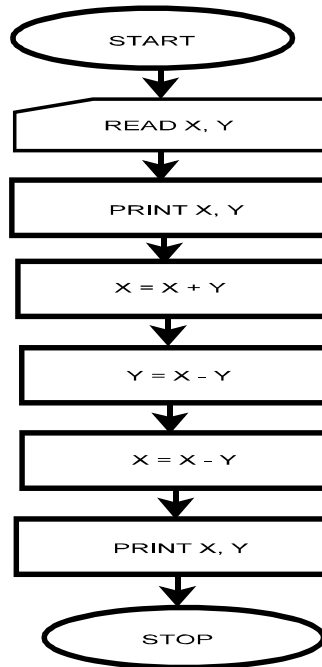
(a) Print the output displayed for using the given two sets of data:

	X	Y
1 <sup>st</sup> Set :	15	20
2 <sup>nd</sup> Set :	35	30

(4 marks)

(b) What interpretation do you make from the instructions given in the flow chart? (3 marks)

(c) Comment about the storage of the variables used in the instructions of the flow chart. (1 mark)



Answer:

(a) For first set, X=15, Y=20

Instruction	Output
Read X, Y	15, 20
Print X, Y	15, 20

.....1<sup>st</sup> Print

<b>7.24</b>	■	<b>Solved Scanner IPCC Gr. II Paper - 7A</b>
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$X = X + Y$	$X = 15 + 20 = 35$	
$Y = X - Y$	$Y = 35 - 20 = 15$	
$X = X - Y$	$X = 35 - 15 = 20$	
Print X, Y	20, 15	.....2 <sup>nd</sup> Print
	1 <sup>st</sup> Print 15 20	
	2 <sup>nd</sup> Print 20 15	
For second set,	$X = 35, Y = 30$	
Instruction	Output	
Read X, Y	35, 30	
Print X, Y	35, 30	.....1 <sup>st</sup> Print
$X = X + Y$	$X = 35 + 30 = 65$	
$Y = X - Y$	$Y = 65 - 30 = 35$	
$X = X - Y$	$X = 65 - 35 = 30$	
Print X, Y	30, 35	.....2 <sup>nd</sup> Print
	1 <sup>st</sup> Print 35 30	
	2 <sup>nd</sup> Print 30 35	

**(b)** The given set of instructions in the flow chart is the steps for swapping/interchanging the values of two variable without involving the third variable. As clearly interpreted from the output, the values of X and Y in the both the value sets have got interchanged.

**Note:** The interpretation involves two important factors:

- (i) Interchange of values of two variables X and Y.
- (ii) Without involving the third or temporary storage/variable.

**(c)** The comments about the storage of the variables used in the instructions of the flow chart are as follows

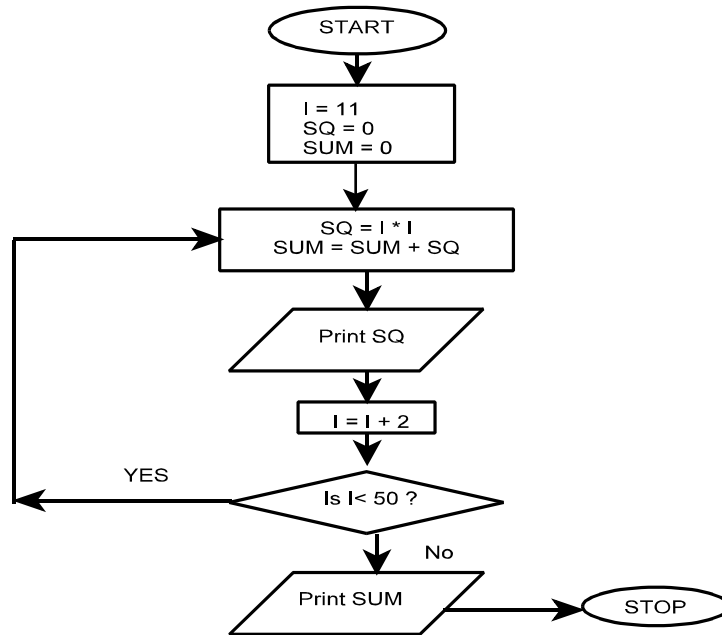
$X = X + Y$  // The value of X has been assigned the value of (X+Y)...(i)  
 $Y = X - Y$  // The value of Y has been assigned the value of (X-Y)..(ii)  
 $X = X - Y$  // The value of X has again been assigned the value of (X-Y), where the value of X and Y are calculated from the statement (i) and (ii)

**2012 - Nov [6]** Draw a flow chart to print the square of odd numbers between 10 to 50 and also print the sum of their square. (8 marks)



**Answer:**

The required flowchart is as follows:



**I:** Stores the value of odd number between 10 to 50 at each step.

**SQ :** Stores the calculated value of square of each odd number at each step.

**SUM :** Stores the sum of the squares of all the odd numbers till that step.

**2013 - May [6]** (b) Top town Municipality, is levying annual House Tax, as per following rules:

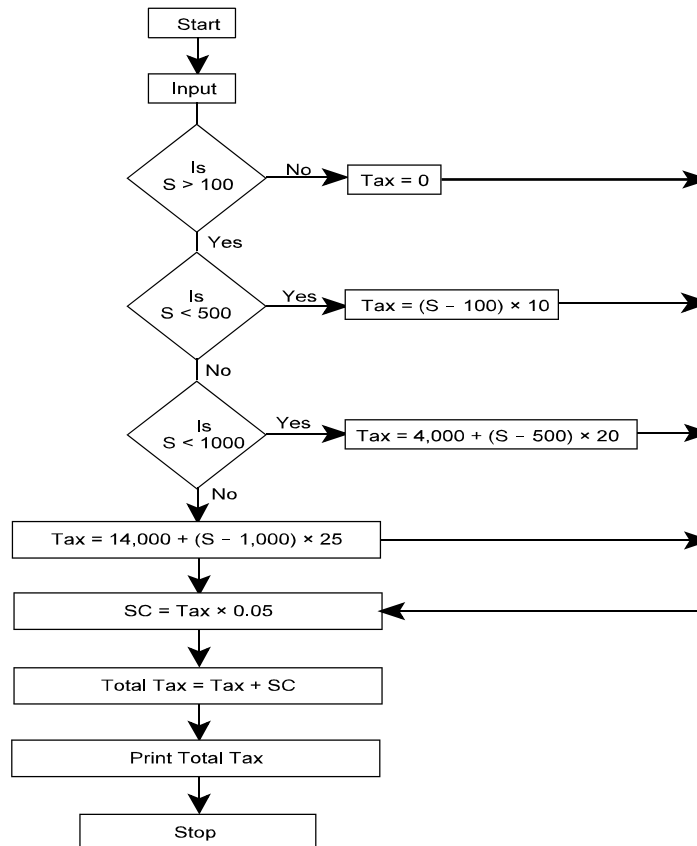
Size of House in Sq. Metre	House tax rate per Square Metre
Less than 100	Nil
Upto Next 400	₹ 10
Upto Next 500	₹ 20
More than 1000	₹ 25

There is a surcharge of 5% of the value of House Tax. Taking into account the above factors, draw a flow chart to compute appropriate total House Tax including surcharge for any one house. (6 marks)

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Solved Scanner IPCC Gr. II Paper - 7A

Answer:



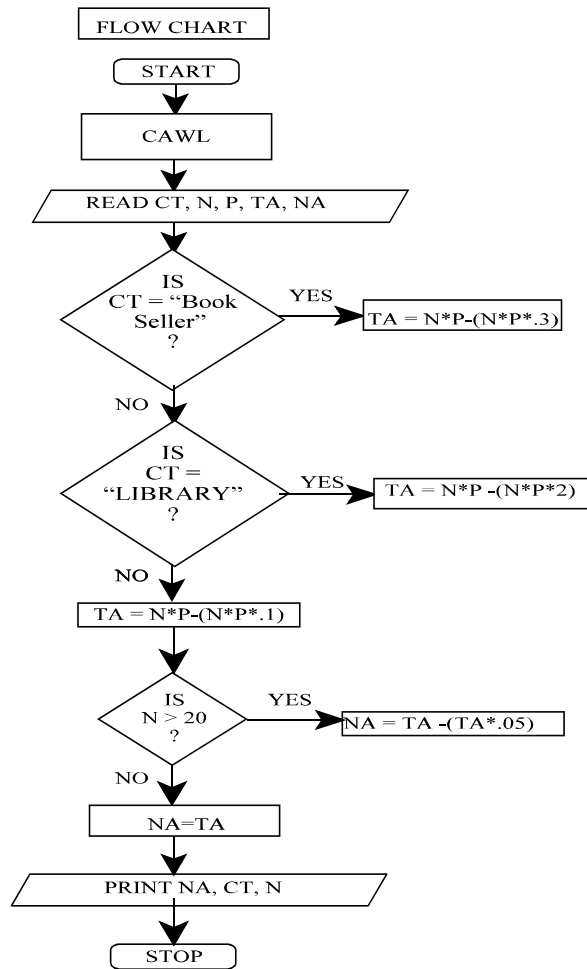
**2013 - Nov [6]** A book publisher of Information Technology offers discount to its customers on the basis of customer type as detailed below:

Customer Type	Discount
Book Seller	30%
Library	20%
Student	10%

Further if number of copies purchased is more than 20, then additional discount of 5% is allowed irrespective of customer type. Number of books, unit price of each book and customer type are given as input.

Draw a flow chart to calculate the net amount after all discount and print customer type, number of copies and net amount. (8 marks)

Answer:



**2014 - May [6]** A Housing Society in a newly developed Smart City has provided several advanced security systems to each house in that city. Based on the value of these advanced security systems installed in each house, the Society has divided all the houses in four categories and fixed the criteria for annual maintenance charges as under:

**7.28**■ **Solved Scanner IPCC Gr. II Paper - 7A**

House Category	Maintenance charges as % of value of advanced security systems installed at house
A	8%
B	6%
C	4%
D	3%

In addition to above there is a service tax @ 14.50% on the amount of maintenance charges. Considering house number and value of advanced security system installed, as input, draw a flow chart to have printed output as house number, maintenance charges, service tax and the total amount to be paid by each house owner. (8 marks)

**Answer:**

Let us define the variables first:

HNO: House Number

HC: House Category

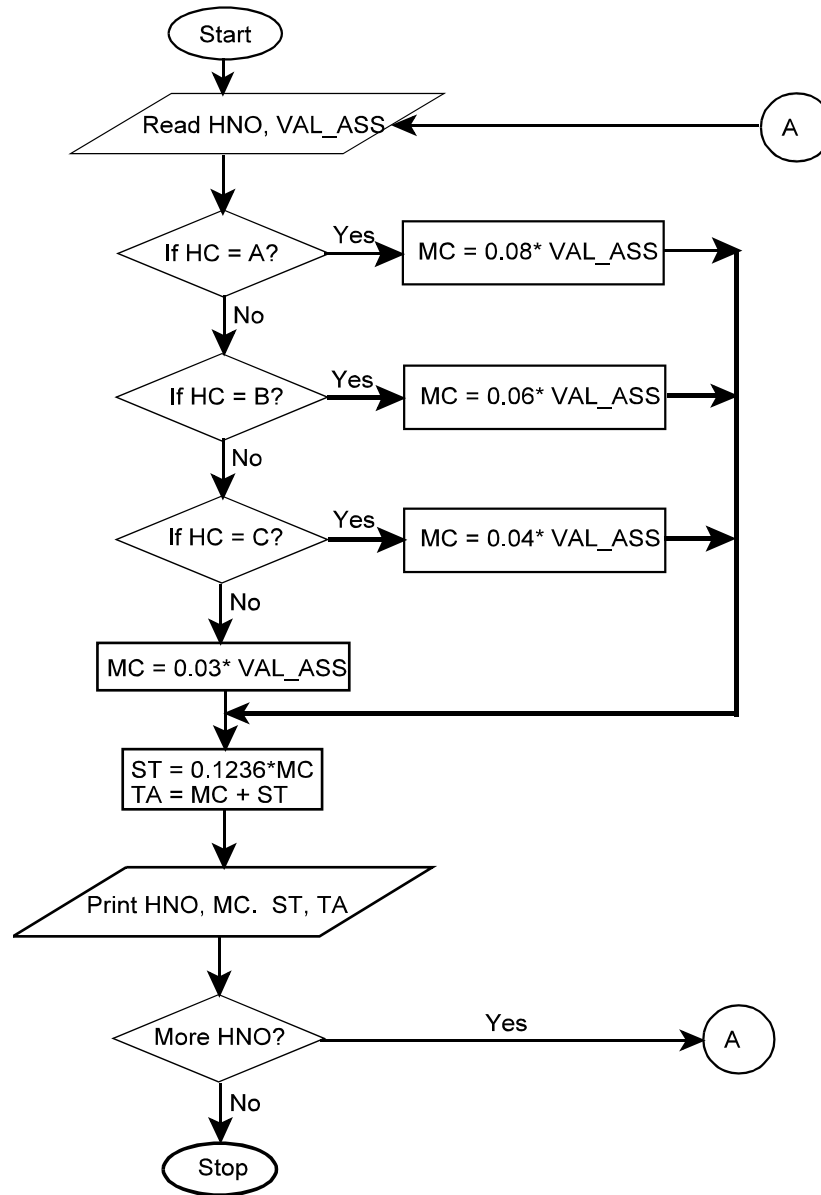
VAL ASS: Value of Advanced Security Systems

ST: Service Tax

MC: Maintenance Charges

The desired flowchart is given as follows:

TA: Total Amount



7.30

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**2015 - May [2]** ABC Limited is a software development company, which appointed 50 software engineers in August' 2014 at a monthly salary of ₹ 30,000. All these engineers shall be entitled for an increment in their monthly salary after six months. The increment on present monthly salary shall be based on their performance to be evaluated on a 100 marks scale as per details given below:

- Performance Marks  $< 70$ , then increment shall be 10% of present salary.
- $70 \leq$  Performance marks  $< 80$ , then increment shall be 20% of present salary.
- Performance Marks  $\geq 80$ , then increment shall be 30% of present salary.

Draw a Flow-Chart to enable to print the details like name of the engineer, performance marks, monthly increment amount and revised monthly salary for each of these 50 engineers. (8 marks)

**Answer:**

**Let us define the variables first:**

PM: Performance Marks

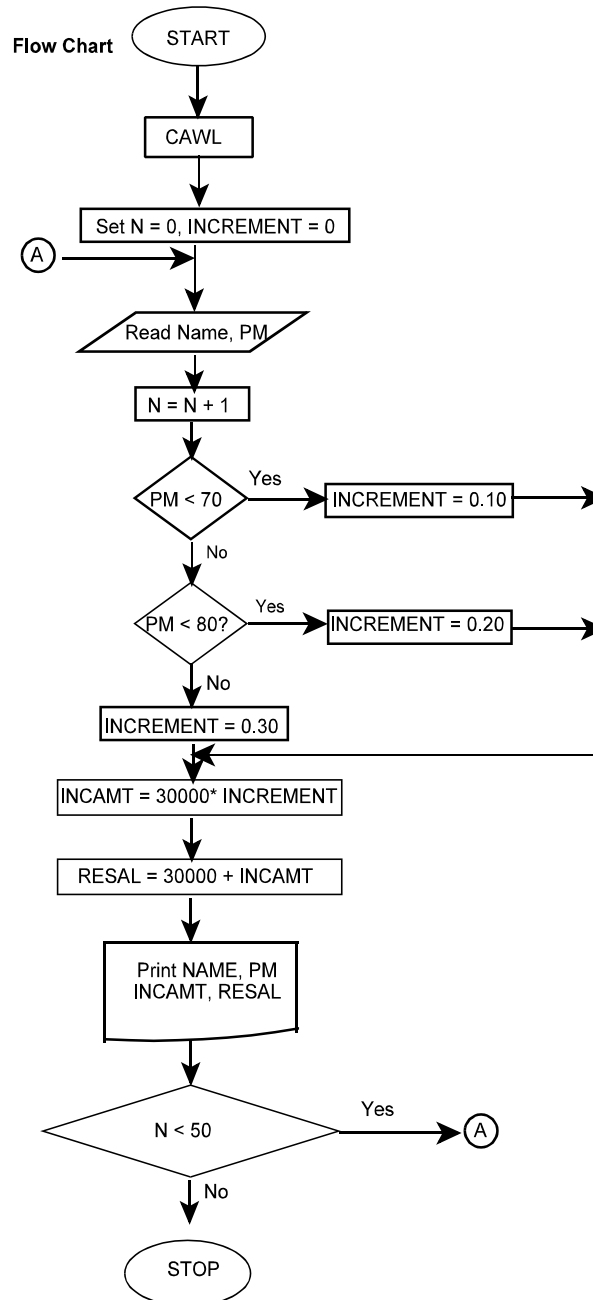
RESAL: Revised Monthly Salary,

INCAMT: Increment Amount,

NAME: Name of Engineer,

N: Pointer to track number of Engineers,

INCREMENT = 0



**2015 - Nov [2]** An E-Commerce site has the following cash back offers.

- (i) If the purchase mode is via website, an initial discount of 10% is given on the bill amount.
- (ii) If the purchase mode is via phone app, an initial discount of 20% is given on the bill amount.
- (iii) If done via any other purchase mode, the customer is not eligible for any discount.

