Q.	Part A - Statistics for Economics	Marks
1	(b) Arithmetic Mean	1
2	(a) Statistics expresses the quantitative problems of economics. (b) In statistics different sets of data are used to find the cause-and-effect relationship. **OR** In the plural sense, statistics refers to information in terms of numbers or numerical data.	1
3	Direct personal investigation is the method in which data are collected by the investigator personally from sources concerned	1
4	Histograms are used to show distributions of variables while bar charts are used to compare variables.	1
5	(c) 25	1
6	(d) $\dfrac{(Q3 - Q1)}{2}$	1
7	A positive correlation exists when one variable decreases as the other variable decreases, or one variable increases while the other increases. Therefore, Positive Correlation exists in the Variable X and Variable Y.	1
8	(d) Mean Deviation $= \dfrac{\Sigma f|d|}{N}$	1
9	(b) Current year	1
10	Lack of representative character: - Median fails to be a representative measure in case of such series the different values of which are wide apart from each other. **OR** It is easy to calculate and simple to understand.	1
11	**Write down the essential qualities of a good questionnaire.** ● Limited number of questions: The number of questions should be limited as far as possible. ... ● Simplicity: The language of the questions should be simple and easily understandable. ... ● Logically arranged: The questions should be arranged logically **OR** **The main characteristics of the statistical table are:** (a) It shows the probability distribution or the frequency distribution or any relevant parameter distribution in a simplified manner. (b) It represents the quantitative and qualitative attributes.	3

	(c) It can represent the data based on different time periods.	
12	**Sampling error:** Sampling error is defined as the amount of inaccuracy in estimating some value, which occurs due to considering a small section of the population, called the sample, instead of the whole population. **Non-sampling error:** A non-sampling error is a term used in statistics that refers to an error that occurs during data collection, causing the data to differ from the true values. A non-sampling error refers to either random or systematic errors, and these errors can be challenging to spot in a survey, sample, or census.	3
13	Uses of the Consumer Price Index 　1. It serves as an indicator of inflation in an economy. 　2. Can be used to change the components of national income 　3. It helps in analysing market 　4. It helps in determining government policy Mode: "The value occuring most frequently in series (or group) of items" **Following are the demerits of the mode:** (a) Incapable of Algebraic treatment—Unlike mean, mode is not capable of further algebraic treatment. (b) Uncertain and vague—Mode is an uncertain and vague measure of central tendency. (c) Restricted use—If the frequency of each item of the series is the same then mode cannot be calculated. In this way, the use of mode is restricted.	4
14	(table below)	4

Class Interval	Frequency
0 - 10	5
10 - 20	8
20 - 30	15
30 - 40	10
40 - 50	4

By inspection, it is clear that 20 - 30 is the modal class as the frequency of class is the maximum i.e. 15

