

Chapter 4 : Methods of calculating National Income

Methods of Measuring National income (NNP_{FC})

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graph TD; A[Methods of Measuring National income (NNP_FC)] --> B[Income Method]; A --> C[Expenditure Method]; A --> D[Value Added method];
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Income Method

Expenditure Method

Value Added method

1. Income Method

- ❑ It is also called Distributed Share Method or Factor Payment Method**
- ❑ According to this method, national income is estimated in terms of factor payments (compensation of employees, rent, interest and profit) to the owners (households) of factors of production (labour, land, capital and enterprise) during an accounting year.**
- ❑ Sum total of factor incomes generated within the domestic territory of a country (by the residents or non-residents) is called domestic income.**
- ❑ Net factor income from abroad is added to domestic income to find national income.**

Income Method

Domestic Income (NDP_{FC})

**Compensation
of employees**

+

**Operating
Surplus**

+

**Mixed
Income**

- 1. Wages & salaries
- 2. Payments in kind
- 3. Employer's cont.
to social securities
- 4. Pension on retirement

Profit + Rent + Interest

→ Dividend

→ Corporate profit tax

→ Undistributed profit

Incomes of the self
employed persons using
their own labour, land,
capital and
entrepreneurship in their
household enterprises.

1. Compensation of Employees : It includes the following components

(i) Wages and Salaries in Cash

It refers to cash paid or transferred to the salary account of the employees by the employers as a reward for the work done during the period of an accounting year.

(ii) Payments in Kind

It refers to benefits in kind (like rent-free accommodation) given to the employees by the employers.

(iii) Employers' Contribution to Social Security

It refers to such payments as provident fund contributions by the employers on behalf of the employees.

(iv) Pension on Retirement

To be specific, it does not refer to old-age pensions. It only refers to pension payments as a part of the 'Service-Contract' between the employer and the employees.

2 . Operating surplus

It refers to income from property and entrepreneurship.
It includes the following items:

- (a) Rent,**
- (b) Interest, and**
- (c) Profit**

Profit is further split into three components as under:

(i) Dividends

That part of the profit which is distributed among the shareholders. It is also called 'distributed profit'.

(ii) Corporate/Corporation Profit Tax

That part of the profit which is paid to the government by way of 'profit tax'.

(iii) Undistributed Profit

That part of the profit which is retained by the firms for future use, particularly to meet some contingent expenses. It is also called 'corporate saving' or 'undistributed profits'.

3 . Mixed income

Mixed income refers to the incomes of the self-employed persons using their own labour, land, capital and entrepreneurship in their household enterprises. These incomes are a mixture of wages, rent, interest and profit. That is why it is called mixed income. Separate estimation of wages, rent, interest and profit is not possible. Because, factors of production are not hired/purchased from the market.

Precautions Regarding Income Method

- ❖ Transfer earnings like old-age pensions, unemployment allowances, scholarships, pocket expenses, etc., should not be included in national income.
- ❖ Income generated in terms of black money is not included. Income from illegal activities like, theft and gambling, etc., is not to be included in national income.
- ❖ Income in terms of windfall gains (like from lotteries) should not be included as there is no value addition corresponding to windfall gains. Likewise, income in the form of capital gains is not to be treated as factor income.

- ❖ **Corporate tax ,dividends and undistributed profits are components of corporate profits. Once profit is included in the estimation of national income, any of these components should not be separately added**
- ❖ **Income tax is paid out of compensation of employees. It should not be added in the estimation of national income.**
- ❖ **Wages and salaries in cash and kind-as well as social security contributions by the employers on behalf of employees are all components of compensation of employees. Any of these components should not be separately added once compensation of employees is included in the estimation of national income.**

Q.1 Given the following data and using Income method Calculate:

(a) Net domestic Income

(b) Gross domestic income

(c) Net National Income

(d) Net national Income at market price

Particulars	in crores
Indirect Taxes	9,000
Subsidies	1,800
Depreciation	1,700
Mixed Income of self employed	28,000
Operating surplus	10,000
Net Factor Income from abroad	-300
Compensation of employees	24,000

Solution 1 :

(a) Calculation of net domestic income (NDP_{FC})

**NDP_{FC} = Mixed income of Self-employed + Operating surplus
+ compensation of Employees**

$$\text{NDP}_{\text{FC}} = 28,000 + 10,000 + 24,000$$

$$\text{NDP}_{\text{FC}} = 62,000$$

(b) Calculation of Gross domestic income (GDP_{FC})

GDP_{FC} = NDP_{FC} + Depreciation

$$\text{GDP}_{\text{FC}} = 62,000 + 1,700$$

$$\text{GDP}_{\text{FC}} = 63,700$$

(c) Calculation of Net National income (NNP_{FC})

$$NNP_{FC} = NDP_{FC} + NFIA$$

$$NDP_{FC} = 62,000 + (-300)$$

$$NDP_{FC} = 61,700$$

(D) Calculation of Net National income (NNP_{MP})

$$NNP_{MP} = NNP_{FC} + NIT$$

$$GDP_{FC} = 61,700 + (9,000 - 1,800)$$

$$GDP_{FC} = 68,900$$

Q.2 Given the following data and using Income method Calculate:

(a) Domestic Income

(b) National income

Particulars	in crores
Wages	10,000
Rent	5,000
Interest	400
Dividend	3,000
Mixed Income of self employed	400
Undistributed profit	200
Social security contribution	400
Corporate profit tax	400
Net Factor Income from abroad	1,000

Solution 2 :

(a) Calculation of Domestic income (NDP_{FC})

NDP_{FC} = Compensation of emp. + operating surplus + mixed income

NDP_{FC} = Wages + Social securities contribution + Rent + Interest
+ Dividend + Undistributed profit + Corporate profit tax
+ Mixed income

NDP_{FC} = 10,000 + 5,000 + 400 + 3000 + 400 + 200 + 400 + 400

NDP_{FC} = 19,800

(b) Calculation of National income (NNP_{FC})

$$NNP_{FC} = NDP_{FC} + NFIA$$

$$NNP_{FC} = 19,800 + 1,000$$

$$NNP_{FC} = 20,800$$

Q.3 Calculate wages and salaries from following data :

