Statstrive ExamIQ

ISI MSQE PEA 2025 Question Paper

Regenerated from the local solution TeX source. Items missing full source detail are marked Needs Review.

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Question 1

Topic: Macroeconomics **Difficulty:** Easy **Status:** Ready

Consider a standard Solow style economy where the aggregate production function is $Y = KN$. Assume no technological progress ($g = 0$) and no population growth ($n = 0$). Let $\bar{K}$ and $\bar{Y}$ be the steady state capital stock and output respectively, $s \in [0, 1]$ the saving rate and $\delta \in [0, 1]$ the depreciation rate. Find the steady-state capital per worker and output per worker.

(A) $s\delta$ and $(s\delta)^2$

(B) s/δ and s

(C) s^2/δ^2 and s/δ

(D) None of the above

Question 2

Topic: Macroeconomics **Difficulty:** Moderate **Status:** Ready

Continue with Q1. Assume $\delta = 0.1$. At the steady state, consumption per worker and the saving rate that maximises consumption per worker are given by, respectively:

(A) $s(1-s)$ and $s = 0.5$

(B) $(s/\delta)^2$ and $s = 0.4$

(C) s/δ^2 and $s = 0$

(D) $\delta/(1-s)$ and $s = 1$

Question 3

Topic: Macroeconomics **Difficulty:** Moderate **Status:** Ready

Wage setting: $W = P(1 - u)$. Production: $Y = N$. Markup $\mu = 20\%$. Labour force $L = 60$. Find the natural rate u_n and natural output Y_n.

(A) 16.667% and 50

(B) 23.5% and 15.5

(C) 20% and 15.5

(D) 20% and 20

Question 4

Topic: Macroeconomics **Difficulty:** Moderate **Status:** Ready

Open economy, fixed exchange rate = 1. $IM = 0.3Y$, $X = 0.3Y^*$. The foreign country has the same structure. Find the domestic multiplier.

(A) 1

(B) 2

(C) 0.4

(D) 0.8

Question 5

Topic: Macroeconomics **Difficulty:** Moderate **Status:** Ready

Continue with Q4. Target $Y = 250$, foreign G^* unchanged. Required increase in G?

(A) 112.4

(B) 96

(C) 38.8

(D) 86

Question 6

Topic: Macroeconomics **Difficulty:** Hard **Status:** Ready

$Y = A\min\{K, L\}$, $A > 0$. With $W = \partial Y/\partial L$ and $R = \partial Y/\partial K$:

(A) R and W same for every k.

(B) Same for $k \leq 1$ but not for $k > 1$.

(C) Same for $k > 1$ but not for $k \leq 1$.

(D) None of the above.

Question 7

Topic: Macroeconomics **Difficulty:** Moderate **Status:** Ready

$\frac{d}{dt}\left[e^{-\rho t}U'(C)\right] = e^{-\rho t}U'(C)r$. When is $\dot{c} > 0$?

(A) $r < \rho$

(B) $r > \rho$

(C) $r = \rho$

(D) Never.

Question 8

Topic: Macroeconomics **Difficulty:** Moderate **Status:** Ready

Income stream $\{y_h, y_l, y_h, y_l, \ldots\}$, discount factor $\beta \in (0,1)$. Find constant $\bar{c}$ with equal present value.

(A) $\beta(y_h + y_l)/(1-\beta)$

(B) $\beta^2(y_h + y_l)/(1-\beta)$

(C) $\beta^2(y_h + y_l)(1-\beta)$

(D) $(y_h + \beta y_l)/(1+\beta)$

Question 9

Topic: Statistics **Difficulty:** Easy **Status:** Ready

Out of 20 questions, average correct = 11.7, average wrong = 5.3. Has the TA made a mistake?

(A) Yes

(B) No

(C) Maybe

(D) Insufficient information

Question 10

Topic: Probability **Difficulty:** Moderate **Status:** Ready

Under the null $p = 1/2$, compare $P(15 \text{ of } 20 \text{ smokers die first})$ vs. $P(12 \text{ of } 20)$.

(A) $= 1$

(B) < 1

(C) > 1

(D) Insufficient info.

Question 11

Topic: Econometrics **Difficulty:** Easy **Status:** Ready

$\hat{\beta}_0 = 5$, $\bar{y} = 65$, $\bar{x} = 90$. Predict y for $x = 75$.

(A) 55

(B) 75

(C) 40

(D) 65

Question 12

Topic: Probability **Difficulty:** Moderate **Status:** Ready

Two fair coins. A: head on first coin. C: head on second coin. D: coins match. G: two heads. Which statement is false?

(A) C and D independent.

(B) A and G independent.

(C) A and D independent.

(D) A and C independent.

Question 13

Topic: Probability **Difficulty:** Moderate **Status:** Ready

Bowl: 3 chips = Re. 1, 2 chips = Rs. 4. Draw 2 without replacement. Expected sum?

(A) < 2

(B) 3

(C) $(3, 4)$

(D) $(4, 5)$

Question 14

Topic: Econometrics **Difficulty:** Moderate **Status:** Ready

Two samples; R^2 of first $>$ R^2 of second. Which follows?

(A) Coefficient on X greater in first.

(B) |coefficient| on X greater in first.

(C) Variance of Y smaller in first.

(D) None of the above.

Question 15

Topic: Econometrics **Difficulty:** Easy **Status:** Ready

$\text{sd}(x) = 2$, $\text{sd}(y) = 4$. The OLS slope of Y on X equals:

(A) $8r$

(B) $2r$

(C) $r/2$

(D) None.