Mode = $l_1 + (f_1 - f_0)/(2f_1 - f_0 - f_2) \times i$

Where, $l_1 = 20$, $f_1 = 15$, $f_0 = 8$, $f_2 = 10$, $i = 10$

　　　= $20 + (15 - 8) / (2 \times 15 - 8 - 10) \times 10$

　　　= $20 + (7 / 12) \times 10$

	= 20 + 5.83 = 25.83 Mode = 25.83	
15	<table><tr><th>Maths X</th><th>R₁</th><th>Economics Y</th><th>R₂</th><th>R₁ - R₂ (D)</th><th>D²</th></tr><tr><td>60</td><td>5</td><td>85</td><td>5</td><td>0</td><td>0</td></tr><tr><td>48</td><td>1</td><td>65</td><td>3</td><td>-2</td><td>4</td></tr><tr><td>49</td><td>2</td><td>75</td><td>4</td><td>1</td><td>1</td></tr><tr><td>50</td><td>3</td><td>60</td><td>2</td><td>1</td><td>1</td></tr><tr><td>55</td><td>4</td><td>55</td><td>1</td><td>3</td><td>9</td></tr><tr><td>N = 5</td><td></td><td></td><td></td><td></td><td>ΣD² = 15</td></tr></table> $rk = 1 - \dfrac{6\Sigma D^2}{N^3 - N}$ $= 1 - \dfrac{6 \times 15}{5^3 - 5}$ $= 1 - \dfrac{90}{120}$ $rk = 0.25$	4
16	Covariance of X and Y $= \dfrac{\Sigma xy}{N}$ $= 15.2$ Variance of Y $= (\sigma_y)^2 = 163.8$ $\sigma_y = \sqrt{163.8} = 12.80$ Applying formula: $r = \Sigma xy / N.\sigma_y.\sigma_x$ $= \dfrac{\Sigma xy}{N} \times \dfrac{1}{\sigma_x} \times \dfrac{1}{\sigma_y}$ $0.56 = 15.2 \times \dfrac{1}{\sigma_x} \times \dfrac{1}{12.80}$ $0.56 \times 12.80 \ \sigma_x = 15.2$ $7.168\sigma_x = 15.2$ $\sigma_x = \dfrac{15.2}{7.168}$ $= 2.12 = \text{approx } 2$	(6

					Therefore, variance of $X = (\sigma_x)^2 = (2)^2 = 4$			

		Base Year 2004		Current Year 2014		p_1q_0	p_0q_0	p_1q_1	p_0q_1
	Items	Price p_0	Quantity q_0	Price p_1	Quantity q_1				
	A	12	40	14	30	560	480	420	360
	B	10	25	12	18	300	250	216	180
	C	8	30	8	35	240	240	280	280
	D	6	20	8	22	160	120	176	132
						P_1q_0 = 1260	P_0q_0 = 1090	P_1q_1 = 1092	P_0q_1 = 952

17 ... **6**

Laspeyre's price index number = $\frac{\Sigma p_1q_0}{\Sigma p_0q_0}$ X 100

$= \frac{1260}{1090}$ X 100

= 115.60

Paasche's price index number $= \frac{\Sigma p_1q_1}{\Sigma p_0q_1}$ X 100

$= \frac{1092}{952}$ X 100

= 114.71

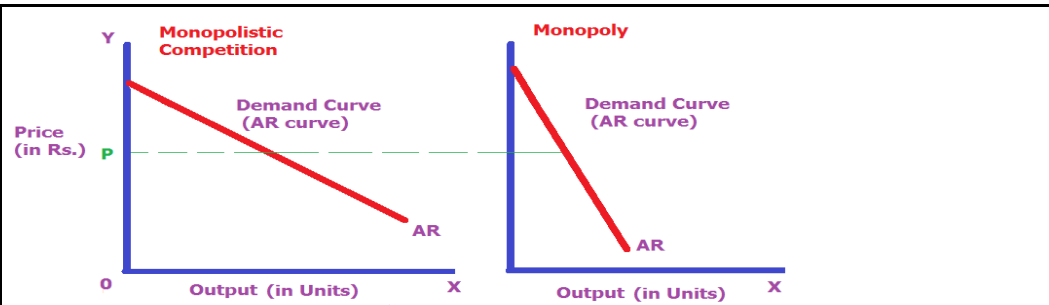**Part B - Microeconomics**

18 | MC declines as output increases in the beginning and after a certain level of output it increases.

