9. Given the demand function as $p = \frac{1}{4} q^{-\frac{1}{2}}$, consumer's surplus at q = 25 is:

A. 1.12   B. 1.25   C. 1   D. 0.5

ans

10. The demand and supply functions are given as : $P_D = 30 - 5x$ and $P_S = 3x - 10$ respectively(x=quantity).The consumer surplus is

(A) 125

(B) – 62.5

(C) 62.5 ← ans.

(D) –125

11. What is the value of the equilibrium level of income for the data given below for an economy?

c = 50 + 0.8 Yd

t = 20%

I = 100

G = 30

1. 400

2. 300

3. 500

4. 600

$C = 50 + 0.8 Yd$ $t = 20\%$ $I = 100$ $G = 30$ $Y = ?$

$Y = C + I + G$ → $C(Yd)$ → $C(Y-t)$

$Y = 50 + 0.8 Y_d + 100 + 30$

$= 50 + 0.8(Y - 0.2Y) + 130$

$Y = 180 + 0.64Y$ → $0.36Y = 180$

$Y = 500$

12. Given the saving function S= -20 + 0.2Y and autonomous investment (I) = Rs. 100 million, the equilibrium of level of consumption would be

1. 500

2. 600 ← ans

3. 400

4. 700

$S = -20 + 0.2Y$ $I = 100$

$C + S = Y$

$C = Y - S = Y - (-20 + 0.2Y)$ $Y = C + I$

$C = Y + 20 - 0.2Y$ $I = -20 + 0.2Y|_{100}$

$C = 20 + 0.8Y$ $0.2Y = 120$ $Y = 600$

13. In an economy, the saving and investment functions are given as :

S = – 100 + 0.2 y

I = – 30 + 0.1 y

What will be equilibrium level of income ?

$S = I$

9.) $P = \frac{1}{4} q^{-1/2}$ c·s at $\boxed{q = 25}$?

$q^* \frac{1}{4} q$

$CS = \int_0^{?} D(q) \, dq - P^* \times Q^*$

$P = \frac{1}{4} \times 25^{-1/2}$

$= \frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$

$\int_0^{25} \left(\frac{1}{4} q^{-1/2} \right) dq - \frac{1}{20} \times 25$

$= \frac{1}{4} \int_0^{25} q^{-1/2} \, dq - \frac{25}{20}$

$= \frac{1}{4} \left[\frac{q^{-1/2+1}}{-\frac{1}{2}+1} \right]_0^{25} - \frac{25}{20}$

$\boxed{\frac{x^{n+1}}{n+1}}$

$= \frac{1}{4 \cdot \frac{1}{2}} \left[q^{1/2} \right]_0^{25} - \frac{25}{20}$

$= \frac{1}{2} (25)^{1/2} - \frac{25}{20} = \frac{5}{2} - \frac{5}{4} = \frac{5}{4}$

(10) $P_d = 30 - 5x$ and $P_s = 3x - 10$

equil: $P_d = P_s$ → $30 - 5x = 3x - 10$

$8x = 40$

equil $\boxed{x = 5}$

$\therefore P = 3 \times 5 - 10$

$\boxed{P^* = 15 - 10 = 5}$

$cs = \int_0^5 (30 - 5x) \, dx - P \times Q$

$= 30 \int_0^5 dx - 5 \int_0^5 x \, dx - 5 \times 5$

$= 30 [x]_0^5 - 5 \left[\frac{x^2}{2} \right]_0^5 - 25$

$= 30 [5] - \frac{5}{2} [25] - 25$

$= 150 - 125 - 50$

13. In an economy, the saving and investment functions are given as :

$S = -100 + 0.2y$

$I = -30 + 0.1y$

What will be equilibrium level of income ?

