60 IS-LM MODEL EQUILIBRIUM IN GOODS & MONEY MARKET

Q:1 Explain the term Goods Market and Explain How IS Curve is derived?

OR Explain the derivation of IS Curve and explain the Slope and Shift in IS Curves?

(A) Introduction :- The IS-LM model has been developed by Hicks, Hansen, Lerner and Johnson. The IS-LM model shows, how the level of National income and rate of interest is Jointly determined by Simultaneous equilibrium in two independent markets i.e- Goods market and Money market.

(B) Goods market Equilibrium :- The goods market is in equilibrium when - Agg. Demand = Agg. Income. The Aggregate demand is determined by - Consumption Demand and Investment Demand. When Rate of interest Falls, the level of investment increase and Vice Versa. The increase in Investment will increase Agg. Demand which result increase in Agg. income of economy.

(C) Derivation of IS Curve :-

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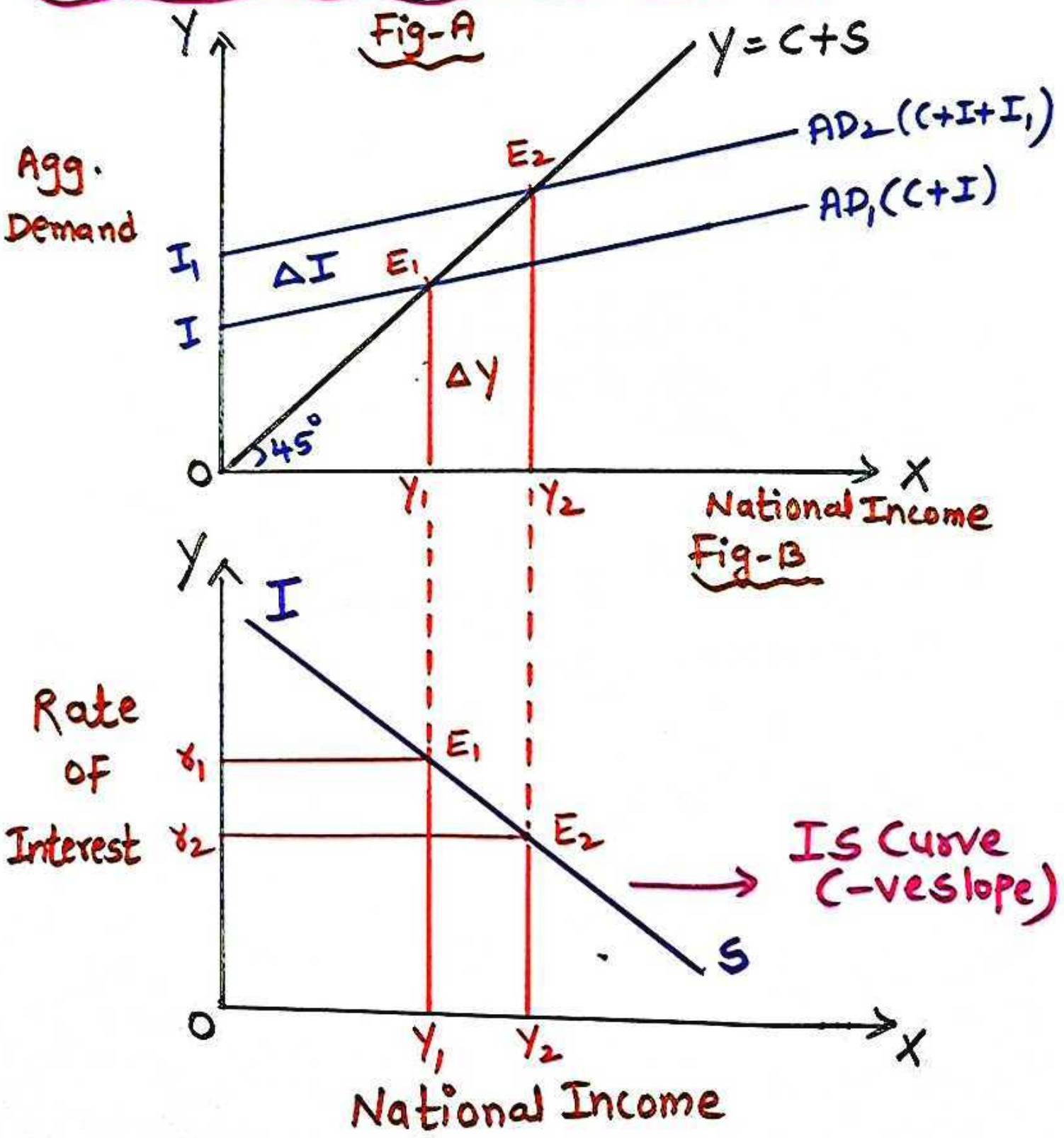
"IS Curve shows the different combinations of interest rates and the levels of incomes at which the goods market is in Equilibrium.."

Diagram — Derivation of IS Curve in Goods market.



In above figure Observe :—

1) In Fig-A, AD_1 is Aggregate Demand which shows Planned Investment in economy with OI-level of investment.

2) AD_1 (C+I) Curve intersect OY curve at Point-E. It shows Or_1 = Rate of interest at OY_1 level of National income in Fig-B.

3) Now when Rate of interest falls to Or_2 in Fig-B, it increase the investment level to $OI_1 = C+I+I_1$. Now we get New Equilibrium in goods market at E_2. This increase in investment will increase Agg. Demand which helps to increase National Income upto OY_2.

4) By Joining the Equilibrium Points E_1 and E_2 in Fig-B we get IS Curve sloping Downward from Left to right.

5) IS Curve shows that as Rate of interest falls more investment expenditure in goods market will help to increase National income from Y_1 to Y_2.