OR

TC and TVC curves are parallel to each other because the vertical gap | **1**

	between them represents TFC which remains constant at all levels of output.	
19	(c) Rs. 18 per unit.	1
20	(d) Both a) and c)	1
21	d) Wages **OR** In economics, the total cost is the total economic cost of production. It consists of variable costs and fixed costs. Total cost is the total opportunity cost of each factor of production as part of its fixed or variable cost.	1
22	(b) Towards left	1
23	All those bundles that give content to these norms are set to structure a part of what is known as the budget set.	1
24	(d) MRS increases: Indifference curve will be concave to the origin.	1
25	'U'	1
26	Inelastic demand is when a buyer's demand for a product does not change as much as its change in price. **OR** Elastic demand is said to be the condition in which the price elasticity of demand is always greater than one.	1
27	decrease	1
28	What to produce: This problem involves selection of goods and services to be produced and the quantity to be produced for each selected commodity. Every economy has limited resources and thus, cannot produce all the goods. More of one good or service usually means less of another. When an economy has taken a decision as to what goods or services to be produced, then it has to be about its quantity. How much of consumer goods and capital goods are to be produced. For example, if an economy decides to produce rice and wheat within a given period with limited resources then it will have to use less machinery. OR Production possibility curve shows the various production possibilities with the help of given limited resources and technology. It is also known as the production possibility frontier or transformation curve. It is a tool which can help to solve the central problems of an economy:	3
29	**Diagram:**	3

Explanation:
Due to the following reasons demand curve under monopoly is less elastic than monopolistic competition:
- Single firm and no competition i.e. No close substitute

Whereas, in case of monopolistic competition, a large number of firms are there i.e. close substitutes are available.

30						4

Output (Units)	TC (₹)	TFC (₹)	TVC (₹) (TC - TFC)	MC (₹)
0	40	40	0	0
1	60	40	20	20
2	78	40	38	18
3	97	40	57	19
4	124	40	84	27

31	**Very large number of buyers and sellers:** There are a very large number of buyers and sellers. The number of buyers and sellers is such a large that each buyer or seller is just like a drop in the ocean. Under such conditions, no single buyer or seller can influence the market price of a commodity. As a result, uniform price prevails in the market. **OR** Monopolistic competition refers to the market situation in which there is a large number of sellers selling closely related but differentiated products.	4

32	Price elasticity of demand may be defined as: "A degree measure of responsiveness of demand for a commodity to a unit change in its price." $Ed = \dfrac{\Delta Q}{\Delta P} \times \dfrac{P}{Q}$ $\Delta Q = Q_1 - Q$ $\Delta P = P_1 - p$ $P = 20$, $P_1 = 16$ $\Delta P = 16 - 20$	4

= - 4

Q = 200, Q_1 =300
ΔQ = 300 - 200
    = 100

Ed = 100/-4 x 20/200
    = (-)2.5
Demand is highly elastic.

OR

Demand Curve is negatively sloped showing the inverse relationship between price and quantity demanded of the commodity.
According to utility analysis , the marginal utility of a commodity reduces when the quantity of goods is more. Consequently, when the quantity is more, the prices will fall and demand will increase. Hence, consumers will demand more goods when prices are less. This is why the demand curve slopes downwards.

33	● Law of variable proportions is a concept of short run. ● This law states, as we combine more and more units of variable factor with the same fixed factors, - Initially TP increases at increasing rate and MP increases, - then at TP increases at diminishing rate and MP falls - and finally TP falls and MP becomes negative.	6

Capital (in Lac Rs.)	Labour (No. of workers)	TP (in units)	MP (in units)
1	1	4	4
1	2	10	6
1	3	18	8
1	4	24	6
1	5	28	4
1	6	30	2
1	7	30	0
1	8	28	(-2)

Phase - 1 Phase of Increasing Returns
● Initially when we combine more units of labour with the same amount of capital, TP increases at an increasing rate and MP increases. In the above diagram this phase operates till '3' workers are employed.

- This phase ends at the level where MP is maximum.
- **Reason** - Fuller utilization of fixed factors, Division of labour & specialization.

Phase -2 Phase of Diminishing Returns
- When we further increase the number of workers without changing capital, TP still rises but at a diminishing rate.
- In the above diagram this phase operates between '4' and '7' workers.
- This phase ends where MP is Zero and TP is maximum and constant.
- **Reason** – Factors of production are imperfect substitutes for each other,Ideal combination of fixed and variable factors is distorted.