Every purchase eligible to discount is given 10 reward points.

(a) If the reward points are between 100 and 200 points, the customer is eligible for a further 30% discount on the bill amount after initial discount.

(b) If the reward points exceed 200 points, the customer is eligible for a further 40% discount on the bill amount after initial discount.

Taking purchase mode, bill amount and number of purchases as input, draw a flowchart to calculate and display the total reward points and total bill amount payable by the customer after all the discount calculation. (8 marks)

**Answer:**

**Please see answer on next page**

Let us define the variables first:

PM: Purchase Mode

BA: Bill Amount TBA : Total Bill Amount

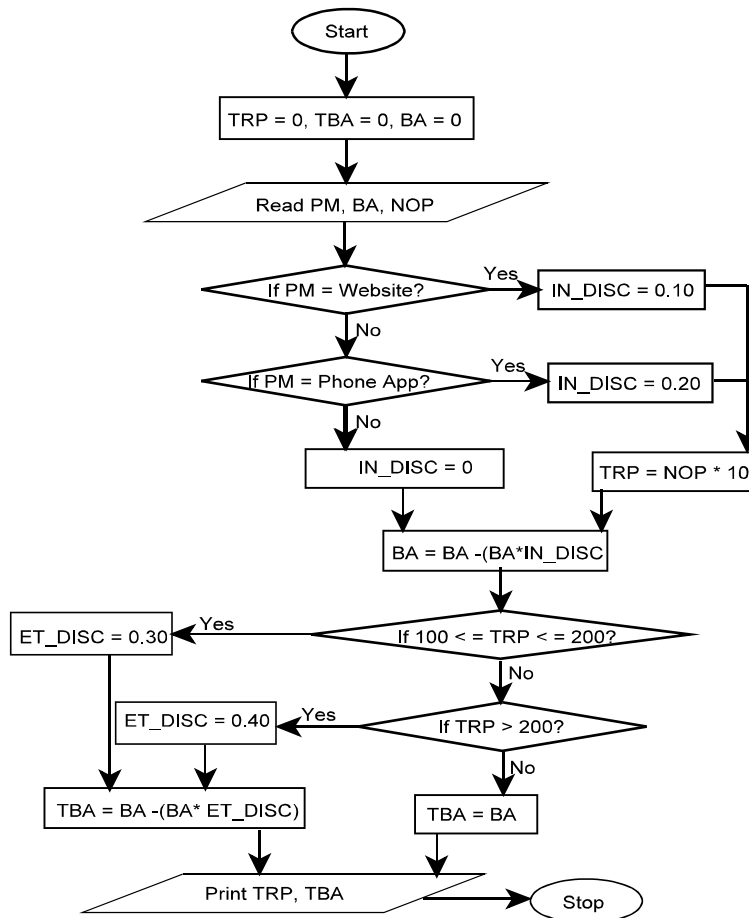
NOP: Number of Purchases TRP: Total Reward Points

IN\_DISC: Initial Discount

ET\_DISC: Extra Discount on purchases eligible to Initial Discount

N: Counter (to track the number of purchases)





**2016 - Nov [5]** Draw a Flowchart for the following process:

Leebay is a new e-commerce website that is setting up business in India. Leebay and their partner bank Paxis have come up with a joint promotion plan for which the following offers are proposed.

Customers can either log in through a mobile app or directly from the website:

- (1) If the payment mode chosen is 'Paxis Credit', then a 20% discount is given to the user.
- (2) If the payment mode chosen is 'Paxis Debit', then a 10% discount is given to the user.
- (3) If other payment modes are used, then no discount is given.

7.34

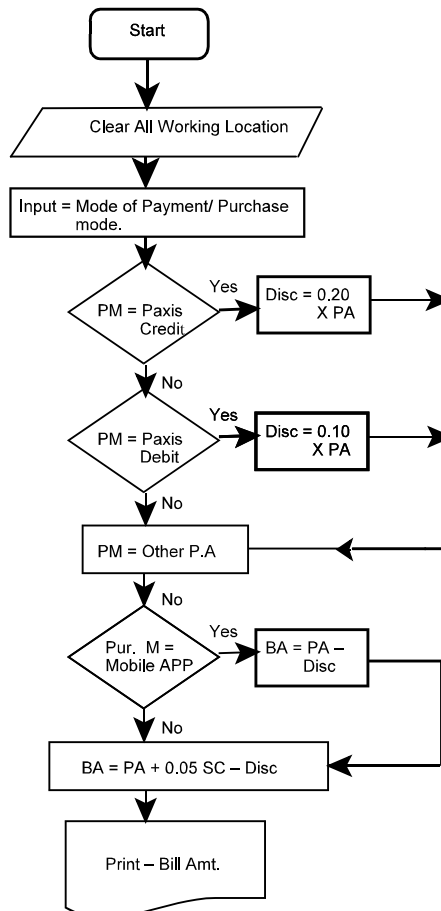
■ *Solved Scanner IPCC Gr. II Paper - 7A*

Also, to promote the downloads of its new smartphone app, the company has decided to give the following offer:

1. If the purchase mode is 'Mobile App', then no surcharge is levied on the user.
2. If any other purchase mode is used, then additional 5% surcharge is levied on the user. This surcharge is applied on the bill after all necessary discounts have been applied.