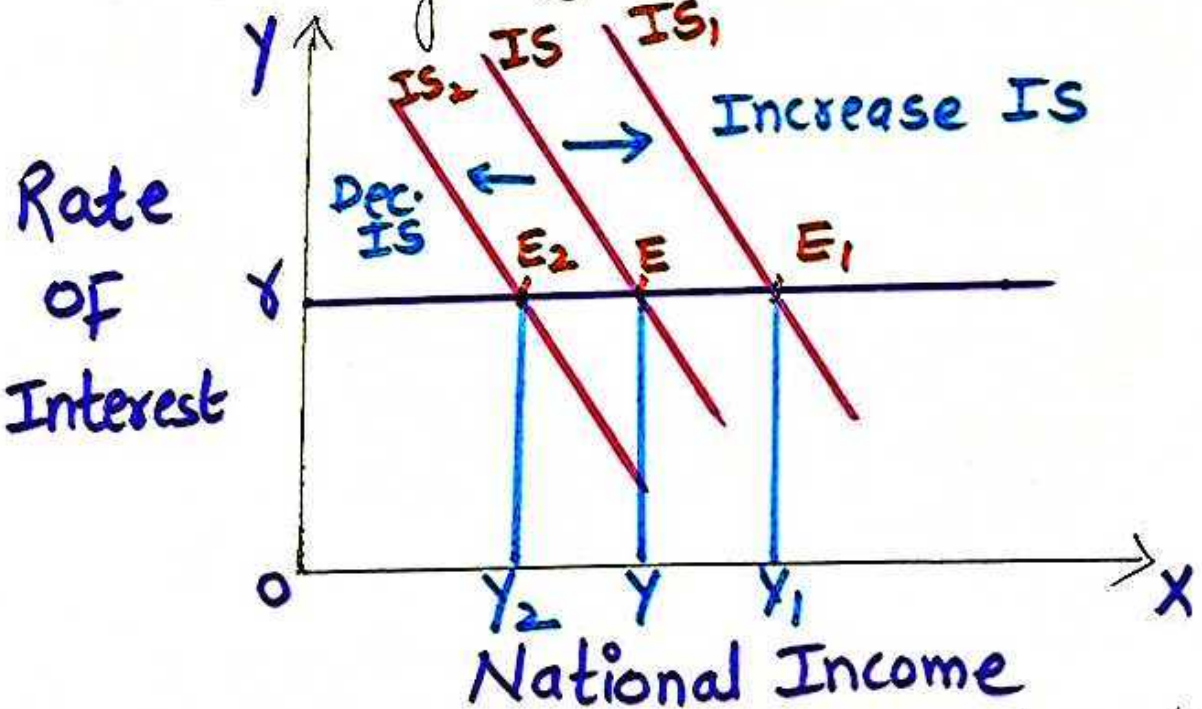
6) IS Curve has Steeper slope when investment Exp. and Autonomous consumption is reduced, it will result in Fall in income and Rate of interest may be increase.

(D) Slope of IS Curve :-

IS Curve is sloping Downward from left to right. A Fall in Rate of interest - R.O.I may increase investment expenditure, which result in increase in Agg. Demand and Agg. Income.

(E) Shifts in IS Curve :-

The Position of IS-Curve is determined by the Level of Autonomous Expenditure. Sometimes there is change in Autonomous Expenditure or Government expenditure. It will shift IS-Curve either on Right side or on Left side shown in following diagram:-



1) IS is original IS-Curve in goods market.
2) With increase in Autonomous Government Expenditure, IS Curve is shifted on Right Side - IS_1. Here we get new Equilibrium E_1 and National income increase to OY_1.

3) When Autonomous Expenditure reduced, then IS-curve is shifted to Left Side - IS_2. Here we get New Equilibrium - E_2 where National Income of economy Reduced to - OY_2.

(F) Factors Responsible For Change in Autonomous Expenditure :-

1. **Change in Government Spending :-** Increase in Government Expenditure will shift IS-curve on Right Side. Decrease in Govt. Exp. will shift IS-curve on Left-Side.
2. **Change in Autonomous Investment :-** more investment in Infrastructure will increase income and Aggregate Demand which shift the IS-curve either on Right side or Left Side.
3. **Change in Taxes :-** An increase in Taxes will reduce the Agg. Demand which shift the IS-curve to the Left-Side while Decrease in Taxes will shift the IS Curve on Right Side.
4. **Transfer Payments :-** An increase in transfer Payment will increase Agg. Demand which shift the IS-Curve to the right while a decrease in transfer Payment will shift IS-Curve to the Left Side.

Q:2 Explain the term money market. Explain How LM curve is derived?

OR Explain the factors that determine the slope and shift in the LM curve?

(A) Money Market:-

Money market is concerned with demand for money and supply of money. The money market is in equilibrium when the demand for money is equal to supply of money.

Equilibrium = Demand for money = Supply of money.

Demand for money (M_d) depends upon Level of real income (Y) and the interest rate (r)

$$M_d = L(Y, r)$$

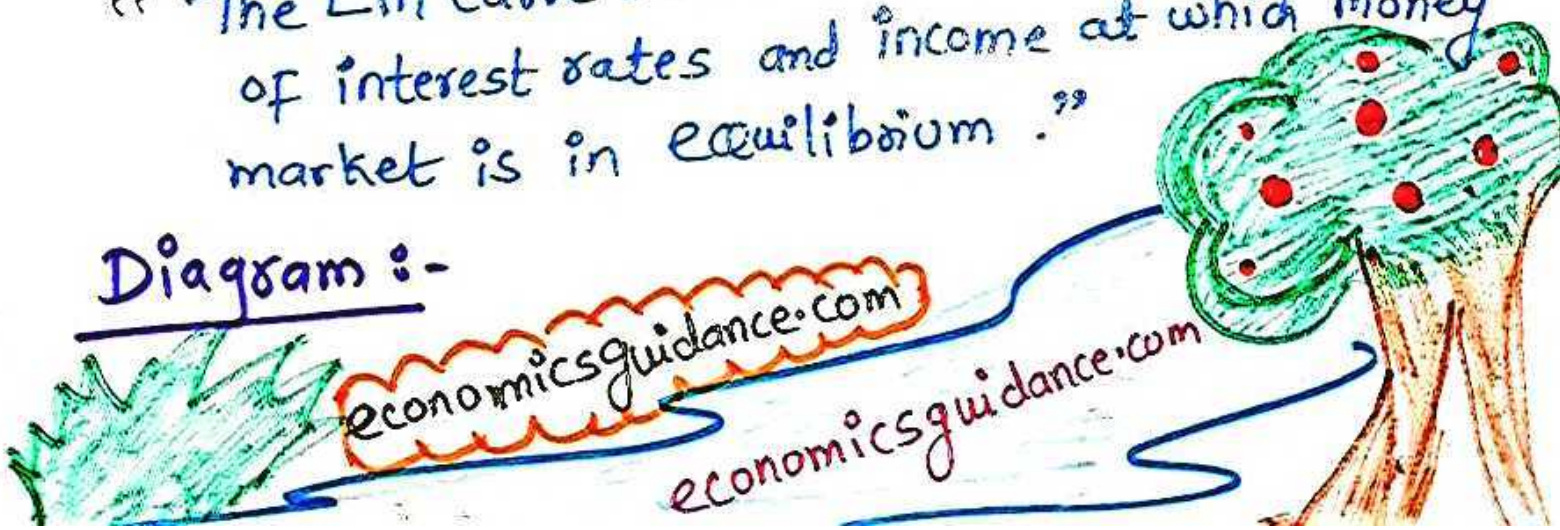
Demand for money varies positively with income and inversely with interest rates.