Particulars	in crores
Royalty	50
Rent	100
Interest	400
Net indirect tax	70
Net national product at M.P	1,700
Profit	300
Net factor income to Abroad	-20
Consumption of Fixed capital	120
Social security Cont. by employers	60
Social security Cont. by employees	40

Solution 3 :

$$\text{NDP}_{\text{FC}} = \text{NNP}_{\text{MP}} - \text{NFIA} - \text{NIT}$$

$$\text{NDP}_{\text{FC}} = 1700 - 20 - 70$$

$$\text{NDP}_{\text{FC}} = 1700 - 20 - 70$$

$$\text{NDP}_{\text{FC}} = 1610$$

$$\text{NDP}_{\text{FC}} = \text{Wages and salaries} + \text{social security cont. by employers} + \text{Rent} + \text{Royalty} + \text{Interest} + \text{Profit}$$

$$1610 = \text{Wages and salaries} + 60 + 100 + 50 + 400 + 300$$

$$\text{Wages and salaries} = 1610 - 910$$

$$\text{Wages and salaries} = 700$$

Q.4 From the following data , calculate operating surplus

Particulars	in crores
Net indirect tax	300
Gross Domestic product at M.P	3,120
Employees contribution to social sec.	200
Compensation of employees	1,600
Rent	200
Interest	150
Net factor income From abroad	-20
Depreciation	200

Solution 4 :

$$\text{NDP}_{\text{FC}} = \text{GDP}_{\text{MP}} - \text{depreciation} - \text{NIT}$$

$$\text{NDP}_{\text{FC}} = 3120 - 200 - 300$$

$$\text{NDP}_{\text{FC}} = 2620$$

$$\text{NDP}_{\text{FC}} = \text{Compensation of employees} + \text{operating surplus} + \text{M.I}$$

$$2620 = 1600 + \text{operating surplus}$$

$$\text{operating surplus} = 1020$$

Q.5 Calculate Mixed income from following data :

Particulars	in crores
(i) Profit	500
(ii) Rent	200
(iii) Consumption of fixed capital	100
(iv) Compensation of employees	1,000
(v) National income	2,700
(vi) Corporation tax	200
(vii) Net retained earnings of private enterprises	150
(viii) Net factor income from abroad	-50
(ix) Interest	250
(x) Net indirect taxes	160

Solution 5 :

Calculation of NDP_{FC}

$$NDP_{FC} = NNP_{FC} - NFIA$$

$$NDP_{FC} = 2700 - (-50)$$

$$NDP_{FC} = 2750$$

$$NDP_{FC} = \text{Compensation of employees} + \text{Rent} + \text{Interest} + \text{Profit}$$

$$2750 = 1,000 + (200 + 250 + 500) + \text{Mixed Income}$$

$$2750 = 1950 + \text{Mixed Income}$$

$$\text{Mixed Income} = 800$$

Q.6 Calculate 'Gross National Product at Market Price:

Particulars	in crores
(i) Rent	100
(ii) Net current transfers to rest of the world	30
(iii) Social security contributions by employers	47
(iv) Mixed income	600
(v) Gross domestic capital formation	140
(vi) Royalty	20
(vii) Interest	110
(viii) Compensation of employees	500
(ix) Net domestic capital formation	120
(x) Net factor income from abroad	-10
(xi) Net indirect tax	150
(xii) Profit	200

Solution 6 :

Calculation of Domestic income (NDP_{FC})

NDP_{FC} = Compensation of emp. + operating surplus + mixed income

NDP_{FC} = Compensation of employees + (Rent + Interest + royalty + profit) + MI

NDP_{FC} = 500 + (100 + 20 + 110 + 200) + 600

NDP_{FC} = 1,530

Calculation of GDP_{MP}

GDP_{MP} = NDP_{FC} + Depreciation + NFIA + NIT

GDP_{MP} = 1,530 + (140 - 120) + (-10) + 150

GDP_{MP} = 1,690

Q.7 Calculate National Income :

Particulars	in crores
(i) Rent	200
(ii) Net factor income to abroad	10
(iii) National Debt Interest	15
(iv) Wages and salaries	700
(v) Current transfers from Government	10
(vi) Undistributed profits	20
(vii) Corporation tax	30
(viii) Interest	150
(ix) Social security contributions by employers	100
(x) Net domestic product accruing to govt.	250
(xi) Net current transfers to rest of the world	5
(xii) Dividend	50

Solution 7 :

Calculation of Domestic income (NDP_{FC})

NDP_{FC} = Compensation of emp. + operating surplus + mixed income

**NDP_{FC} = (Wages and salaries + social security cont. by employers) +
Rent + Interest + Undistributed Profit + corporation tax + Divi.**

$$\mathbf{NDP_{FC} = (700 + 100) + (200 + 150 + 20 + 30 + 50)}$$

$$\mathbf{NDP_{FC} = 1,250}$$

Calculation of NNP_{FC}

$$\mathbf{NNP_{FC} = NDP_{FC} + NFIA}$$

$$\mathbf{GDP_{MP} = 1,250 + (- 10)}$$

$$\mathbf{GDP_{MP} = 1,240}$$

2. Expenditure Method

- ❖ According to this method, national income is estimated in terms of expenditure on the purchase of final goods and services produced in the economy during an accounting year.
- ❖ It is also called Consumption and Investment Method, or Income Disposal Method.
- ❖ Expenditure on final goods and services produced within domestic territory during an accounting period is known as Final expenditure.
- ❖ Final expenditure is broadly classified into four categories, viz.
 - (i) Private final consumption expenditure (C)
 - (ii) Government final consumption expenditure (G)
 - (iii) Investment expenditure or gross domestic capital formation (I)
 - (iv) Net exports ($X - M$).

GDP_{MP}

**Consumption
expenditure**

+

**Investment
expenditure**

+

**Net
Exports**

**Private Final
consumption
expenditure
(C)**

**Government
Final
consumption
expenditure
(G)**

**Fixed Investment
(Gross domestic
fixed capital
formation)**

**Inventory
Investment
(Change in
stock)**

**Exports (X)
-
Imports (M)**

$$GDP_{MP} = C + G + GDCF + (x - m)$$

$$NNP_{FC} = GDP_{MP} - \text{Depreciation} + NFIA - NIT$$

(1) Private Final Consumption Expenditure (C)

❖ It refers to expenditure on final goods and services by the individuals, households and non-profit private institutions.

