Statstrive ExamIQ

ISI MSQE PEA 2026 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: Sequences and Series **Difficulty:** Easy **Status:** Ready

Suppose a and b are positive integers that are relatively prime, and

$$\frac{a}{b} = \sum_{n=1}^{2026} \frac{1}{n^2 + 15n + 56}.$$

Then the value of $a + b$ is

(A) 9149

(B) 9229

(C) 8189

(D) 11

Question 2

Topic: Algebra **Difficulty:** Easy **Status:** Ready

If $x^2 - 3x + 1 = 0$, then the value of $\left(x^4 + \frac{1}{x^4}\right)$ is

(A) 43

(B) 45

(C) 47

(D) 49

Question 3

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

Let $f : \mathbb{R} \to \mathbb{R}$ satisfy $f(x^3 + 1) = x^6 + 4x^3 + 8$ for all $x \in \mathbb{R}$. Then $\int_1^2 f(x)\,dx$ equals

(A) $\frac{29}{3}$

(B) 10

(C) 11

(D) $\frac{31}{3}$

Question 4

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

Determine the value of

$$\int_0^2 |x^2 - 7x + 10|\, dx.$$

(A) 8

(B) 9

(C) $\frac{26}{3}$

(D) $-\frac{23}{3}$

Question 5

Topic: Real Analysis **Difficulty:** Moderate **Status:** Ready

Let $f : [0,1] \to \mathbb{R}$ be continuous with $\displaystyle\int_0^1 f(t)\,dt = 1$, and let

$$P(x) = \sum_{k=1}^{n} a_k x^k, \qquad \sum_{k=1}^{n} a_k = 1.$$

Then there exists $c \in (0,1)$ such that

(A) $f(c) = 2\sum_{k=1}^{n} a_k$

(B) $f(c) = \int_0^1 P(t)\,dt$

(C) $f(c) = P'(c)$

(D) $f(c) = P(c)$

Question 6

Topic: Real Analysis **Difficulty:** Moderate **Status:** Ready

Let $f : [0, \pi/4] \to \mathbb{R}$ be continuous. Then there exists $c \in (0, \pi/4)$ such that

(A) $f(c) = \int_0^{\pi/4} f(t)\, dt$

(B) $f(c) = 2\cos(2c) \int_0^{\pi/4} f(t)\, dt$

(C) $f(c) = \sin(2c)$

(D) $f(c) = \sin(2c) \int_0^{\pi/4} f(t)\, dt$

Question 7

Topic: Real Analysis **Difficulty:** Easy **Status:** Ready

Suppose $f : [a, b] \to \mathbb{R}$ is continuous and

$$\int_a^x f(t)\,dt \;=\; \int_x^b f(t)\,dt \quad \text{for all } x \in [a, b].$$

Then $f(x)$ must be

(A) A non-zero constant

(B) A linear function

(C) Identically zero

(D) An odd function about $\dfrac{a+b}{2}$

Question 8

Topic: Calculus **Difficulty:** Hard **Status:** Ready

Let $f : \mathbb{R} \to \mathbb{R}$ be a continuous odd function, vanishing exactly at one point and satisfying $f(1) = \frac{1}{2}$. If

$$\lim_{x \to 1} \frac{F(x)}{G(x)} = \frac{1}{14},$$

where

$$F(x) = \int_{-1}^{x} f(t)\, dt, \qquad G(x) = \int_{-1}^{x} t\, |f(f(t))|\, dt,$$

then the value of $f\left(\frac{1}{2}\right)$ is

(A) $\frac{1}{7}$

(B) 7

(C) -7

(D) $\frac{7}{2}$

Question 9

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

If the correlation between X and Y is zero, then which of the following is always true?