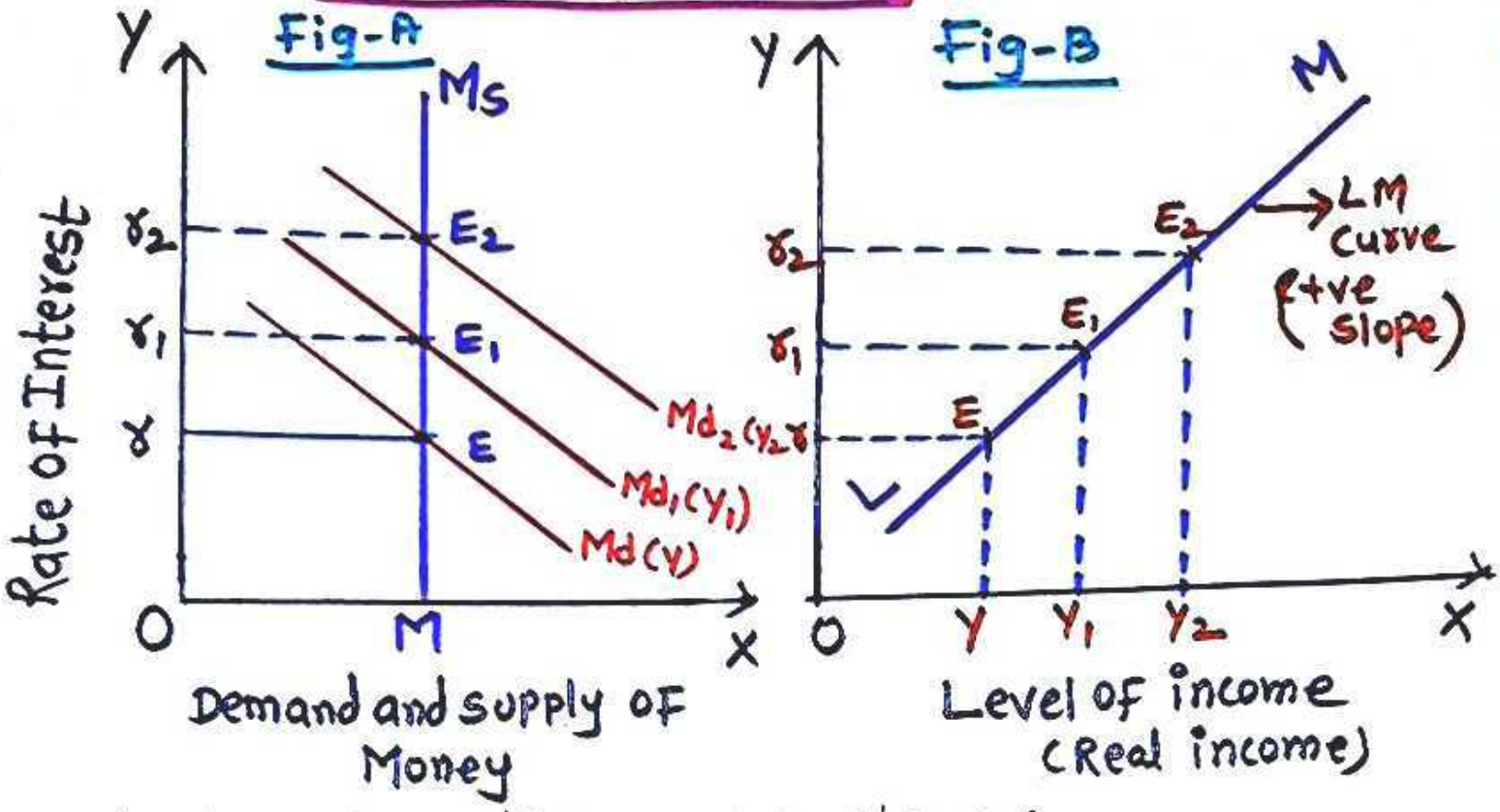
Supply of money is controlled by the central bank (RBI). The supply of money remain fixed and constant. So the supply curve of money is a Vertical Line

(B) Derivation of LM Curve:-

"The LM Curve shows the different combinations of interest rates and income at which money market is in equilibrium."

Diagram:-





In the above diagram we Observe :-

1. In Fig-A, Md, Md, and Md_2 Curves are Demand for money Curves at different Level of incomes.
2) Ms is Money supply Curve, which is fixed by Monetary Authority. It is a Vertical straight Line
3) When Demand Curves of money - Md, Md, and Md_2 intersect Ms Curves we get Rate of interest - γ, γ_1, γ_2 at Equilibrium level, E, E_1 and E_2.
4) In Fig-B, The interest rates are determined through money market and we get Equilibrium E, E_1 and E_2.
5) By joining these interest rates, we get LM Curve which is sloping upward from Left to right. It has Positive slope.