(1) 1000

(2) 900

(3) 600

(4) 700 (ans)

$S = I$

$-100 + 0.2y = -30 + 0.1y$

$0.2y - 0.1y = 100 - 30$

$0.1y = 70$

$y = \dfrac{70}{0.1} = 700$

---

14. Given the consumption function, $C = 0.8Y$, and the investment function $I = 102 - 0.2i$, then the IS-curve is

(A) $Y = 500 - 10i$

(B) $Y = 450 - i$

(C) $Y = 510 - i$ ← (ans)

(D) $Y = 505 - 2i$

$C = 0.8Y$

$I = 102 - 0.2i$

$IS: \quad Y = C(Y) + I(i) + G$

$Y = 0.8Y + 102 - 0.2i$

$Y - 0.8Y + 0.2i = 102$

$0.2Y + 0.2i = 102$

$Y + i = 102/0.2 = 510$

$Y = 510 - i$

---

15. Given the production function

$Q = 2.K^{1/3} \cdot L^{2/3}$

, find the output level when 8 units of capital and 27 units of labour are used.

(A) 36 ← (ans)

(B) 54

(C) 18

(D) 24

$2 \times K^{1/3} \quad L^{2/3} = (L^{1/3})^2$

$2 \times 2 \qquad = (27^{1/3})^2$

$\qquad\qquad = 3^2 = 9$

$4Y = 9$

---

16. Consider an economy with a linear homogeneous Cobb – Douglas production function with two inputs – capital and labour. The share of capital and labour are, respectively, 1/3 and 2/3. The rates of growth of capital and labour are, respectively 6% and 3% per annum. If the rate of growth of output is 6% per annum, what is the rate of growth of output due to Total Factor Productivity (TFP)?

1. 1%

2. 2% (ans)

3. 3%

4. 4%

growth of TFP = Growth of output – contribution of capital – contribution of labour

---

17. When nominal GDP is 11,000 crores and real GDP is ` 10,000 crores, GDP deflator is:

A. 9.09   B. 90.91   C. 1.11   D. 110

$= 30[5] - \dfrac{5}{2}[25] - 25$

$= 150 - \dfrac{125}{2} - 25 = \dfrac{300 - 125 - 50}{2} = \dfrac{125}{2}$

12 $Y - S = C = 20 + 0.8Y$, $I = 100$

Now: $Y = C + I$

$Y = 20 + 0.8Y + 100$

$Y - 0.8Y = 20 + 100$

$0.2Y = 120 \Rightarrow Y = \dfrac{120}{0.2} = 600$ (ans)

$AD = AS$ → $S = I$

$C + I + G = Y$

$IS: \quad Y = C(Y) + I(r) + G$

$LM: \quad M^d = M^s$

$L(Y, i) = \dfrac{M}{P}$

$q = 2K^{1/3} \quad L^{2/3} \cdot \; \dfrac{2}{3}$

$(L^{1/3})^2 = 2 \times 8^{1/3} (27)^{2/3}$

$= 2 \times 2 \times 9 = 36$

$Q = ?, \quad K = 8, \quad L = 27$

growth of output = 6% = 0.06

growth of labour = 3%

contribution $= \dfrac{2}{3} \times 3\%$

grow capital $= \dfrac{1}{3} \times 6\%$

TFP $= 0.06 - \dfrac{1}{3} \times 0.06 - \dfrac{2}{3} \times 0.03$

$= 0.06 - 0.03$

$= 0.02 = 2\%$

19. Match the Economists with their field of contribution in

Mathematical economics

List I	List II
(a) Slutsky	(i) Linear programming
(b) Arrow	(ii) Input - output analysis
(c) Leontief	(iii) Consumer behaviour analysis
(d) Dantzig	(iv) CES production function

Choose the right combination

1. (a) – ii, (b) – iv, (c) – i, (d) – iii
2. (a) – iii, (b) – iv, (c) – ii, (d) – i
3. (a) – i, (b) – ii, (c) – iv, (d) – iii
4. (a) – iv, (b) – i, (c) – iii, (d) – ii