- ❑ consumer services.
- ❑ consumer non-durable goods, that is, goods which are not repeatedly used like butter or milk.
- ❑ consumer durable goods which are repeatedly used for several years, like furniture and washing machines.
- ❑ Imputed value of expenditure on goods produced for self consumption.
- ❑ Imputed rent of owner occupied house.

(2) Government Final Consumption Expenditure (G)

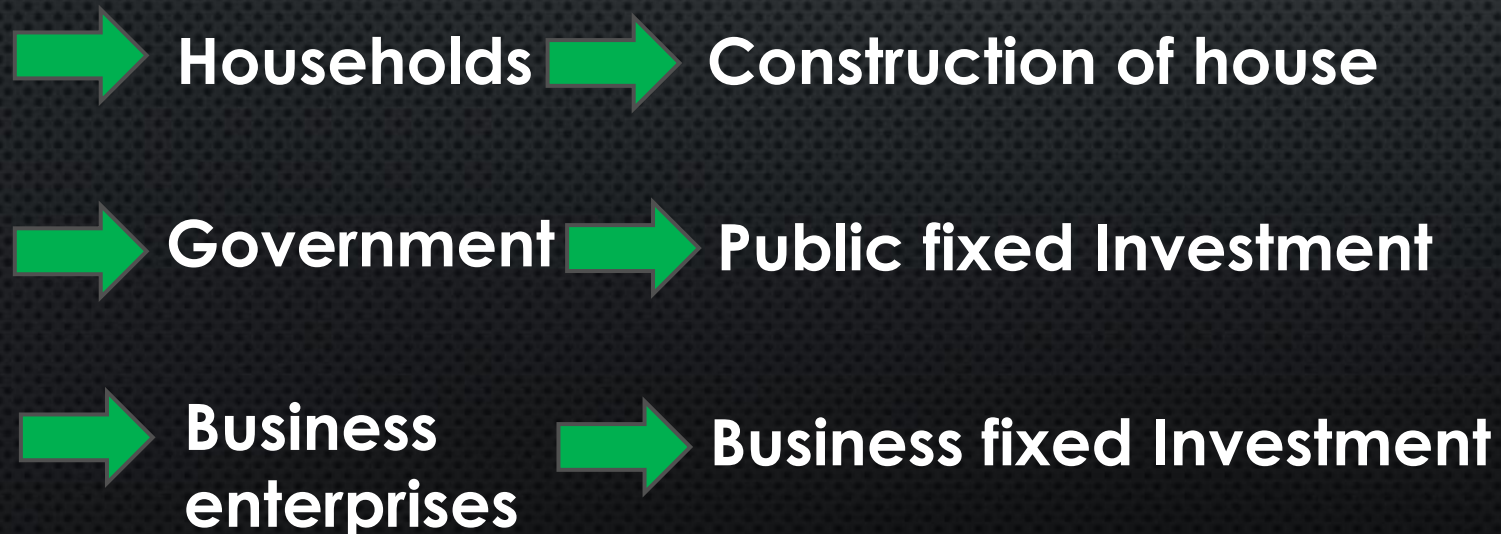
❖ It refers to expenditure on final goods and services by the government.

- ❑ Expenditure on intermediate consumption.
(Defence , Education , law & order etc.)
- ❑ Expenditure on compensation of government employees.
- ❑ Consumption of fixed capital (Depreciation).

(3) Investment expenditure or Gross domestic capital formation (GDCF)

Gross domestic capital formation (GDCF)

Gross domestic fixed capital formation (GDCF) or Fixed investment



Inventory investment

Difference between closing stock of a year and opening stock of a year.

$$\Delta \text{ Stock} = (\text{Closing stock} - \text{Opening stock})$$

(4) Net Exports (X - M)

- ❖ **Net exports refer to the difference between exports and imports during an accounting year.**
- ❑ **Exports are an expenditure on the domestically produced final goods and services hence it should be added in total exp.**
- ❑ **Imports are an expenditure on the goods and services produced abroad hence it should be subtracted from total exp.**
- ❑ **Here**
 - X = Total exports**
 - M = Total imports**

Precautions regarding expenditure method

- ❖ Expenditure on Intermediate goods will not be included in national income.
- ❖ Expenditure on Transfer payments is not to be included.
- ❖ Expenditure on second-hand goods is not to be included as they have already been included when they were originally purchased. However any commission or brokerage on such goods is included.
- ❖ Purchase of financial assets like shares , debentures , bonds will not be included.

**Q.8 From the following data , calculate the GDP at both
(a) Market price (b) Factor cost**

Particulars	in crores
Gross Investment	90
Net exports	10
Net indirect taxes	5
Depreciation	15
Net Factor Income From abroad	(-5)
Private consumption expenditure	350
Government purchases of goods and services	100

Solution 8 :

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + \text{GDCF} + (\text{X}-\text{M})$$

$$\text{GDP}_{\text{MP}} = 350 + 100 + 90 + 10$$

$$\text{GDP}_{\text{MP}} = 550 \text{ crore}$$

Calculation of GDP_{FC}

$$\text{GDP}_{\text{FC}} = \text{GDP}_{\text{MP}} - \text{NIT}$$

$$\text{GDP}_{\text{FC}} = 550 - 5$$

$$\text{GDP}_{\text{FC}} = 545 \text{ crore}$$

Q.8 Find NDP_{FC} from the following data

Particulars	in crores
Gross domestic fixed Investment	10,000
Inventory Investment	5,000
Indirect taxes	1,000
Depreciation	2,000
Subsidies	2,000
consumption expenditure	20,000
Residential construction investment	6,000

Solution 9 :

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + \text{GDCF} + (\text{X}-\text{M})$$

$$\text{GDP}_{\text{MP}} = \text{CE} + (\text{GDFCF} + \text{Inventory Investment})$$

$$\text{GDP}_{\text{MP}} = 20,000 + (10,000 + 5,000)$$

$$\text{GDP}_{\text{MP}} = 35,000 \text{ crore}$$

Calculation of NDP_{FC}

$$\text{NDP}_{\text{FC}} = \text{GDP}_{\text{MP}} - \text{Depreciation} - \text{NIT}$$

$$\text{NDP}_{\text{FC}} = 35,000 - 2,000 - (-1000)$$

$$\text{GDP}_{\text{FC}} = 34,000 \text{ crore}$$

Q.10 Find GNP_{FC} from the following data

Particulars	in crores
Net domestic Fixed capital formation	350
Closing stock	100
Government final consumption expenditure	200
Net indirect taxes	40
Opening stock	60
Consumption of fixed capital	50
Net exports	-10
Private final consumption expenditure	1,500
Imports	20
Net factor income from abroad	-30