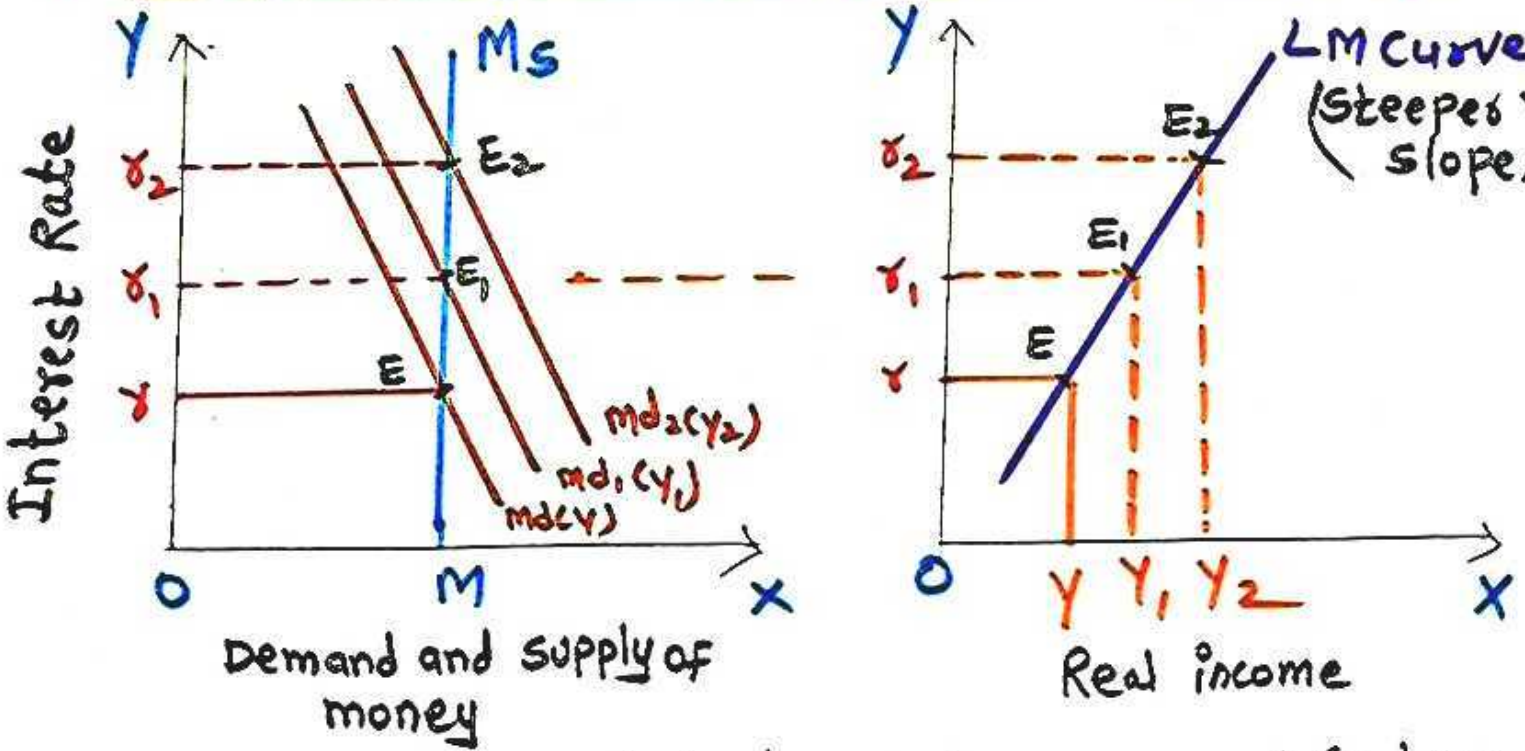
(C) Slope of LM Curve :-

The LM curve is sloping upward from Left to right it has positive slope. Due to increase in rate of interest, demand for money reduced. Now to maintain Demand for money equal to supply of money, the income level has to rise.

Thus in money market, Equilibrium can be achieved with increase in interest rate accompanied by an increase in income Level.

(D) Factors influence Slope of LM Curve :-

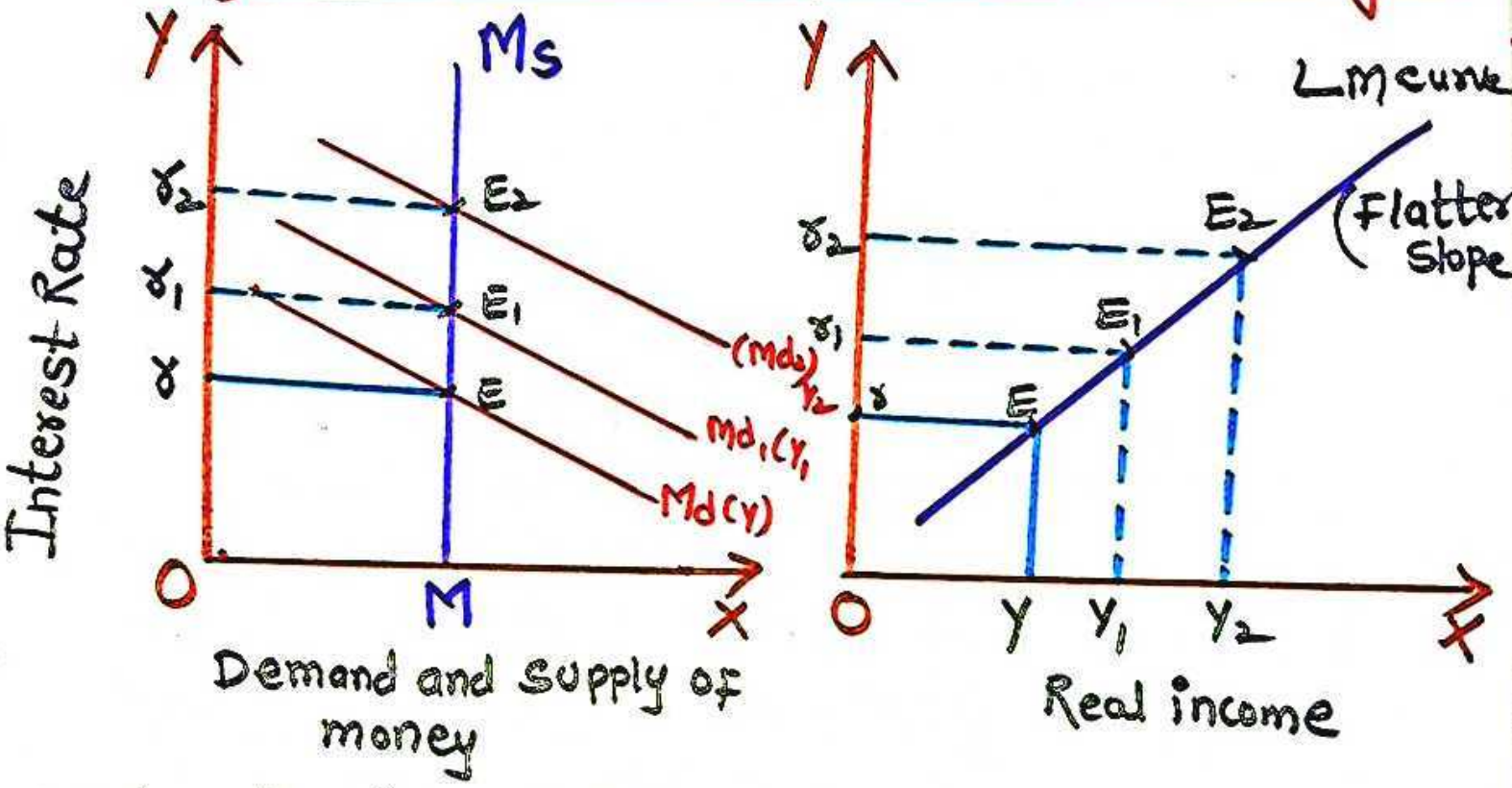
1. Low interest Elasticity of Demand for money :-