20. Which of the following is condition of economic viability and technological feasibility of Leontief's static system?
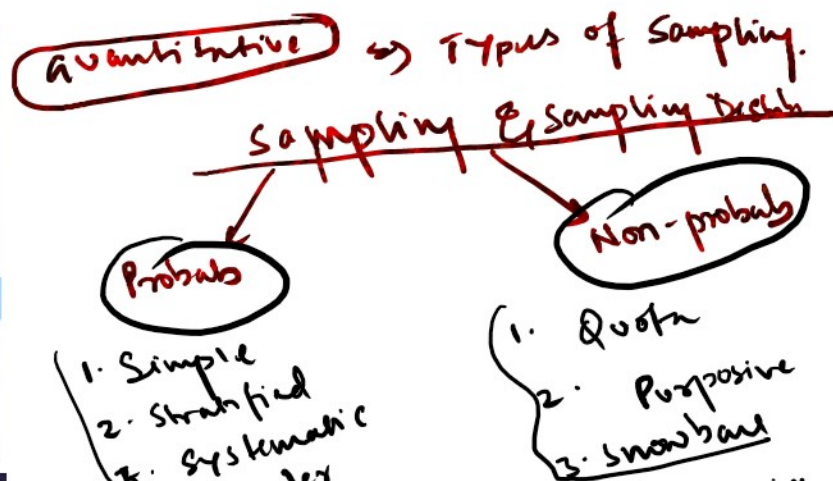A. Marshall-Edgeworth conditions
B. Kuhn-Tucker conditions
C. Hawkins-Simon conditions
D. Value of the objective function of primal problem should equal the value of the objective function of the dual of the primal

1. In quantitative research paradigm which of the following sampling methods are given preference?
A. Simple random sampling
B. Stratified sampling
C. Quota sampling
D. Snowball sampling
E. Systematic sampling
Choose the correct answer from the options given below.
1. A, B and C only
2. A, B and E only
3. B, C and D only
4. C, D and E only

Quantitative ⟹ Types of Sampling.

Sampling & Sampling Desab

Probab — Non-probab

Probab:
1. Simple
2. Stratified
3. Systematic
...

Non-probab:
1. Quota
2. Purposive
3. Snowball
...

Which one of the following denotes the probability of rejecting null hypothesis when it is false?
[a is probability of Type I error and b is probability of Type II error]

(A) a

(B) b

(C) 1 – a

(D) 1 – b ← ans, b = type II error.

3. In a multiple linear regression with independent variables, the overall regression's significance is to be tested. Which test would be used?

1. Z test
2. F test ✓
3. Chi-square test
4. t-test

4. In a frequency distribution the standard deviation of which is 20, the value of median is more than mean by 6, what will be its coefficient of skewness ?

(A) – 0.76

(B) + 0.80

(C) – 0.85

(D) – 0.90 (ans) ✓

$\sigma = 20$

$\bar{x} - Med = -6$

$S_k = \dfrac{3(\bar{x} - Med)}{\sigma}$

$= 3\left(\dfrac{-6}{20}\right) =$

$= \dfrac{-18}{20} = -0.9 \ (ans)$

6. Given the following data When Number of observations = 140 Arithmetic Mean = 200 Variance = 256 then coefficient of variation will be

(1) 12.4%

(2) 10%

(3) 8% (ans) ✓

(4) 1.8%

$Cv = \dfrac{\sigma}{\bar{x}} \times 100$

$= \dfrac{\sqrt{256}}{200} \times 100$

$= \dfrac{16}{2} = 8\%$

Handwritten side notes:

2. Stratified
5. Systematic
9. Cluster
5. Multistage

2. Pure
3. Snowball
4. Consecutive

Type-I error! Ⓐ = prob of rejecting H₀ when it is true.