With bill amount, payment mode and purchase mode as inputs, draw a flowchart for the billing procedure for Leebay. (1 × 8 = 8 marks)

**Answer:**



**2017 - May [2]** A company is selling three types of products, namely, A, B and C to two different types of customers viz. dealers and retailers. To promote the sales, the company is offering the following discounts:

- (i) 10% discount is allowed on Product A, irrespective of the category of customers and the value of order.
- (ii) On product B, 8% discount is allowed to retailers and 12% discount to dealers, irrespective of the value of order.
- (iii) On product C, 15% discount is allowed to retailers irrespective of the value of order and 20% discount to dealers if the value of order is minimum of ₹ 10,000.

Draw a flowchart to calculate the discount for the above policy. (8 marks)

KZ - 2		Knowledge Zone	
<b>Decision - Table</b>			
<b>Meaning</b>	A decision table is a table which may accompany a flowchart defining the possible contingencies considered within the program and appropriate course of action for the same. It is a tabular presentation of system or program logic. Program logic is represented with the help of a table. They are based on IF / THEN relationships. The general format of a decision table is shown below.		
<b>General Format of Decision Table</b>			
Table Heading	Decision Rule (R1)	Decision Rule (R2)	Decision Rule (R...)
Condition Stub	Condition Entry (Yes/ No)	Condition Entry (Yes/ No)	Condition Entry (Yes/ No)
Action Stub.	Action Entry ( X / -)	Action Entry ( X / -)	Action Entry ( X / -)

<b>The components of a decision table in detail are as follows:</b>		
1	<b>Table Heading</b>	The name or number of decision table specifies the problem. Sometimes decision table are broken into parts for complex problems, where the table heading would identify the part of the program being represented.
2	<b>Condition Stub</b>	It sets forth a list of all the conditions that could exist in the program logic.
3	<b>Action Stub</b>	It lists all the possible actions which may be taken to solve the problem.
4	<b>Decision Rules</b>	A unique combination of 'conditions and 'actions' to be taken under those condition. There may be one or more decision rules numbered 1, 2, 3, 4.....n
5	<b>Condition Entry</b>	The possible permutations of answers to the questions in the condition stub. The condition entry can be 'Y' for yes or 'N' for No only.
6	<b>Action Entry</b>	It lists in the columns corresponding to the condition entries, the action contingent upon the set of answers to questions of that column.

<b>Types of decision tables</b>		
1	<b>Limited Entry Tables</b>	<ul style="list-style-type: none"> <li>In a limited entry table the condition and action statements are complete. The condition and action entries merely define whether or not a condition exists or an action should be taken.</li> <li>Condition Entry may contain a 'Y' or 'N' representing the existence or otherwise of a condition.</li> </ul>

		<ul style="list-style-type: none"> <li>Action Entry may contain a 'X' or ' - ' representing the execution or otherwise of a particular action.</li> </ul>
<b>2</b>	<b>Extended Entry Tables</b>	In this table the action and condition statements are not complete but are completed by action and condition entries. Following table represents an extended entry table.

<b>Credit Allowing facility</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
<b>Conditions:</b> Local Customer Identification proof	OK OK	V NOT OK	NOT OK OK	NOT OK NOT OK
<b>Actions :</b> Credit facility Credit Action	Allow —	— Reject order	— Reject order	— Reject order

<b>3</b>	<b>Mixed Entry Tables:</b>	It is a combination of limited and extended entry tables. While the limited and extended entry forms can be mixed within a table, only one form may be used within a condition statement/entry or an action statement/entry. Following example represents mixed entry table:
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<b>Credit Allowing facility</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
<b>Conditions:</b> Local customer Identification proof	Y OK	Y NOT OK	N OK	N NOT OK
<b>Actions :</b> Credit facility Credit Action	ALLOW —	— X	— X	— X


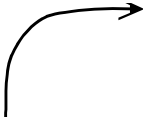
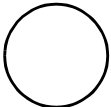
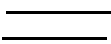
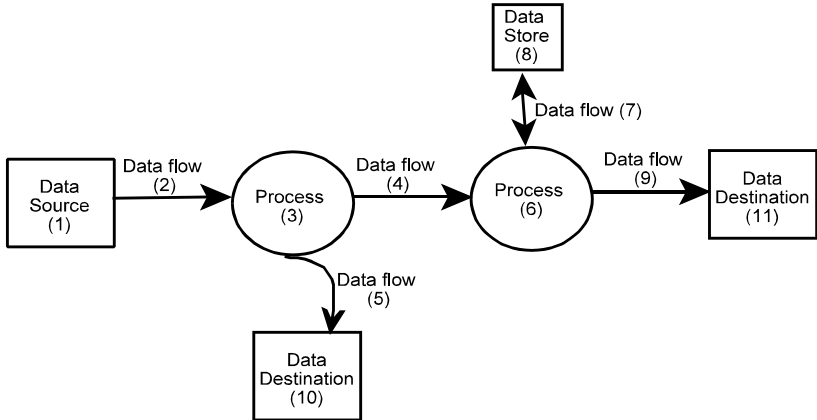
7.38

■ *Solved Scanner IPCC Gr. II Paper - 7A***KZ - 4****Knowledge Zone****Advantages of Decision Tables**

1.	<b>Easy to draw</b>	It is easy to construct compared to flowchart.
2.	<b>Accuracy</b>	A framework for a complete and accurate statement of processing or decision logic is provided.
3.	<b>Compact documentation</b>	Easily understood and effective means of communication between analysts and programmers and non-technical users.
4.	<b>Direct codification</b>	Direct conversion to computer program is possible.
5.	<b>Better Analysis</b>	Possible to check existence of all test combinations and alternatives are shown side by side to facilitate analysis of combinations.
6.	<b>Modularity</b>	For complex problems decision tables can be easily broken down to micro- decision tables.
7.	<b>Non-technical</b>	Computer knowledge is not required for table users.