Solution 9 :

Calculation of GDP_{MP}

$$GDP_{MP} = PFCE + GFCE + GDCF + (X-M)$$

$$GDP_{MP} = PFCE + (GDFCF + \text{Inventory Investment}) + (X-M)$$

$$GDP_{MP} = 1,500 + 200 + (400 + 40) + (-10)$$

$$GDP_{MP} = 2,130 \text{ crore}$$

Calculation of GNP_{FC}

$$GNP_{FC} = GDP_{MP} + NFIA - NIT$$

$$GNP_{FC} = 2,130 + (-30) - 40$$

$$GNP_{FC} = 2,060 \text{ crore}$$

Q.11 Calculate Government Final Consumption Expenditure from the following data:

Particulars	in crores
National income	930
Net domestic fixed capital formation	100
Net imports	-20
Net indirect tax	5
Net current transfers from abroad	15
Private final consumption expenditure	600
Change in stocks	10
Net factor income from abroad	5
Net factor income from abroad	5
Gross domestic fixed capital formation	125

Solution 11:

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{NDP}_{\text{FC}} + \text{Depreciation} - \text{NFIA} + \text{NIT}$$

$$\text{GDP}_{\text{MP}} = 930 + 25 - 5 + 5$$

$$\text{GDP}_{\text{MP}} = 955 \text{ crore}$$

Calculation of GFCE

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + (\text{GDFCF} + \text{Inventory investment}) + (X - M)$$

$$955 = 600 + \text{GFCE} + (125 + 10) + 20$$

$$955 = 755 + \text{GFCE}$$

$$\text{GFCE} = 955 - 755$$

$$\text{GFCE} = 200 \text{ crore}$$

Q.12 Calculate 'National Income':

Particulars	in crores
Personal tax	80
Private final consumption expenditure	600
Undistributed profits	30
Private income	650
Government final consumption expenditure	100
Corporate tax	50
Net domestic fixed capital formation	70
Net indirect tax	60
Depreciation	14
Change in stocks	-10
Net imports	20
Net factor income to abroad	10

Solution : 12

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + \text{GDCF} + (\text{X}-\text{M})$$

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + (\text{GDFCF} + \text{Inventory Investment}) + (\text{x}-\text{m})$$

$$\text{GDP}_{\text{MP}} = 600 + 100 + (84 - 10) - 20$$

$$\text{GDP}_{\text{MP}} = 754 \text{ crore}$$

Calculation of NDP_{FC}

$$\text{NNP}_{\text{FC}} = \text{GDP}_{\text{MP}} - \text{Depreciation} + \text{NFIA} - \text{NIT}$$

$$\text{NNP}_{\text{FC}} = 754 - 14 + (-10) - 60$$

$$\text{NNP}_{\text{FC}} = 670 \text{ crore}$$

Q.13 Calculate 'Net National Product at Market Price':

Particulars	in crores
Transfer payments by government	7
Government final consumption expenditure	50
Net imports	-10
Net domestic fixed capital formation	60
Private final consumption expenditure	300
Personal income	280
Net factor income to abroad	-5
Closing stock	8
Opening stock	8
Depreciation	12
Corporate tax	60
Retained earnings of corporations	20

Solution : 13

Calculation of GDP_{MP}

$$GDP_{MP} = PFCE + GFCE + GDCF + (X-M)$$

$$GDP_{MP} = PFCE + GFCE + (GDFCF + \text{Inventory Investment}) + (x-m)$$

$$GDP_{MP} = 300 + 50 + (72 + 0) + 10$$

$$GDP_{MP} = 432 \text{ crore}$$

Calculation of NNP_{MP}

$$NNP_{MP} = GDP_{MP} - \text{Depreciation} + NFIA$$

$$NNP_{MP} = 432 - 12 + 5$$

$$NNP_{MP} = 425 \text{ crore}$$

Q.14 Calculate Net Domestic Product at Factor Cost

Particulars	in crores
Private final consumption expenditure	8,000
Government final consumption expenditure	1,000
Exports	70
Imports	120
Consumption of fixed capital	60
Gross domestic fixed capital formation	500
Change in stock	100
Factor income to abroad	40
Factor income from abroad	90
Indirect taxes	700
Subsidies	50
Net current transfers to abroad	-30

Solution : 14

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + \text{GDCF} + (\text{X}-\text{M})$$

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + (\text{GDFCF} + \text{Inventory Investment}) + (\text{x}-\text{m})$$

$$\text{GDP}_{\text{MP}} = 8,000 + 1,000 + (500 + 100) - 50$$

$$\text{GDP}_{\text{MP}} = 9,550 \text{ crore}$$

Calculation of NDP_{FC}

$$\text{NDP}_{\text{FC}} = \text{GDP}_{\text{MP}} - \text{Depreciation} - \text{NIT}$$

$$\text{NDP}_{\text{FC}} = 9550 - 60 - (700 - 50)$$

$$\text{NDP}_{\text{FC}} = 8840 \text{ crore}$$

Q.15 Calculate National Income:

Particulars	in crores
Net factor income to abroad	-50
Net indirect taxes	800
Net current transfers from rest of the world	100
Net imports	200
Private final consumption expenditure	5,000
Government final consumption expenditure	3,000
Gross domestic capital formation	1,000
Consumption of fixed capital	150
Change in stock	-50
Mixed income	4,000
Scholarship to students	80