When the interest elasticity of Money Demand is Low, then LM Curve will take steepes slope.

As income increase from Y to Y_1 and Y_2, the money demand Curve shift From $Md_{(Y)}$ to $Md_1(Y_1)$ and $Md_2(Y_2)$. But because of Low interest elasticity of money demand, interest has increased by higher rate.

2. High Interest elasticity of Demand for money :-



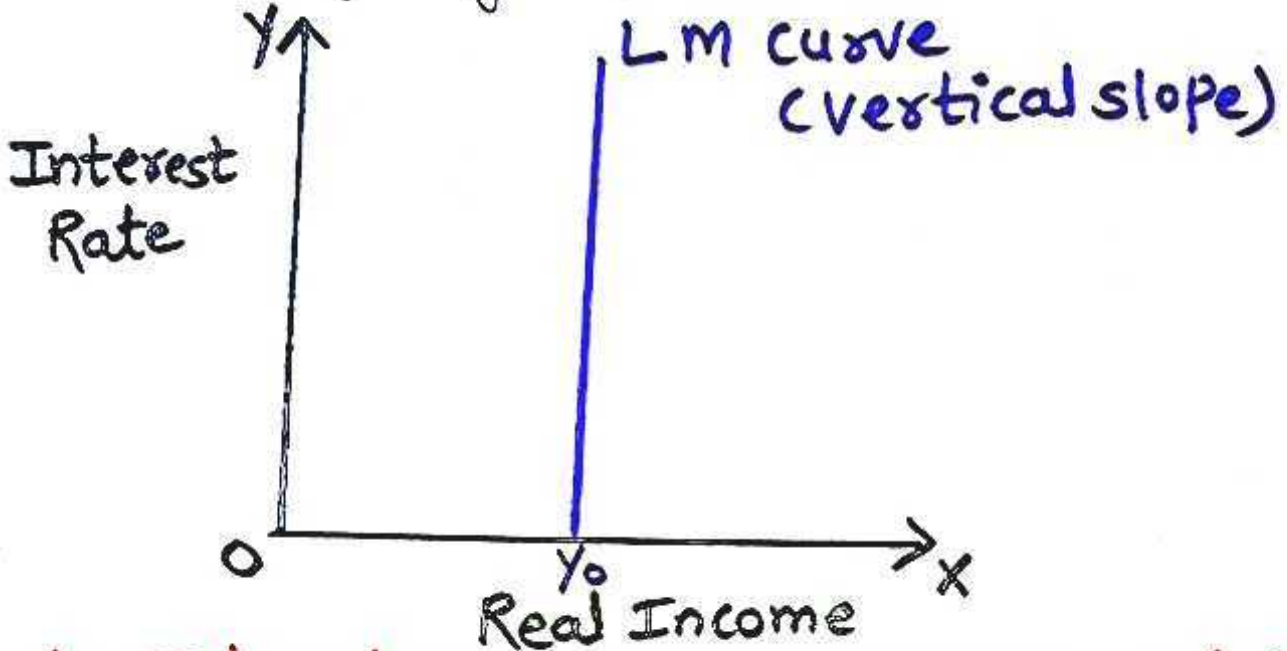
When the interest Elasticity of money Demand is High the LM Curve will take Flatter slope.

As income increase From Y to Y_1 and Y_2, the money demand Curve shift from $Md_{(Y)}$ to $Md_{(Y_1)}$ and $Md_{(Y_2)}$. But because OF Higher interest elasticity OF money demand, interest has increased by Lower rate.