**KZ - 5****Knowledge Zone****Data Flow Diagrams****1. Concept of Data Flow Diagram (DFD):**

- A Data flow diagram graphically describes the flow of data within an organisation. It is used to document existing system and to plan and design new ones. There is no ideal way to develop a DFD; different problems call for different methods. A DFD is composed of four basic elements : data sources and destinations, data flows, transformation processes, and data stores. Each is represented on a DFD by one of the symbols shown in figure given below.

Data Flow Diagram Symbols	
Symbol	Explanation
 <p>Represent Data Sources and destinations</p>	The people and organizations that send data to and receive data from the system are represented by square boxes. Data destinations are also referred to as data sinks.
 <p>Represent Data flows</p>	The flow of data into or out of a process is represented by curved or straight lines with arrows :
 <p>Represent Transformation process</p>	The processes that transform data from inputs to outputs are represented by circles. They are often referred to as bubbles.
 <p>Represent Data stores</p>	The storage of data is represented by two horizontal lines.
<p>These four symbols are combined to show how data are processed</p> <p><b>For Example :</b> In data flow</p>  <pre> graph LR     DS1[Data Source (1)] -- Data flow (2) --&gt; P3((Process (3)))     P3 -- Data flow (4) --&gt; P6((Process (6)))     P3 -- Data flow (5) --&gt; DD10[Data Destination (10)]     P6 &lt;--&gt;  Data flow (7)  DS8[Data Store (8)]     P6 -- Data flow (9) --&gt; DD11[Data Destination (11)]     </pre>	

- Input to process (3) is data flow, (4) which comes from data source (1). The outputs of process (3) are data flows (4) and (5) Data flow (5) is sent to data destination (10). Process (6) uses data flow (4) and (7) as input and produces data flow (9) and (7) as output. Data flow (7) comes from and returns to data store (8). Data flow is sent to data destination (11).
- Above figure assigns specific titles to each of the processes depicted in symbols.
- These figures will be used to examine the four basic elements of a DFD in more detail.

## 2. Components of Data Flow Diagram :

(i)	<b>Data Flows</b>	<ul style="list-style-type: none"> <li>• It represents the flow of data between processes, data stores, data source and destinations.</li> <li>• Data flow arrows are labelled to indicate the type of data being passed.</li> <li>• Data that pass between data stores and a data source/destination must go through some form of data processing, i.e. through a transformation process.</li> </ul>
(ii)	<b>Data Source and Destinations</b>	<ul style="list-style-type: none"> <li>• An entity can be both a Source and a Destination.</li> <li>• A source or destination symbol on the DFD represents an organisation or individual that sends or receives data used or produced by the system.</li> <li>• A Data Flow can consist of one or more pieces of datum. As data flow may be composed of more than one data element, it must be determined whether to show one or more lines. The determining factor is whether the data elements always flow together.</li> </ul>



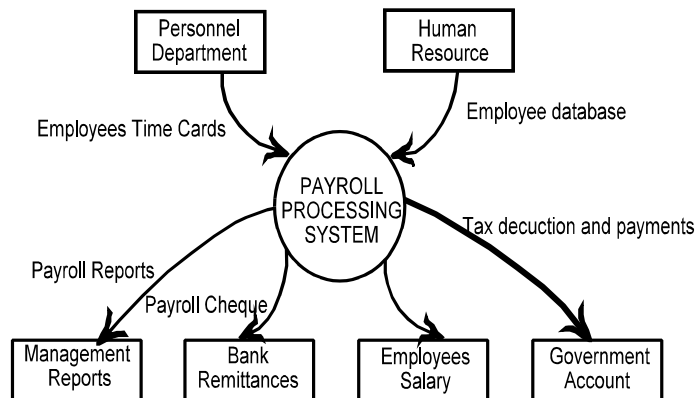
(iii)	<b>Processes</b>	<ul style="list-style-type: none"> <li>• Process represent the transformation of data into information.</li> <li>• The output is sent to Data Stores or Data Destinations.</li> </ul>
(iv)	<b>Data Stores</b>	<ul style="list-style-type: none"> <li>• A Data Store is a temporary or permanent repository of data.</li> <li>• DFDs do not show the physical storage medium (disks, paper, etc.) used to store the data.</li> <li>• Like other DFD elements, Data Store names should be descriptive.</li> <li>• As in above figure, item (8) data store are represented by horizontal lines, with the data store's name recorded inside.</li> </ul>
<b>3. Sub-division of Data Flow Diagrams</b>		
(i)	<b>Need for Sub-Division</b>	Data flow Diagrams are sub-divided into successively lower levels in order to provide increasing amount of detail. This is because only few systems can be fully diagramed on one sheet of paper. Moreover, different Users have different needs, and hence, various DFD levels covering each user area can only satisfy their requirements.
(ii)	<b>Context Diagram :</b>	The highest-level DFD is referred to as a <b>Context Diagram</b> . A context diagram provides the reader with a summary level view of a system. It depicts a data processing system and the external entities that are the sources and destinations of the system's inputs and outputs.
(iii)	<b>An example Context Diagram</b>	is shown below. Example shows the payroll processing procedures. On an inference, it is understood that the Payroll Processing System