Solution : 15

Calculation of GDP_{MP}

$$\begin{aligned} GDP_{MP} &= PFCE + GFCE + GDCF + (X-M) \\ GDP_{MP} &= 5,000 + 3,000 + 1,000 - 200 \end{aligned} \quad \left. \vphantom{\begin{aligned} GDP_{MP} &= PFCE + GFCE + GDCF + (X-M) \\ GDP_{MP} &= 5,000 + 3,000 + 1,000 - 200 \end{aligned}} \right\} \rightarrow$$

$$GDP_{MP} = 8,800 \text{ crore}$$

Calculation of NNP_{FC}

$$NNP_{FC} = GDP_{MP} - \text{Depreciation} + NFIA - NIT$$

$$NNP_{FC} = 8,800 - 150 + 50 - 800$$

$$NNP_{FC} = 7900 \text{ crore}$$

**Q.16 find Net National Product at Market Price by
(a) Income Method (b) Expenditure Method.**

Particulars	in crores
Personal consumption expenditure	1,400
Wages and salaries	1,400
Employers' contribution to social security	200
Contribution to provident fund by the employees through the employer	100
Gross business fixed capital formation	120
Gross residential construction investment	120
Gross public expenditure	480
Rent	100
Inventory investment	40
Dividend and corporate profit tax	120
Corporate saving	80
Excess of exports over imports	40

Interest	80
Mixed income of self-employed	200
Net factor income to abroad	20
Depreciation	0
Indirect taxes	40
subsidies	20

Solution : 16 (a) Expenditure method

Calculation of GDP_{MP}

$$GDP_{MP} = PFCE + GFCE + (GDFCF + I.I) + (X-M)$$

$$GDP_{MP} = PFCE + GFCE + [(const. of house + P.I + B.I) + I.I] + (X-M)$$

$$GDP_{MP} = 1,400 + 0 + [(120 + 480 + 120) + 40] + 40$$

$$GDP_{MP} = 2,200 \text{ crore}$$

Calculation of NNP_{MP}

$$NNP_{MP} = GDP_{MP} - \text{Depreciation} + NFIA$$

$$NNP_{FC} = 2,200 - 0 - 20$$

$$NNP_{FC} = 2180 \text{ crore}$$

(B) Income method

Calculation of NDP_{FC}

NDP_{FC} = Compensation of emp. + operating surplus + mixed income

NDP_{FC} = (Wages & salaries + Employer cont. to social security) +
(Rent + Interest + dividend and corp. tax + corp. saving)
+ MI

NDP_{FC} = (1,400 + 200) + (100 + 80 + 120 + 80) + 200

NDP_{FC} = 2,180 crore

Calculation of NNP_{MP}

NNP_{MP} = NDP_{MP} + NFIA + NIT

NNP_{MP} = 2,180 - 20 + 20

NNP_{MP} = 2180 crore

Q.17 From the following data, find the missing values of 'Private Final Consumption Expenditure and 'Operating Surplus'.

Particulars	in crores
National income	50,000
Net indirect taxes	1,000
Private final consumption expenditure	?
Gross domestic capital formation	17,000
Profits	1,000
Government final consumption expenditure	12,500
Wages and salaries	20,000
Consumption of fixed capital	700
Mixed income of self-employed	13,000
Operating surplus	?
Net factor income from abroad	500
Net exports	2,000

Solution : 18 (a) calculation of PFCE

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{NNP}_{\text{FC}} + \text{Depreciation} - \text{NFIA} + \text{NIT}$$

$$\text{GDP}_{\text{MP}} = 50,000 + 700 - 500 + 1,000$$

$$\text{GDP}_{\text{MP}} = 51,200 \text{ crore}$$

Calculation of PFCE

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + \text{GDCF} + (\text{X}-\text{M})$$

$$51,200 = \text{PFCE} + 12,500 + 17,000 + 2,000$$

$$\text{GDCF} = 19,700 \text{ crore}$$

(B) Calculation of Operating surplus

Calculation of NDP_{FC}

$$NDP_{FC} = NNP_{FC} - NFIA$$

$$NDP_{FC} = 50,000 - 500$$

$$NDP_{FC} = 49,500 \text{ crore}$$

Calculation of operating surplus

$$NDP_{FC} = \text{Compensation of emp.} + \text{operating surplus} + \text{mixed income}$$

$$49,500 = 20,000 + \text{Operating surplus} + 13,000$$

$$COE = 16,500 \text{ crore}$$

Q.18 Given the following data, find the missing values of 'Gross Domestic Capital Formation' and 'Wages and Salaries'.

Particulars	in crores
Mixed income of self-employed	3,500
Net indirect taxes	300
Wages and salaries	?
Government final consumption expenditure	14,000
Net exports	3,000
Consumption of fixed capital	300
Net factor income from abroad	700
Operating surplus	12,000
National income	30,000
Profits	500
Gross domestic capital formation	?
Private final consumption expenditure	11,000

Solution : 18 (a) calculation of GDCF

Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{NNP}_{\text{FC}} + \text{Depreciation} - \text{NFIA} + \text{NIT}$$

$$\text{GDP}_{\text{MP}} = 30,000 + 300 - 700 + 300$$

$$\text{GDP}_{\text{MP}} = 29,900 \text{ crore}$$

Calculation of GDCF

$$\text{GDP}_{\text{MP}} = \text{PFCE} + \text{GFCE} + \text{GDCF} + (\text{X}-\text{M})$$

$$29,900 = 11,000 + 14,000 + \text{GDCF} + 3000$$

$$\text{GDCF} = 1,900 \text{ crore}$$

(B) Calculation of wages & salaries

Calculation of NDP_{FC}

$$NDP_{FC} = NNP_{FC} - NFIA$$

$$NDP_{FC} = 30,000 - 700$$

$$NDP_{FC} = 29,300 \text{ crore}$$

Calculation of Wages and salaries

$$NDP_{FC} = \text{Compensation of emp.} + \text{operating surplus} + \text{mixed income}$$

$$29,300 = COE + 12,000 + 3,500$$

$$COE = 13,800 \text{ crore}$$

Q.18 Calculate National Income by (a) Income Method (b) Expenditure Method.

Particulars	in crores
Capital transfers from rest of the world	200
Government final consumption expenditure	2,000
Current transfers from rest of the world	200
Wages and salaries	7,600
Dividend	1,000
Rent and royalty	400
Interest	300
Addition to the stock of capital	1,000
Profit	1,600
Employers' contribution to social security	400
Excess of imports over exports	100
Excess of factor income earned by the - non-residents from the domestic territory over the factor income earned by the residents from rest of the world	60

Consumption of fixed capital	80
Private final consumption expenditure	8,000
Net indirect taxes	600

3. Value added Method

- ❖ Value added Method is also known as:
 - (i) Product Method (ii) Inventory Method
 - (iii) Net Output Method (iv) Commodity Service Method.
- ❖ Value added method measures national income in terms of value addition by each producing enterprise in the economy during an accounting year
- ❖ Value added refers to the addition of value to the raw material (intermediate goods) by a firm, by virtue of its productive activities. It is the contribution of an enterprise to the current flow of goods and services. It is calculated as the difference between value of output and value of intermediate consumption.