3. Zero interest Elasticity of money Demand :-

When the demand For money is not affected by

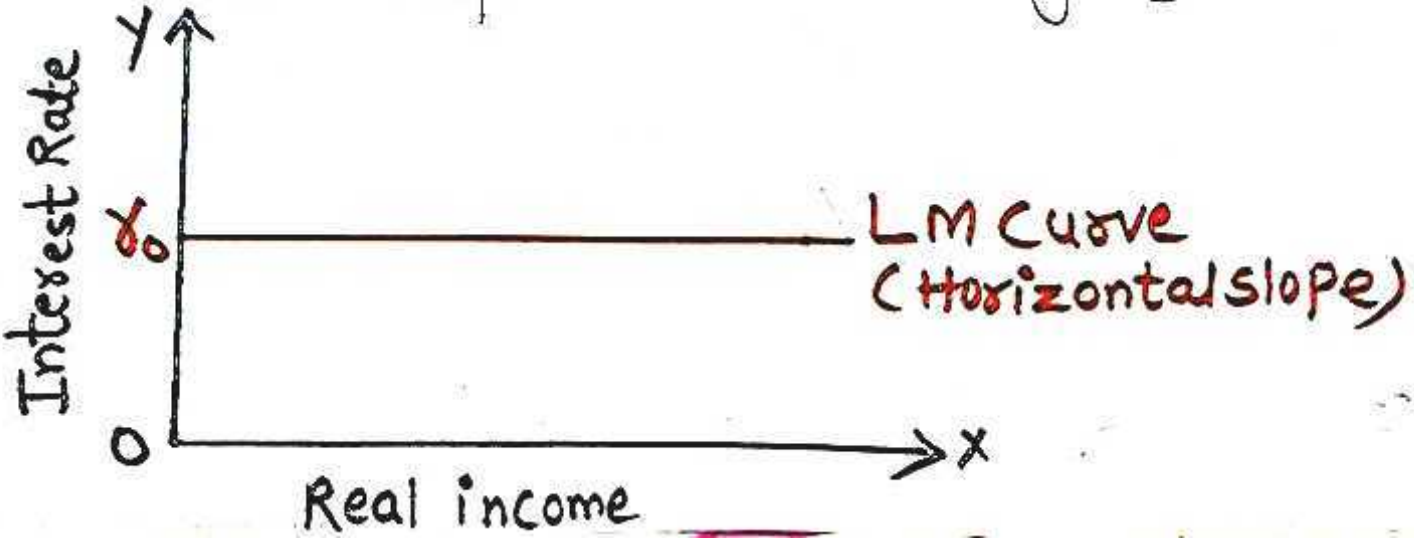
interest rate then LM Curve will take Vertical Slope. According to Classical theory demand for money only depends on Income.



4. Interest elasticity of money demand is Infinity :-

When the interest elasticity of Demand for money is extremely High, LM Curve take Horizontal slope. Here Small change in interest rate brings large Change in the Level of income.

Example - Keynesian - Liquidity trap, demand for money is Infinity so LM Curve will take Horizontal slope shown in Following diagram :-