Question 16

Topic: Calculus **Difficulty:** Easy **Status:** Ready

$f(x) = 4x^3 - 6x^2 - 72x$. Where is f increasing / decreasing?

(A) Increasing everywhere.

(B) Decreasing everywhere.

(C) Increasing in $(-\infty, -2)$, decreasing in $(-2, \infty)$.

(D) Increasing in $(-\infty, -2)$ and $(3, \infty)$, decreasing in $(-2, 3)$.

Question 17

Topic: Sequences and Series **Difficulty:** Easy **Status:** Ready

Find $\sum_{k=1}^{2024} \frac{1}{k(k+1)}$.

(A) 1

(B) 2025/2026

(C) 2024/2025

(D) 2025/2024

Question 18

Topic: Optimization **Difficulty:** Easy **Status:** Ready

Find non-negative x, y with $x + y = 16$ minimising $x^3 + y^3$.

(A) $x = y = 8$

(B) $x = 15, y = 1$

(C) $x = 12, y = 4$

(D) None.

Question 19

Topic: Calculus **Difficulty:** Easy **Status:** Ready

$\int_1^2 \log x \, dx.$

(A) $\log 4$

(B) $\log 4 - 1$

(C) $\log 2 - 1$

(D) None.

Question 20

Topic: Number Theory **Difficulty:** Moderate **Status:** Ready

Find $6^{2025} \mod 25$.

(A) 0

(B) 1

(C) 24

(D) 6

Question 21

Topic: Functional Equations **Difficulty:** Moderate **Status:** Ready

$f : \mathbb{N}_+ \to \mathbb{N}_+$, $f(x+y) = f(x)f(y)$, $f(1) = 2$. Find $2 + \sum_{n=1}^{2025} f(n)$.

(A) 2^{2025}

(B) 2^{2026}

(C) 3^{2024}

(D) None.

Question 22

Topic: Microeconomics **Difficulty:** Moderate **Status:** Ready

Two demand groups. Both stop at $p = 5$. Per Re. price decrease: student demand +5, professor demand +10. $MC = 1$. Who is charged more?

(A) Professors

(B) Students

(C) Same

(D) Insufficient info.

Question 23

Topic: Microeconomics **Difficulty:** Easy **Status:** Ready

Bharat: linear demand, zero above $p = 5$. Chinmayi: linear demand, zero above $p = 10$. Market demand kink and flatness?

(A) Kink at Rs. 5, flatter to right.

(B) Kink at Rs. 5, flatter to left.

(C) Kink at Rs. 15, flatter to right.

(D) Kink at Rs. 15, flatter to left.

Question 24

Topic: Consumer Theory **Difficulty:** Moderate **Status:** Ready

Income = 200. $p_B = 5$, $p_Y = 1$. $U = 4B + 2Y$. Plus a Rs. 50 gift card usable only on books.

(A) 10 books, 200 other goods.

(B) 0 books, 200 other goods.

(C) 20 books, 150 other goods.

(D) 40 books, 0 other goods.

Question 25

Topic: Public Goods **Difficulty:** Hard **Status:** Ready

$MC = 25$. 5 "high" people have $MB_H = 100 - 0.5Q$, 10 "low" people have $MB_L = 50 - 0.25Q$. Max number of trees voluntarily provided with cost-sharing?

(A) 0

(B) 100

(C) 150

(D) 195

Question 26

Topic: Consumer Theory **Difficulty:** Hard **Status:** Ready

$x \succ y$ iff (i) $x_a + x_b > y_a + y_b$, or (ii) $x_a + x_b = y_a + y_b$ and $x_a > y_a$. Which statements are true?

I. $d_a = w/p_a$ if $p_a < p_b$. **II.** $d_a = w/p_a$ if $p_a \leq p_b$. **III.** $d_a = 0$ if $p_b \leq p_a$. **IV.** $d_b = w/p_b$ if $p_b < p_a$. **V.** $d_b = 0$ if $p_b < p_a$.

(A) I and III

(B) II and III

(C) II and IV

(D) I and V

Question 27

Topic: Consumer Theory **Difficulty:** Hard **Status:** Ready

Same setting as Q26. Are d_a, d_b continuous in (p_a, p_b)?

(A) Both continuous.

(B) d_a continuous, d_b not.

(C) d_a not continuous, d_b continuous.

(D) Neither continuous.

Question 28

Topic: Consumer Theory **Difficulty:** Hard **Status:** Ready

$U(x_1, x_2) = 4x_1^2 + x_2^2$. Solve $\max U$ subject to $p_1x_1 + p_2x_2 = w$. Let $X(p_1, p_2, w)$ be the solution set. Which is true?

(A) $X(2, 1, 10)$ not convex.

(B) $X(6, 3, 30)$ convex.

(C) $X(1, 1, 10)$ not convex.

(D) $X(4, 2, 20)$ convex.

Question 29

Topic: Consumer Theory **Difficulty:** Moderate **Status:** Ready

$U(x, y) = \dfrac{x}{1+x} + y$, $p_x = p_y$. Then:

(A) $x > 0$, $y = 0$.

(B) $x = 0$, $y > 0$.

(C) $x > 0$, $y > 0$.

(D) $x = y = 0$.

Question 30

Topic: General Equilibrium **Difficulty:** Moderate **Status:** Ready

Two consumers, same preferences, same endowments. Strictly convex preferences. Then the economy has:

(A) No Pareto-efficient allocation.

(B) Multiple competitive equilibrium allocations.

(C) Exactly two Pareto-efficient allocations.

(D) Only one competitive equilibrium allocation.