Farmer

Sells wheat for 500

Miller

Output	→	Wheat
Value of Output	→	500
Value of Input	→	0
Value Added	→	500

Output	→	Flour
Value of Output	→	700
Value of Input	→	500
Value Added	→	200

Sells for Flour 700

Consumer

Sells Bread for 1,000

Baker

Expenditure by consumer	→	1,000
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Output	→	Bread
Value of Output	→	1,000
Value of Input	→	700
Value Added	→	300

Calculation of National income

STEP 1 - Calculation of Value of output for all three producing sectors of economy (primary , secondary and tertiary sector)

$$\text{Value of output} = \text{Sales} + \text{Change in stock} + \text{Production for self consumption} \quad (1.1)$$

Here :

Sales

Given or (P X Q)

- Sales to H.H
- Sales to govt.
- Sales to firms
- Sales to R.O.W
(Exports)

Change in stock

Closing stock

(-)

Opening stock

Production for self consumption

That part of production which is kept by producer for his own use and consumption

STEP 2 - Calculation of Value of Input or Intermediate consumption

Intermediate consumption = Total purchase value of Raw material

Here :

Purchase

Given or (P X Q)

- **Purchase from H.H**
- **Purchase from Govt**
- **Purchase from Firms**
- **Purchase from R.O.W
(Imports)**

❖ **Purchase Value capital goods will not be considered**

STEP 3 - Calculation of Gross value added (GVA_{MP})

VALUE ADDED = VALUE OF OUTPUT (I) - INTERMEDIATE CONSUMPTION
(GVA_{MP})

STEP 4 - Calculation of GDP_{MP}

$GDP_{MP} =$ GVA_{MP} OF PRIMARY SECTOR
+ GVA_{MP} OF SECONDARY SECTOR
+ GVA_{MP} OF TERTIARY SECTOR

STEP 5 - Calculation of National income (NNP_{FC})

$$NNP_{FC} = GDPMP - Depreciation + NFIA - NIT$$

Precautions regarding value added method

- ❖ Intermediate Goods are not to be included in the national income since such goods are already included in the value of final goods.
- ❖ Sale and Purchase of second-hand goods is not included as they were included in the year in which they were produced and do not add to current flow of goods and services.
- ❖ Production of Services for self-consumption (Domestic Services) are not included
- ❖ Production of Goods for self-consumption will be included
- ❖ Sale and purchase of shares , debentures and bonds will not be included

Q.19 Calculate the value added by Firm A and Firm B

Particulars	in crores
Domestic sales by Firm A	4,000
Exports by Firm A	1,000
Purchases by Firm A	200
Sales by Firm B	2,940
Purchases by Firm B	1,300

Solution : 19 (i) Calculation of value added by Firm A

(a) Value of output = Domestic sales + Exports

$$\text{Value of output} = 4,000 + 1,000$$

$$\text{Value of output} = 5,000$$

(b) Intermediate consumption = Purchase value

$$\text{Intermediate consumption} = 200$$

Value added By Firm A = Value of output - Intermediate consumption

$$\text{Value added By Firm A} = 5,000 - 200$$

$$\text{Value added By Firm A} = 4,800$$

(ii) Calculation of value added by Firm B

Value added By Firm B = Value of output - Intermediate consumption

$$\text{Value added By Firm B} = 2,940 - 1300$$

$$\text{Value added By Firm B} = 1,640$$

Q.20 From the information given below calculate

(a) Value added by Firm A and Firm B

(b) Gross domestic product at MP

(c) Net domestic product at FC

Particulars	in crores
Sales by Firm B to general govt.	100
Sales by Firm A	500
Sales by Firm B to households	350
Change in stock of Firm A	20
Closing stock of Firm B	40
Opening stock of Firm B	30
Purchases by Firm A	320
Indirect taxes paid by both firms	75
Consumption of Fixed capital	120
Sales by Firm A to B	200

Solution : 20 (i) Calculation of value added by Firm A

$$\begin{aligned}\text{(a) Value of output} &= \text{Sales} + \text{Change in stock} \\ &= 500 + 20 \\ &= 520\end{aligned}$$

$$\begin{aligned}\text{(b) Intermediate consumption} &= \text{Purchase value} \\ &= 320\end{aligned}$$

$$\text{Value added By Firm A} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added By Firm A} = 520 - 320$$

$$\text{Value added By Firm A} = 200 \text{ crore}$$

(ii) Calculation of value added by Firm B

$$\begin{aligned} \text{(a) Value of output} &= \text{Sales to govt.} + \text{Sales to H.H} + \text{change in stock} \\ &= 100 + 350 + (40-30) \\ &= 460 \end{aligned}$$

$$\begin{aligned} \text{(b) Intermediate consumption} &= \text{Purchase from Firm A} \\ &= 200 \end{aligned}$$

$$\text{Value added By Firm A} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added By Firm A} = 460 - 200$$

$$\text{Value added By Firm A} = 260 \text{ crore}$$

(iii) Calculation of GDP_{MP}

$$\text{GDP}_{\text{MP}} = \text{GVA}_{\text{MP}} \text{ of Firm A} + \text{GVA}_{\text{MP}} \text{ of Firm B}$$

$$\text{GDP}_{\text{MP}} = 200 \text{ crore} + 260 \text{ crore}$$

$$\text{GDP}_{\text{MP}} = 460 \text{ crore}$$

(iii) Calculation of NDP_{FC}

$$\text{NDP}_{\text{FC}} = \text{GDP}_{\text{MP}} - \text{Depreciation} - \text{NIT}$$

$$\text{NDP}_{\text{FC}} = 460 - 120 - 75$$

$$\text{NDP}_{\text{FC}} = 265 \text{ crore}$$

Q.21 From the following data about a Firm X for the year 2000-01 calculate the net value added at MP during that year :