Type II error? Ⓑ = accepting H₀ when it is false

1-b = rejecting

7. Which of the following statements is correct

✓ ~~1~~.The coefficient of correlation is the geometric mean of two regression coefficients

~~2~~.The coefficient of correlation lies between -1 and +1

✗ 3.The coefficient of correlation is independent of change of origin <mark>Not</mark> scale

1. सहसंबंध का गुणांक दो प्रतीपगमन गुणांकों का ज्यामितीय माध्य है
2. सहसंबंध का गुणांक -1 और +1 . के बीच होता है
3. सहसंबंध का गुणांक मूल के परिवर्तन से स्वतंत्र है पैमाना नहीं

Codes:
A. 1 only
B. 1 and 3
✓ C. 1 and 2 (ans)
D. 1,2 and 3

---

8. Two people X and Y apply for a job in a company. The probability of the selection of X is 4/5, and Y is 6/8. What is the probability that both of them get selected?

दो व्यक्ति X और Y एक कंपनी में नौकरी के लिए आवेदन करते हैं। एक्स के चयन की संभावना 2/5 है, और वाई 4/7 है। दोनों के चुने जाने की क्या प्रायिकता है?

1. 1/6
2. 6/10
3. 8/40
4. 3/13

---

9. The average value of the series is 320 and most frequent value of the series is 180 and standard deviation is 50 then coefficient of skewness will be

1. -1.8
2. 2.8
3. 7.5
4. -8.5

---

10. Which of the following methods satisfy only time reversal test

1. Kelly's method
2. Dorbish bowley's method
3. Marshall edgeworth method
4. Fisher's method

11. Match the items in List-I and List-II and answer from the codes given below :

(a) Standard Deviation   (i) Positively skewed distribution

(b) Stratified Random Sampling   (ii) Analysis of attributes

(c) Coefficient of Association   (iii) Measure of dispersion

(d) Mean > Mode   (iv) Probability based sampling

Codes :

(a) (b) (c) (d)

(1) (iv) (ii) (iii) (i)

(2) (i) (ii) (iii) (iv)

(3) (iv) (iii) (ii) (i)

(4) (iii) (iv) (ii) (i)

12. Fisher's method of constructing index is called 'ideal' because

1. It is based on the geometric mean which is theoretically considered to Be the best average for constructing index numbers
2. It satisfies both the time reversal and factor reversal tests
3. It takes only into account year prices and quantities
4. It is unbias

Codes:

1. 1, 2and3
2. 1 and2
3. 1,2 and4
4. 1,2,3and4

13. Which of the following statements is correct

1.The coefficient of correlation is the geometric mean of two regression coefficients

2.The coefficient of correlation lies between -1 and +1

3.The coefficient of correlation is independent of change of origin and scale

Codes:

1. 1 only
2. 1 and3
3. 1 and 2
4. 1,2 and3

14.Given arithmetic mean = 150, mode = 120, then median =
(A) 130

(B) 135

(C) 140

(D) 125

15. The estimated regression lines are given as follows :

Y=10+0.3 X

X=-4+2.7 Y

Then the coefficient of correlation between X and Y is.

(A) 0.3

(B) 0.79

(C) 0.80

(D) 0.90

16. A coin is thrown 3 times .what is the probability that atleast one head is obtained?

1. 1/8
2. 7/8
3. 1/6
4. 5/6

Sample space = [HHH, HHT, HTH, THH, TTH, THT, HTT, TTT]
Total number of ways = 2 × 2 × 2 = 8. Fav. Cases = 7
P (A) = 7/8
OR
P (of getting at least one head) = 1 − P (no head) → 1 − (1/8) = 7/8

17. Mean and variance of which of the following

A Bernoulli distribution

B. Binomial distribution

C. Poisson distribution

D. Normal distribution

18. The normal distribution was discovered by

A. Bernoulli

B. Abraham De. Moivre.

C. Alfred normal

D. Karl pearson

19. Standard normal variation is normally distributed with mean and variance.

A. 0,1.

B. 1,0

C. 1,1

D. 0,0

20. Match the following.

A. Contingency table	1. Stationarity
B. Unit root test	2. Causality
C. Fisher's test	3. Chi-square test
D. Granger test	4. Test of significance of overall regression

1. A-3 B-1 C-4 D-2
2. A-1 B-2 C-3 D-4
3. A-4 B-3 C-2 D-1
4. A-2 B-3 C-1