7.42

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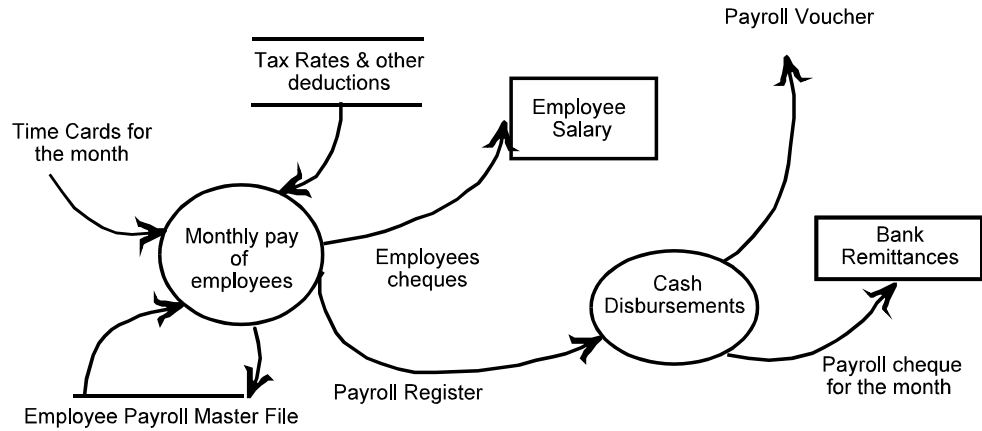
receives time cards from the Personnel Department and employee data from the Human Resources Department. When these data are processed, the system produces:

- (a) Tax reports for payments into Government Account,
- (b) Employee pay cheques,
- (c) A cheque for the entire salary amount to be deposited in the Bank Account, and
- (d) Payroll Reports for submission to Management for review.



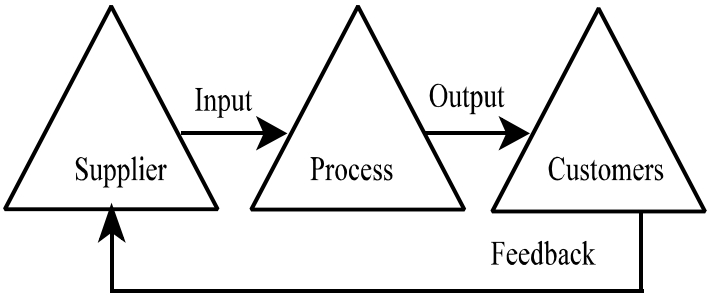
- 4. Sub-division of DFD:** Sub-dividing the Context Diagram leads to modules of lesser levels. In the aforesaid example, if preparation of employee pay cheques is taken as a lower level, the activities concerned with it will be represented by a separate sub-divided DFD. The sub-divided DFD for preparation of pay cheques will involve activities like computation of monthly pay, tax deductions, other deductions, recovery of advances, drawing up cheques in the employees name, preparation of payroll voucher and updation of the payroll Master File.

The process of sub - divided Data is represented below :



[Figure shows the sub-divided Context Diagram of DFD]

KZ - 6		Knowledge Zone	
S. No.	Basis of Difference	Flow Chart	Data Flow Diagram
1.	Meaning	Flow chart presents steps to complete a process.	Data Flow Diagram presents the flow of data.
2.	Input/Output	Flow chart does not have any input from or output to an external source.	Data Flow Diagram describes the path of data from an external source to internal source or <i>vice versa</i> .
3.	Nature	Flow chart shows how to make a system function.	Data Flow Diagram defines the functionality of a system.
4.	Used in	Flow chart is used in designing a process.	Data Flow Diagram is used to describes the path.

KZ - 7	Knowledge Zone
<b>Business Process Re-engineering (BPR)</b>	
<b>Business Processes</b>	<p>Business processes are simply set of activities that transform a set of inputs into set of outputs (goods or services)</p>  <p>In today's competitive market place, the business processes need to be improved to stay in the market.</p> <p>In present days, customers have command over the market, and they are insisting on better quality products and services; and companies are forced to improve their business process in order to satisfy the customers' needs.</p>
<b>Example of Business Process</b>	<ol style="list-style-type: none"> <li>1. <b>Forecasting</b> - Shows Production quantities, Sales figures, Fund flows. etc. over a period of time, say next five years.</li> <li>2. <b>Funds Management</b> - Gives an outline of the necessity of funds and the means of raising such funds, Uncertainty and Risk factors are also considered. A Simulation with "What if" type analysis is carried out.</li> <li>3. <b>Quality Control</b> - Ensuring that the finished products meet the desired quality standards.</li> </ol>

	<ol style="list-style-type: none"> <li>4. <b>Material Requirement Planning</b> - Process of making new products from Raw materials and include production scheduling requirement planning, activities for monitoring and planning of actual production.</li> <li>5. <b>Budget Allocation</b> - Estimation of the desirable mix of funds allocated to different functions using computerised algorithms/relationships.</li> <li>6. <b>Price Planning</b> - Determining the price of the products. Uses technology application to pricing support, such as commercial database services, feedback and sensitivity analysis.</li> </ol>
<b>BPR: Objectives</b>	<p>BPR aims at <b>major transformation</b> of the business processes to achieve dramatic improvement. The business objectives of the enterprise e.g. profits, customer-satisfaction through optimal cost, quality, deliveries, etc. are achieved by transformation of the business processes which may, or may not, require the use of Information Technology (IT).</p>
<b>BPR Dramatic Improvement</b>	<p>BPR aims at to achieve dramatic improvements by major transformation of business processes. Business Process Re-engineering (BPR) is the <b>fundamental re-thinking</b> and <b>radical re-design</b> of processes to achieve <b>dramatic improvement</b>, in critical, contemporary measures of performance such as cost, quality, service and speed.</p> <ol style="list-style-type: none"> <li>1. <b>Fundamental Re-thinking</b> means asking the question "why do you do what you do ?". It seeks to eliminate a business process altogether, if it does not add any value to the customer. It seeks to ensure that only value-added activities and processes are carried out by the business.</li> </ol>