(A) They are independent

(B) There is no linear relationship

(C) They cannot be functionally related

(D) All of the above

Question 10

Topic: Regression **Difficulty:** Easy **Status:** Ready

In simple linear regression $Y = a + bX$, the least squares line based on n data points always passes through

(A) $(0, 0)$

(B) $\left(\frac{1}{n}, \frac{1}{n}\right)$

(C) $(1, 1)$

(D) None of the previous

Question 11

Topic: Hypothesis Testing **Difficulty:** Easy **Status:** Ready

Given sample size n, reducing the significance level α

(A) Increases Type I error

(B) Decreases Type II error

(C) Increases power

(D) Decreases power

Question 12

Topic: Random Variables **Difficulty:** Easy **Status:** Ready

If $X \sim \text{Bernoulli}(p)$, then $E(X^2)$ equals

(A) p^2

(B) p

(C) $p(1-p)$

(D) $p+p^2$

Question 13

Topic: Statistics **Difficulty:** Moderate **Status:** Ready

For $X_1, \ldots, X_n \sim \text{Poisson}(\lambda)$ (i.i.d.), which is unbiased for λ^2?

(A) $\bar{X}^2$

(B) $\bar{X}$

(C) $\bar{X}^2 - \dfrac{\bar{X}}{n}$

(D) $\bar{X}^2 - \bar{X}$

Question 14

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

A dataset consists of 9 observations arranged in increasing order $x_1 \leq x_2 \leq \cdots \leq x_9$ with mean 20 and median 18. If x_9 is replaced by a very large number, which must be true?

(A) Both the mean and the median increase

(B) The mean increases but the median remains unchanged

(C) The median increases but the mean remains unchanged

(D) Both the mean and the median remain unchanged

Question 15

Topic: Probability **Difficulty:** Easy **Status:** Ready

A restaurant has 60% vegetarian customers (of whom 30% order dessert) and 40% non-vegetarian (of whom 50% order dessert). Given that a randomly selected customer ordered dessert, what is the probability they ordered vegetarian?

(A) 0.375

(B) 0.474

(C) 0.600

(D) 0.750

Question 16

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

Suppose preferences are represented by $u(x, y) = x - \ln y$ for $x, y > 0$. Then the underlying preference relation must be

(A) Incomplete

(B) Complete but intransitive

(C) Complete and transitive but discontinuous

(D) Complete, transitive and continuous but not convex

Question 17

Topic: General Equilibrium **Difficulty:** Moderate **Status:** Needs Review

Review note: source status is Draft.

Suppose there are two agents A and B with utilities

$$u_A = x_A + y_A - \tfrac{m}{2}(x_A - y_A)^2, \qquad u_B = x_B + y_B,$$

where x_i and y_i are the amounts of goods X and Y consumed by agent $i \in \{A, B\}$. The total endowments are x and y. Initially A owns the entire endowment of Y and B owns the entire endowment of X. Then A will voluntarily transfer a positive amount of Y to B if

(A) $m > 0$

(B) $m < 0$

(C) $y > 2$

(D) $my > \dfrac{1}{2}$

Question 18

Topic: Public Goods **Difficulty:** Moderate **Status:** Needs Review

Review note: answer option could not be parsed confidently; source status is Needs Review.

Two agents A and B have utilities

$$u_A = x_A + y, \qquad u_B = 2x_B + y,$$

where x_A, x_B are amounts of a private good and y is the amount of a public good. Production satisfies $y + m(x_A + x_B) = 1$, with $m \in (0, 1)$. Suppose a social planner decides that one unit should be produced. For what value of m will the resulting allocation be Pareto optimal?

(A) $\frac{4}{5}$

(B) $\frac{4}{7}$

(C) $\frac{4}{9}$

(D) $\frac{4}{11}$

Question 19

Topic: Market Structure **Difficulty:** Moderate **Status:** Ready

Three consumers with valuations v_A, v_B, v_C each wish to buy one unit. The monopolist has zero marginal cost and knows the valuations but must charge a uniform price. It is given that

$$\frac{7v_B}{6} > v_A > v_B > \frac{8v_C}{5} > 0.$$

The profit-maximising price is

(A) v_A

(B) v_B

(C) v_C

(D) Something in (v_C, v_B)