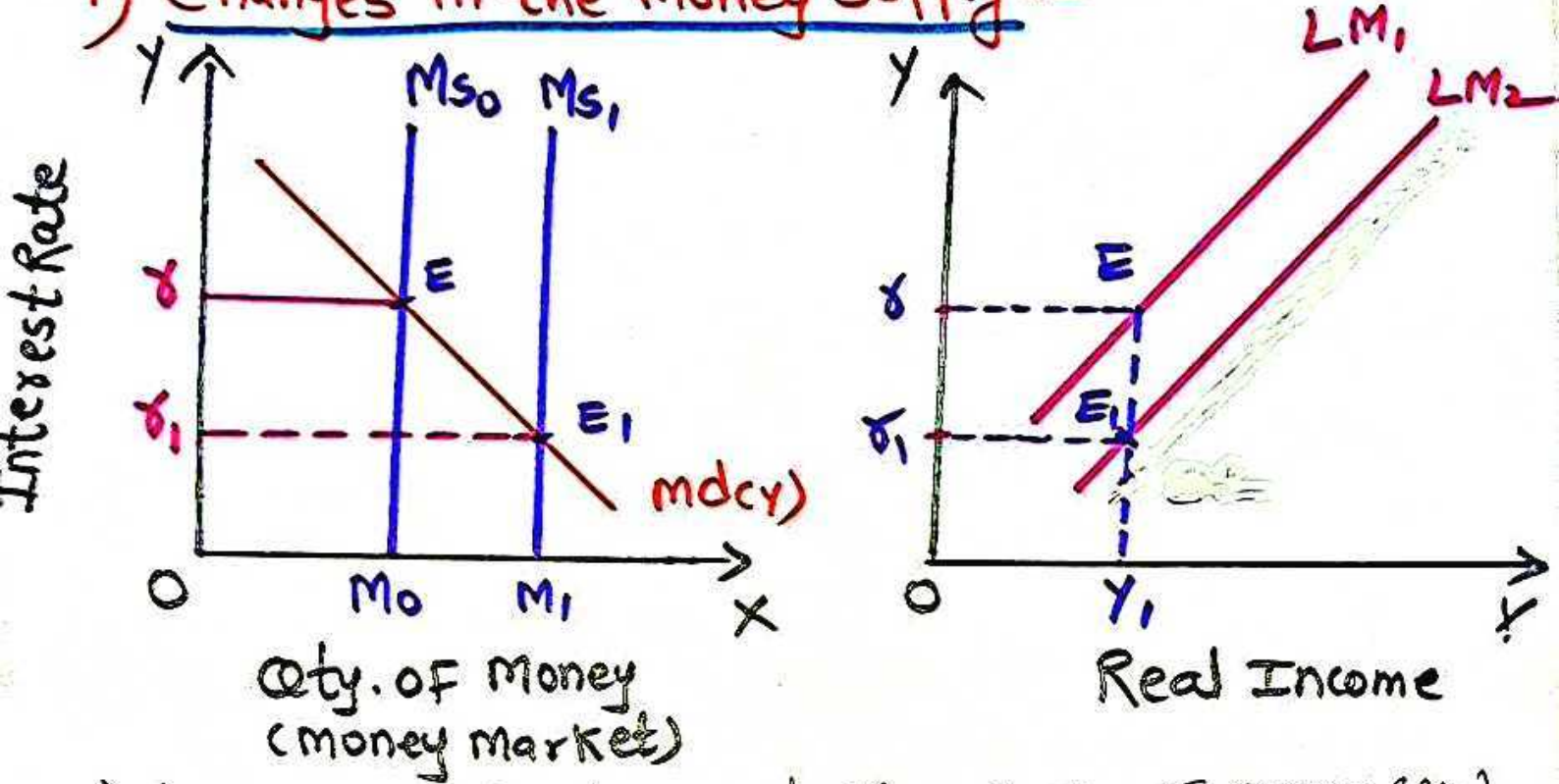


(E) Shift in LM Curve :-

Two factors that Shift LM Curve are —

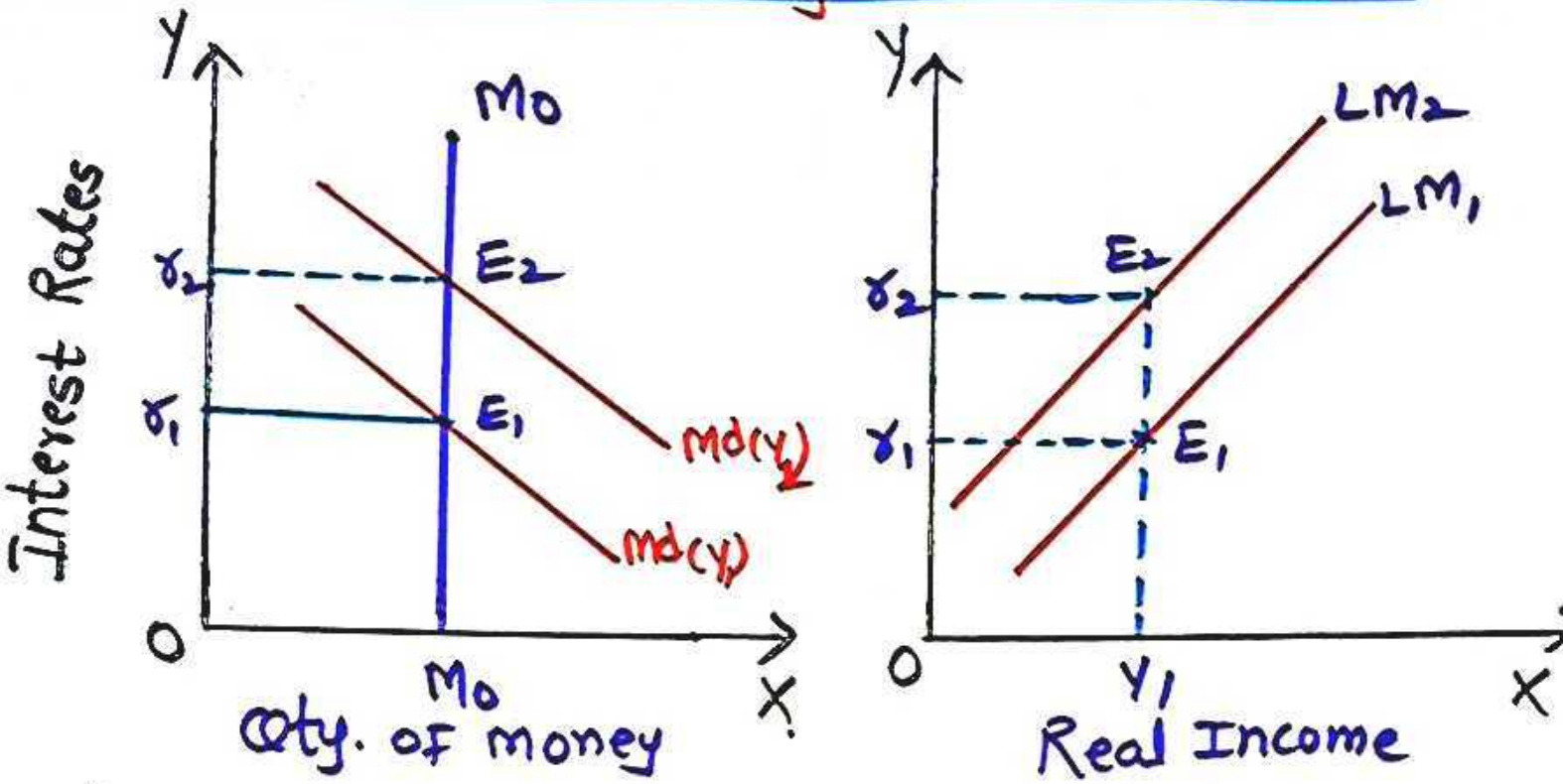
i) Fixed money supply is changed.
ii) Shift in the money demand function

i) Changes in the money supply :-



i) LM curve is drawn at given supply of money (M_0)
ii) When monetary authority increase, supply of money it has reduced interest rate to γ_1.
iii) So People Prefer to keep more money in liquid cash. Here LM Curve will be shifted to right side LM_2. Here we get New Equilibrium E_1.
iv) But due to Decrease in money supply will raise the rate of interest. So Here LM Curve will be shifted to Left Side.

ii) Shift in the money demand Function :-



1) LM Curve can be shifted when there is Change in Demand for money.
2) If there is an increase in demand for money, Md Curve is shifted Upward. It will increase interest rate to γ_2 at Equilibrium - E_2.
3. At higher interest - γ_2, People Prefer Less Liquid Cash so here LM Curve is Shifted Upward on Left Side.

Q:3 Explain the Simultaneous determination of goods and money market equilibrium with the help of IS and LM Curves ?

OR Show with the help of IS-LM Model, how equilibrium level of income and rate of interest are determined ?

(A) Equilibrium in Good market and Money Market

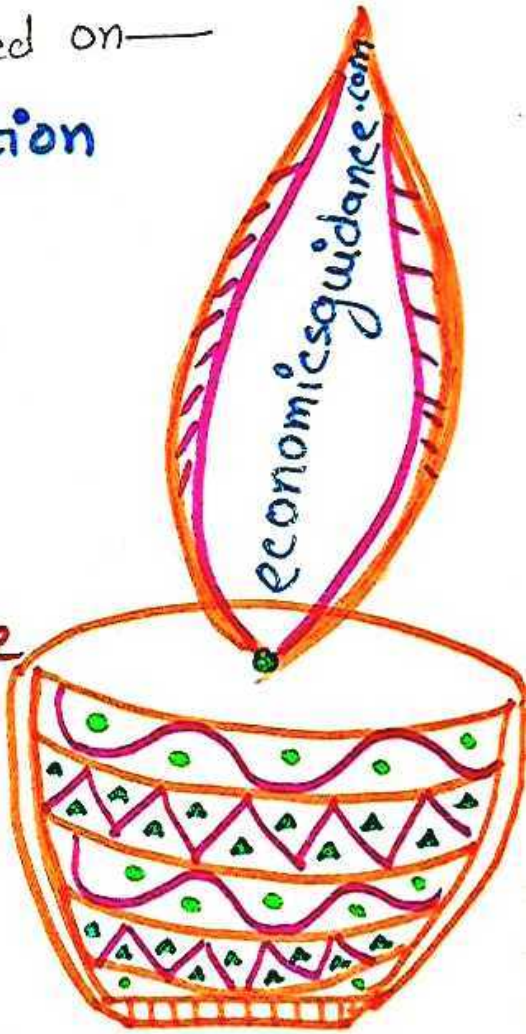
The IS Curve and LM Curve related to two important Variables —.