	<ol style="list-style-type: none"> <li>2. <b>Radical Re-design</b> means BPR aims at re-inventing and not just enhancing or improving. A "clean slate approach" of BPR says that "Whatever you were doing in the past is all wrong", "do not get biased by it" or "re-assemble your new system to re-design it afresh". It focuses on "new methods of doing things" rather than just a "better way of doing the old methods".</li> <li>3. <b>Dramatic Achievement</b> means substantial positive growth, e.g. to achieve 80% or 90% reduction in delivery time, WIP stocks etc. and not just mere 2% reduction. This is possible only by making major improvements and breakthroughs, and not small incremental changes like that in Total Quality Management (TQM) or suggestions schemes.</li> </ol>
<p><b>Principles of BPR</b></p>	<ol style="list-style-type: none"> <li>1. In many organizations the business process is split into many activities and same is assigned to different people. So, single person cannot be held responsible for any business outcome. In such cases, it is difficult to determine the status of work and even more difficult to debug the process problem if it occurs. BPR designs the process, which avoids this type of problem i.e. wherever possible there should be single point responsibility for any business process.</li> <li>2. When different people perform work in parallel, it is essential to design a process that demands continuous communication and co-ordination among these people. Otherwise, Integration problems are sure to come.</li> </ol>

	<p>3. Data should be stored in on-line common database form, so that once collected it need never be re-entered.</p> <p>Using these principles of BPR the processes in the organization are re-designed to improve the processes in terms of cost, accuracy, quality and speed etc.</p>
<p><b>Need for BPR</b></p>	<ol style="list-style-type: none"> <li>1. The objective of introducing an ERP program is to implement such applications and infrastructure architecture, to effectively and completely support the Enterprise's business plan and business processes.</li> <li>2. ERP integrates effectively with business management issues like BPR, TQM, Mass Customisation, Service Orientation and Virtual Corporation etc.</li> <li>3. When an enterprise does not have optimised business processes, ERP implementation needs a process re-engineering which enables to capture knowledge of the experts into the system, thereby gaining considerable benefits in productivity. Hence, there is a need for re-engineering business processes.</li> </ol>
<p><b>Role of BPR in ERP</b></p>	<p>ERP provides the best business practices therefore, ERP use requires organizations, first to change their business processes to make them in best possible manner as specified by ERP or simply said, carry out BPR if you want to get true benefits of ERP i.e. for successful ERP implementation first BPR is required.</p>

7.48

■ *Solved Scanner IPCC Gr. II Paper - 7A***KZ - 8****Knowledge Zone**

BPM refers to the closed loop interactive management of business over its complete life cycle. All the key terms of the definition are explained below:

<b>1.</b>	<b>Achievement</b>	Realizing the strategic objectives as outlined in the organization's strategic plan.
<b>2.</b>	<b>Organization</b>	The organization in this context refers to an enterprise or parts of an enterprise perhaps a business unit that is discrete in its own right.
<b>3.</b>	<b>Objectives</b>	The objectives of a BPM implementation range from the strategic goals of the organization through to the individuals process goals.
<b>4.</b>	<b>Improvement</b>	It is about making the business processes more efficient and effective.
<b>5.</b>	<b>Management</b>	It refers to the process and people performance measurement and management. It is about organizing all the essential components and subcomponents for a processes.
<b>6.</b>	<b>Essential</b>	Not every process in an organization contributes towards the achievement of the organization's strategic objectives. Essential processes are the ones that do.
<b>7.</b>	<b>Business</b>	An implementation of BPM must have an impact on the business by delivering benefits.



**KZ - 9****Knowledge Zone****The key benefits of Business Process Automation are as follows:**

<b>1. Cost Saving</b>	Automation leads to saving in time and labor costs through higher efficiency and better management of the people involved.
<b>2. Strategic Edge</b>	Today, in order to survive, businesses need to adopt automation. Automation helps business to reach strategic edge.
<b>3. Quick Service</b>	Automation shortens cycle times in the execution of processes through improved and refined business work flows and helps enterprises to serve their customers faster and better.
<b>4. Reduces Error</b>	BPA removes human participation in the process, which is the source of many errors.
<b>5. Transforming data into information</b>	BPA can, apart from collecting and storing data also analyze data and make it available in a form that is useful for decision-making.
<b>6. Improving the effectiveness of performance and process</b>	In many cases, tasks that must be done manually are the bottlenecks in the process. Automating those manual tasks speeds up the effective throughput of the application.
<b>7. Making users more efficient and effective</b>	People can focus their energies on the tasks they do best, allowing the computers to handle those that machines are best suited for.

**7.50**■ **Solved Scanner IPCC Gr. II Paper - 7A****\*Similarly Asked Questions**

No.	Category	Question	Marks	Frequency
1	Short Notes/ Descriptive	Write short notes on the following: Program Debugging 10 - Nov [7] (c), 13 - May [7] (ii)	2, 2	2 Times

**Table Showing Marks of Compulsory Questions**

Year	12 N	13 M	13 N	14 M	14 N	15 M	15 N	16 M	16 N	17 M
Dt. Between					2					
Descriptive						2		2		2
Total					2	2		2		2

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\* This table contains the Similarly Asked Questions. Please pay more attention to such questions.