Question 20

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

n agents simultaneously choose private consumption x_i and public-good contribution y_i to maximise

$$u_i = x_i \Big(\sum_{j=1}^{n} y_j \Big),$$

subject to $x_i + y_i = b$, $x_i, y_i \geq 0$. As n increases, the total Nash equilibrium expenditure on the public good

(A) Remains invariant

(B) Monotonically increases and approaches b

(C) Approaches $\dfrac{b}{n}$

(D) Monotonically decreases and approaches 0

Question 21

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

A and B are neighbours; the snow plough cannot clear in front of A's house without clearing in front of B's. Inverse demands are $P_A = 12 - q$, $P_B = 8 - q$. Marginal cost is 16. What is the efficient level of provision?

(A) 6

(B) 4

(C) 2

(D) 1

Question 22

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

A lump-sum tax of Rs. 1 is paid by the buyer per unit of a competitive good. The price paid by buyers rises by 80 paise. Then

(A) Demand must be perfectly elastic

(B) Demand must be perfectly inelastic

(C) Demand and supply elasticities must both be positive but finite

(D) Supply must be perfectly elastic

Question 23

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

A consumer always spends one-fourth of income on X, and the income elasticity of demand for X is 5. Is Y inferior?

(A) Yes

(B) No

(C) Y is inferior iff $p_Y \geq 2p_X$

(D) Y is inferior iff $p_Y \leq p_X/2$

Question 24

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

Half the total quantity is purchased by 75 consumers each with price elasticity 2, and the other half by 25 consumers each with price elasticity 3. What is the aggregate price elasticity for the 100 consumers?

(A) Cannot be determined

(B) 2.25

(C) 2.5

(D) 2.75

Question 25

Topic: International Trade **Difficulty:** Moderate **Status:** Ready

Two countries H and F produce single goods with outputs Y_H, Y_F. Take H's good as numeraire and p as the relative price of F's good. Consumers in country i spend a fraction $1/4$ of their expenditure on the foreign good. E_i denotes total expenditure of country i measured in its own good. Given $Y_H = 120$, $Y_F = 100$, $E_H = 80$ and market clearing with $Y_H + pY_F = E_H + pE_F$, find p.

(A) 8

(B) 6

(C) 4

(D) 2

Question 26

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

An economy has one good produced one-for-one from labour. The representative consumer has $U\left(C, \frac{M}{P}\right) = \frac{3}{4}\ln C + \frac{1}{4}\ln\frac{M}{P}$, labour endowment 50, money endowment $\bar{M} = 100$, with constant money supply $M = \bar{M}$. If the price is flexible (so labour is fully employed), the equilibrium price is

(A) 2

(B) 4

(C) 6

(D) 8

Question 27

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

With the same setup as Question 26 but with price fixed at $P = 10$, the equilibrium output is

(A) 15

(B) 20

(C) 25

(D) 30

Question 28

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

Solow economy with $Y = K^{1/2}L^{1/2}$, no depreciation, $n = 0.02$, savings rate $s > 0$. If the steady-state capital–labour ratio is $k^* = 9$ and the current ratio is $k = 1$, then the growth rate of $y = Y/L$ at the current date is

(A) 0.02

(B) 0.04

(C) 0.03

(D) Indeterminable

Question 29

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

Two Solow economies A, B share the same technology and $n = 0.02$. They have $k_A = 3, k_A^* = 9$ and $k_B = 4, k_B^* = 16$. Then per capita output is growing

(A) Faster in A than in B

(B) Faster in B than in A

(C) At the same rate in A and B

(D) At an indeterminable relative rate

Question 30

Topic: Intertemporal Choice **Difficulty:** Moderate **Status:** Ready

A two-period consumer maximises

$$U(C_1, C_2) = \log C_1 + \tfrac{1}{1+\rho} \log C_2, \qquad \rho > 0,$$

subject to $C_1 + S = w$ and $C_2 = (1 + r)S$, with $w, r > 0$. If w rises by 1% and r falls by 1%, then S

(A) Increases by more than 1%

(B) Increases by 1%

(C) Decreases by 1%

(D) Decreases by more than 1%