1) Income
2) Rate of Interest.

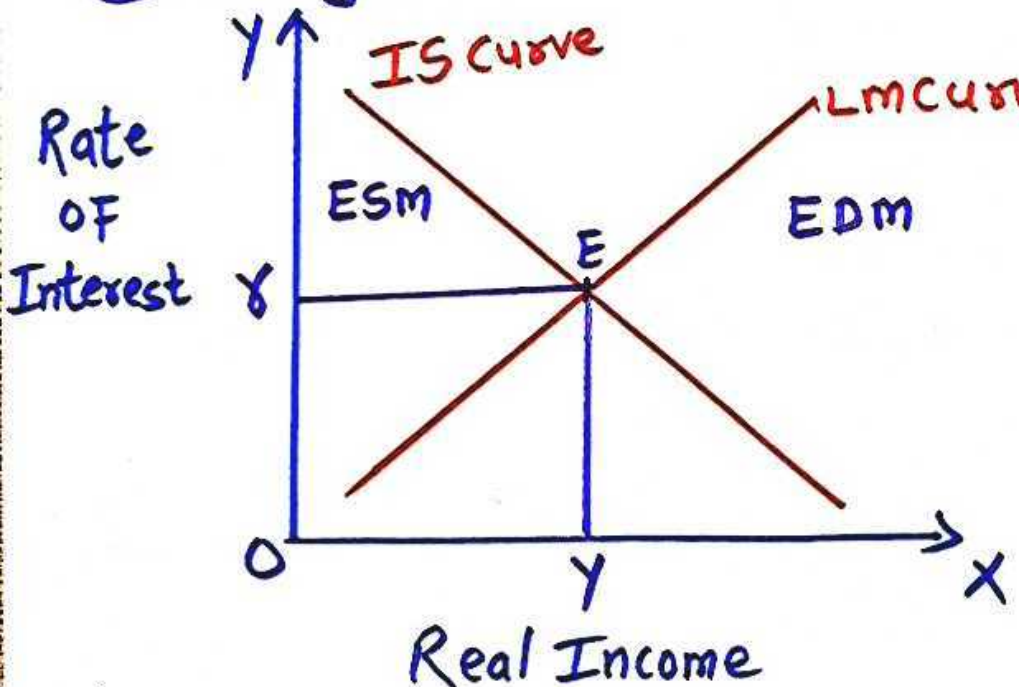
According to IS-LM model, Demand for money and Supply of Money plays an important role in determinati of Income and Rate of Interest.

The IS-LM Curve model is based on—

i) Investment-Demand function
ii) Money-Demand function
iii) Consumption Function
iv) Quantity of money.



(B) Diagram:-



1) IS Curve is sloping downward from Left to right which shows supply of money at different interest rates.
2) LM Curve is sloping Upward from Left to right

which shows Demand for money at different R.O.I.

3) IS Curve intersect LM Curve at Point-E. It is called Equilibrium in Goods market and money market. Here OY level of income is available at Or interest rate.

4) Points to Right Side of LM Curve is Excess Demand for money (EDM)

5) Point to Left Side Shows Excess supply OF Money (ESM)

6) Points to the Right side of IS Curve shows Excess Supply of Goods (ESG) and to the Left side Excess Demand OF Goods (EDG).

Q:4 Choose the Correct answer and rewrite the statements :-

1. which OF the Following Curve Shows the goods market Equilibrium. b- IS Curve

a) LM Curve b) IS Curve
c) AD Demand Curve d) None OF the above.

2. On which Side of the Following Curve there is excess Supply in the goods market?

a- Right Side OF IS Curve

a) Right side OF IS Curve b) Left side OF IS Curve.
c) Right Side OF LM Curve d) Left Side OF LM Curve.

3. Which of the Following is the slope OF IS Curve?

a- Negative Slope.

a) Negative slope b) Positive slope.
c) Direct slope d) None of the above.

4) which of the following will shift the IS curve to the Left?

b- Decrease in Government Expenditure.

a) Increase in government expenditure.
b) Decrease in government expenditure.
c) Increase in Autonomous spending
d) None of the above.

5) which of the Following will Cause the LM curve to shift to the right?

a- Increase in money supply.

a) Increase in money supply b) Decrease in money supply
c) An increase in R.O.I d) Decrease in Govt. Exp.

6) At the Point where IS Curve and LM curve intersect, which of the following markets are in Equilibrium?

b- Money Market and Goods Market.

a) Goods market and Capital market
b) Money market and Goods market.
c) Money market and Foreign Exchange Market
d) Capital market and Foreign Exchange Market.

Q:5 State whether following statements are True or False with Reasons :-

1. At the Point where income is equal to Aggregate Demand in the economy, saving and investment are equal.

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Ans:- True. Explaination. The Condition for Equilibrium in the goods market is that income in the economy is equal to Agg. Demand.

Agg. Demand = C+I+G+NX

Income of economy = C+I+G+NX

AD = Y

∴ C+I+G+NX in open economy.

But If we ignore Govt. and foreign sector.

Y = C+I

Y = C+S

∴ I = S Condition of Equilibrium.

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2. The IS Curve slopes upward to the right.

Ans:- False. Reasons: Q:1 C Part - explaination.

3. The Steepness of IS Curve depends on the sensitivity of Investment spending.

Ans:- True. Reason :- Q:1-D Part.

Reason The IS Curve will be relatively steep, if the interest elasticity of investment is Low. we Generally observe that smaller sensitivity of Investment spending to the interest rates and Smaller the Multiplier make IS Curve more steeper.

4. An increase in government expenditure will shift the IS Curve to the Left.

Ans:- False. Q:1 - E-Part ← Reason

5) The LM Curve shows different combinations of interest rates and income at which the goods market is in equilibrium.

Ans:- False. Q: 2 - B Part for Reason.

6. The LM Curve slopes upward to the right

Ans:. True Reason - Q: 2 B-Part explaination.

7. A decrease in money supply will shift the LM Curve to the Left.

Ans:- True. Reasons: Q:2 E Part - iv- Point

8. An increase in the Quantity of money will shift the LM Curve to the right leading to a Fall in the rate of interest and increase in income.

Ans:- True. Reasons :- Q:2 E Part - iii) Point