Particulars	in crores
Sales	90
Closing stock	25
Opening stock	15
Indirect taxes	10
Depreciation	20
Intermediate consumption	40
Purchases of Raw material	15
Rent	5

Solution : 21 Calculation of Net value added

$$\begin{aligned} \text{(a) Value of output} &= \text{Sales} + \text{Change in stock} \\ &= 90 + (25-15) \\ &= 100 \end{aligned}$$

$$\text{(b) Intermediate consumption} = 40$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 100 - 40$$

$$\text{Value added} = 60 \text{ crore}$$

$$\text{Net Value added} = \text{GVA}_{\text{MP}} - \text{Depreciation}$$

$$\text{Net Value added} = 60 - 20$$

$$\text{Net Value added} = 40 \text{ crore}$$

Q.22 Calculate Gross value added at MP (GVA_{MP}) from the following data

Particulars	in crores
Depreciation	20
Domestic sales	200
Change in stock	-10
Exports	10
Single use producer goods	120
Net indirect taxes	20

Solution : 22

Calculation of Gross value added (GVA_{MP})

$$\begin{aligned} \text{(a) Value of output} &= \text{Domestic Sales} + \text{Export} + \text{change in stock} \\ &= 200 + 10 + (-10) \\ &= 200 \end{aligned}$$

$$\text{(b) Intermediate consumption} = \text{Single use producer goods} = 120$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 200 - 120$$

$$\text{Value added} = 80 \text{ crore}$$

Q.23 From the Following data relating to a Firm calculate its net value added at factor cost :

Particulars	in crores
Subsidy	40
Sales	800
Depreciation	30
Exports	100
Closing stock	20
Opening stock	50
Intermediate Purchases	500
Purchases of machinery for own use	200
Import of non-factor inputs	60

Solution : 23

Calculation of Net value added (NVA_{FC})

$$\begin{aligned} \text{(a) Value of output} &= \text{Sales} + \text{Change in stock} \\ &= 800 + (20-50) \\ &= 770 \end{aligned}$$

$$\text{(b) Intermediate consumption} = 500$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 770 - 500$$

$$\begin{aligned} \text{Value added} &= 270 \text{ crore} \\ &(\text{GDP}_{MP}) \end{aligned}$$

$$NVA_{FC} = \text{GDP}_{MP} - \text{Depreciation} - \text{NIT}$$

$$NVA_{FC} = 270 - 30 - (-40)$$

$$NVA_{FC} = 280 \text{ crore}$$

Q.24 Calculate Net value added at FC (NVA_{FC}) from the following data

Particulars	in crores
Durable producer goods (with a life span of 10 years)	10
Single use producer goods	5
Sales	20
Unsold goods (stock)	2
Goods and service tax (GST)	1

Solution : 24 Calculation of Net value added (NVA_{FC})

$$\begin{aligned} \text{(a) Value of output} &= \text{Sales} + \text{unsold goods} \\ &= 20 + 2 \\ &= 22 \end{aligned}$$

$$\text{(b) Intermediate consumption} = \text{single use producer goods} = 5$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 22 - 5$$

$$\begin{aligned} \text{Value added} &= 17 \text{ crore} \\ &(\text{GDP}_{MP}) \end{aligned}$$

$$NVA_{FC} = \text{GDP}_{MP} - \text{Depreciation} - \text{NIT}$$

$$NVA_{FC} = 17 - 1 - 1$$

$$NVA_{FC} = 15 \text{ crore}$$

Q.25 From the Following data relating to a Firm calculate its Gross value added at factor cost :

Particulars	
Units of output sold	1,000
Price per unit of output	30
Depreciation	1,000
Intermediate cost	12,000
Closing stock	3,000
Opening stock	2,000
Goods and service tax	6,000

Solution : 25

Calculation of Gross value added (GVA_{FC})

$$\begin{aligned} \text{(a) Value of output} &= \text{Sales} + \text{change in stock} \\ &= (1,000 \times 30) + (3,000 - 2,000) \\ &= 31,000 \end{aligned}$$

$$\text{(b) Intermediate consumption} = 12,000$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 31,000 - 12,000$$

$$\text{Value added} = 19,000$$

$$(\mathbf{GVA_{MP}})$$

$$\mathbf{GVA_{FC} = GVA_{MP} - NIT}$$

$$\mathbf{GVA_{FC} = 19,000 - 6,000}$$

$$\mathbf{GVA_{FC} = 13,000}$$

Q.26 From the Following data relating to a Firm calculate its Net value added at factor cost :

Particulars	in crore
Sales	1,000
Decrease in stock	70
Production for self consumption	120
Purchase of raw material	300
Exports	150
Electricity charges	50
Income tax	20
Goods and service tax	70
Subsidy	40

Solution : 26 Calculation of Net value added (NVA_{FC})

$$\begin{aligned}\text{(a) Value of output} &= \text{Sales} + \text{change in stock} + \text{production for self consumption} \\ &= 1,000 - 70 + 120 \\ &= 1,050\end{aligned}$$

$$\text{(b) Intermediate consumption} = 300 + 50 = 350$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 1,050 - 350$$

$$\text{Value added} = 700$$

$$(\text{GDP}_{MP})$$

$$NVA_{FC} = \text{GDP}_{MP} - \text{Depreciation} - \text{NIT}$$

$$NVA_{FC} = 700 - 0 - (70 - 40)$$

$$NVA_{FC} = 670$$

Q.27 Calculate: (a) Gross value added at MP
(b) National income from the following data

Particulars	in crores
(1) Value of output	
(a) Primary sector	800
(b) Secondary sector	200
(c) Tertiary sector	300
(2) Value of intermediate inputs	
(a) Primary sector	400
(b) Secondary sector	100
(c) Tertiary sector	50
(3) Indirect taxes paid by all sectors	50
(4) Consumption of fixed capital	80
(5) Factor income received by residents from rest of world	10
(6) Factor income paid to Non-residents	20
(7) Subsidies of all sectors	20

Q.28 From the Following data relating to a Firm calculate its Net value added at factor cost :

Particulars	in crore
Domestic purchase	400
Increase in unsold stock	60
Domestic sales	1,200
Import of raw material	120
Replacement of fixed capital	50
Power charges	20
Exports	200
Import of machinery	40
Goods and service tax	10
Subsidy	30
Goods used for self consumption	10