Phase - 3 Phase of Negative Returns

- Beyond a certain limit if we increase number of workers (units of variable factor) we start getting negative returns i.e. MP becomes negative and TP starts falling.
- In the given diagram this phase operates when more than '7' workers are employed with the same fixed factors (capital).
- Reason – Scarcity of fixed factors,mismanagement

| 34 | **Meaning & need of maximum price ceiling:**
 ● Ceiling means controlling; and
 ● 'Maximum Price Ceiling' means fixation of the maximum or highest price of a commodity by the government.
 ● Price so fixed is generally less than the equilibrium price i.e. the price fixed by market forces, demand supply.
 ● Government generally imposed 'Maximum Price Ceiling' in case of essential goods and services like, wheat, rice, sugar, medicines, lab tests for Swine flu, Dengue fever etc.
 ● Government is like a parent both for consumers as well as producers but it gives more attention to the deprived one.
 ● If due to any reason the price fixed by the market is very high and common people are not able to afford it, the government intervenes and puts a ceiling. No seller or service provider can recover more than this.

 Diagram showing effects of maximum price ceiling: | 6 |

Excess Demand OR Shortage
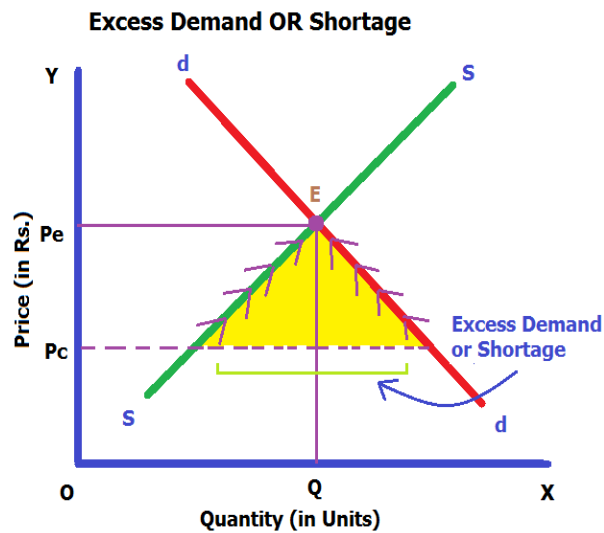
- In the given diagram, OP_e is price fixed by market forces; and OP_c is the 'Maximum Price'
- fixed by the government. It is less than the equilibrium price
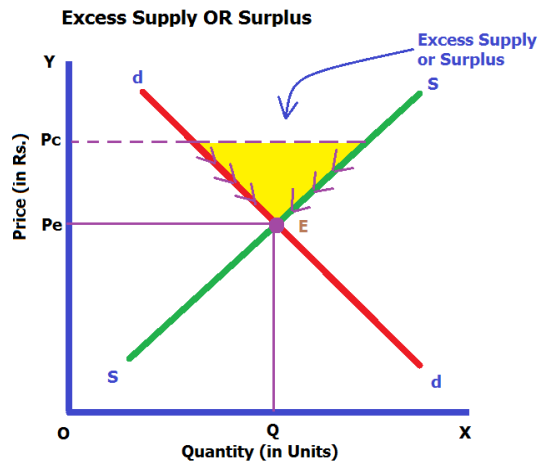- At the price 'OP_c', there is excess demand equal to 'MN'

Implications: Shortage leads to Black Marketing and hoarding.

OR

- 'Minimum Support Price' means fixation of the minimum or lowest price of a commodity by the government.
- Price so fixed is generally more than the equilibrium price i.e. the price fixed by market forces of demand supply.
- Government generally imposes 'Minimum Support Price' on agricultural products.
- *Government is like a parent both for consumers as well as producers but it gives more attention to the deprived one.*
  If due to any reason price fixed by market is very low and it is against the interest of poor farmers and producers, the the government intervenes and fixes a higher price.

Diagram showing effects of maximum price ceiling:

Excess Supply OR Surplus

- In the given diagram, OP_e is price fixed by market forces; and
- OP_c is the 'Minimum Support Price' fixed by the government. It is more than the equilibrium price.
- At the price 'OP_c', there is excess supply equal to 'MN'.

Implications: It leads to surplus of stock for farmers and leads to problems of storage.