Solution : 28 Calculation of Net value added (NVA_{FC})

$$\begin{aligned} \text{(a) Value of output} &= \text{Domestic Sales} + \text{Export} + \text{Increase in stock} \\ &\quad + \text{Production for self consumption} \\ &= 1,200 + 200 + 60 + 10 \\ &= 1,470 \end{aligned}$$

$$\begin{aligned} \text{(b) Intermediate consumption} &= \text{Domestic purchase} + \text{import} + \text{power charges} \\ &= 420 + 120 + 20 = 540 \end{aligned}$$

$$\text{Value added} = \text{Value of output} - \text{Intermediate consumption}$$

$$\text{Value added} = 1,470 - 540$$

$$\text{Value added} = 930$$

$$NVA_{FC} = GDP_{MP} - \text{Depreciation} - NIT$$

$$NVA_{FC} = 930 - 50 - (10-30)$$

$$NVA_{FC} = 900$$

Q.29 Firm A buys from X inputs worth 500 crores and sells to firm B goods worth 1,000 crores and to firm C goods worth 700 crores. Firm B buys from Y inputs worth 200 crores and sells to firm C goods worth 1,500 crores and finished goods worth 2,000 crores to households. Firm C buys from Z inputs worth 150 crores and sells finished goods worth 4,150 crores to households.
Calculate value added by firms A, B and C and GDP_{MP} .

Solution : 29 **(i) Calculation of Gross value added (GVA_{MP}) of firm A**

(a) Value of output = Sales to Firm B + Sales to C

$$\text{Value of output} = 1,000 + 700 = 1,700$$

(b) Intermediate consumption = Purchase from X = 500

(c) GVA_{MP} of Firm A = $1,700 - 500 = 1200$

(ii) Calculation of Gross value added (GVA_{MP}) of firm B

(a) Value of output = Sales to Firm C + Sales to households

$$\text{Value of output} = 1,500 + 2,000 = 3,500$$

(b) Intermediate consumption = Purchase from Firm A + From Y
 $= 1,000 + 200 = 1,200$

(c) GVA_{MP} of Firm B = $3,500 - 1,200 = 2,300$

(iii) Calculation of Gross value added (GVA_{MP}) of firm C

(a) Value of output = Sales to Households = 4,150

(b) Intermediate consumption = Firm A + Firm B + Firm Z

$$= 700 + 1,500 + 150$$

$$= 2,350$$

(c) GVA_{MP} of Firm C = $4,150 - 2,350 = 1,800$

Calculation of $GDP_{MP} = GVA_{MP}$ OF Firm A + GVA_{MP} of Firm B + GVA_{MP} of Firm C

$$= 1,200 + 2,300 + 1,800$$

$$= 5,300 \text{ crore}$$

Q.30 In an economy, the following transactions take place:

- ❖ A sells goods of 20 crores to B, 30 crores to C, 40 crores to households and goods worth 10 crores remain unsold. Value of inputs of firm A is assumed to be zero.
- ❖ B sells his output worth 40 crores to C, 60 crores to D and 50 crores to final consumption.
- ❖ C sells his output worth 100 crores to D, 100 crores to households and exports worth 100 crores.
- ❖ D sells 300 crores to households and 100 crores to government.

Calculate

- (i) value added by each firm
- (ii) Total value added
- (iii) Total consumption expenditure

Q.31 In an economy, industry P sells output to Q. Q sells output to R for 600. Q's value added is $\frac{1}{2}$ of P's value added. Assuming P's value of inputs are 0, calculate how much P sells to Q.

Solution : 31

suppose sales of P = X

Value of output = X

Intermediate consumption = 0

Value added by P = X - 0 = X

Output of P = Intermediate consumption of Q

Intermediate consumption of Q = X

Output of Q = 600

Value added by Q = Value of output of Q - I.C of Q

$$X/2 = 600 - X$$

$$X/2 + X = 600$$

$$X = 400$$

Q.32 Firm A spent 500 crores on non-factor inputs and sold goods worth 600 crores to firm B and 300 crores to firm C. Firm B whose value added is 1,000 crores sold half its output to firm C and half to firm D. Value added by firm C is $\frac{1}{2}$ of value added of firm D. Firm C and Firm D sold their entire output to households. Value of Output of firm C is equal to firm B's value of output. Calculate value of output of firm D.

Firm	Value of output		Intermediate consumption		GVA = VO - IC
A	Sales to B	600	Non-factor inputs	500	400
	Sales to C	300			
B	Sales to C	800	Purchase from A	600	1,000
	Sales to D	800			
C	Sales to H.H	1,600	Purchase from A	300	500
			Purchase from B	800	
D	Sales to H.H	1,800	Purchase from B	800	1,000

Q.33 Sales by Firm A are 80 crores and sales by firm B are 300 crores. Value added by B and C are equal. Value of output of C and D are 280 crores each. Value added by D is 120 crores and GDP_{MP} is 520 crores. Assuming A's value of inputs are zero, calculate:

- (i) Value added by firm B and firm C;
- (ii) Value of Inputs of firm B;
- (iii) Value of Inputs of firm C.

Firm	Value of output		Intermediate consumption		GVA = VO - IC
A	Sales	80	Value of input	0	80
B	Sales	300	Value of input	IC _B	X
C	Sales	280	Value of input	IC _C	X
D	Sales	280	Value of input	160	120
GDP _{MP}					520

$$80 + X + X + 120 = 520$$

$$200 + 2X = 520$$

$$2X = 520 - 200$$

$$2X = 320$$

$$X = 320/2 = 160$$

$$IC_B = 300 - 160 = 140 \text{ crore}$$

$$IC_C = 280 - 160 = 120 \text{ crore}$$

Q.33 In a single day Raju, the barber, collects 500 from haircuts; over this day, his equipment depreciates in value by 50. Of the remaining 450, Raju pays sales tax worth 30, takes home 200 and retains 220 for improvement and buying of new equipment. He further pays 20 as income tax from his income. Based on this information, complete Raju's contribution to the following measures of income:
(assuming intermediate consumption = 0 ,change in stock = 0)

- (i) Gross Domestic Product,
- (ii) NNP at market price,
- (iii) NNP at factor cost.

