PRACTICE PAPER 1

Section-1

Straight Objective Type

This section contains 9 multiple choice question numbered 1 to 9. Each question has 4 choices (a), (b), (c) and (d), out of which ONLY ONE is correct.

Q 1

The number of odd positive integers smaller than or equal to 10,000 which are divisible neither by 3 nor by 5 is

a. 3,332
b. 2,666
c. 2,999
d. 3,665

Q 2

The number of ways in which three distinct numbers in A.P. can be selected from 1, 2, ….. , 24 is

a. 144
b. 276
c. 572
d. 132

Q 3

Number of real roots of the equation $8x^3 - 6x + 1 = 0$ lying between – 1 and 1 is

a. 0
b. 1
c. 2
d. 3

Q 4

The remainder $R(x)$ obtained by dividing the polynomial x^{100} by the polynomial $x^2 - 3x + 2$ is

a. $2^{100} - 1$
b $(2^{100} - 1)x - 2(2^{99} - 1)$
c. $2^{100}x - 3.2^{100}$
d. $(2^{100} - 1)x + 2(2^{99} - 1)$

Q 5

The angles of a triangle are in A.P. and the ratio of the greatest to the smallest angle is 3: 1 then the smallest angle is

a. $\frac{\pi}{6}$
b. $\frac{\pi}{3}$
c. $\frac{\pi}{4}$
d. None of the above

Q 6

The least value of $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}$ for positive x, y, z satisfying the condition $x+y+z=9$ is

a. 15/7

b. 1/9

c. 3

d. 1

Q 7

Let r be the length of the chord intercepted by the ellipse $9x^2+16y^2=144$ on the line $3x+4y=12$. Then

a. $r=5$

b. $r>5$

c. $r=3$

d. $r=\sqrt{7}$

Q 8

A segment *AB* of length moves with its ends on the axes. Then the locus of the point *P* which divides the line in the ratio 1: 2 is

a. $2x^2-2x+3y=0$

b. $9(x^2+4y^2)=4a^2$

c. $9(y^2+4x^2)=4a^2$

d. $9x^2+4y^2=a^2$

Q 9

If 2 sec 2∝= tan β + cot β, then one possible value of ∝ + β is

a. $\frac{\pi}{2}$

b. $\frac{\pi}{4}$

c. $\frac{\pi}{3}$

d. 0

Section-II

Assertion-Reason Type

Q 10

Statement -1: The least period of the function $\sin x-[\sin x]$ is 1.because

Statement -2: The least period of the function $x-(x)$ is unity.

a. Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

b. Statement-1 is True, Statement-2 is True; Statement-2 is not a correct explanation for Statement-1

c. Statement-1 is True, Statement-2 is False

d. Statement-1 is True, Statement-2 is True

Q 11

Statement -1: The f (x) sin |x| is differentiable everywhere. because

Statement -2: If f (x) is continuous zero, then x f (R) is differentiable at zero.

a. Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

b. Statement-1 is True, Statement-2 is True; Statement-2 is not a correct explanation for Statement-1

c. Statement-1 is True, Statement-2 is False

d. Statement-1 is True, Statement-2 is True

Q 12

Statement -1: If three points *A, B, C* in space are collinear then vectors $\overrightarrow{OA}, \overrightarrow{OB}, \overrightarrow{OC}$ (*O* origin) are essentially coplanar. because

Statement -2: There is only one plane through three collinear points in space.

a. Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

b. Statement-1 is True, Statement-2 is True; Statement-2 is not a correct explanation for Statement-1

c. Statement-1 is True, Statement-2 is False

d. Statement-1 is True, Statement-2 is True

Q 13

Statement -1: The circle $x^2 + y^2 = 2ax$ and the parabola $y^2 = ax(a > 0)$ cut at a point P in first quadrant. The distance of the point P from focus of the parabola must be because

Statement -2: The focus distance of any point $P\ (x_1, y_1)$ on the parabola $y^2 = 4ax\ is x_1 + a.$

a. Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

b. Statement-1 is True, Statement-2 is True; Statement-2 is not a correct explanation for Statement-1

c. Statement-1 is True, Statement-2 is False

d. Statement-1 is True, Statement-2 is True

Section-III

Linked Comprehension Type

M_{14+16}: Paragraph for Question Nos. 14 to 16

Consider the equation $\log_a x = x$, where $x > 0, a > 0, a \neq 1$

Q 14

The equation $\log_a x = x$

a. has no solution essentially

b. has one solution essentially

c. has two solution essentially

d. None of the above

Q 15

For $a > e^{1/e}$, the equation $\log_a x = x$

a. has no solution essentially

b. has one solution essentially

c. has two solution essentially

d. None of the above

Q 16

For $a = e^{1/e}$, the equation $\log_a x = x$

a. has no solution essentially

b. has one solution essentially

c. has two solution essentially

d. None of the above

$M_{17\text{-}19}$: Paragraph for Question Nos. 17 to 19

Consider the curve given by parametric equation $x = t - t^3, y = 1 - t^4, -\infty < t < \infty$.

Q 17

The curve cuts y-axis at

a. one point

b. two points

c. three points

d. four points

Q 18

The curve is Symmetrical about

a. x-axis

b. y-axis

c. y = x

d. none of these

Q 19

The curve forms a loop area

a. 8/35

b. 16/35

c. 31/35

d. None of the above

Section-IV

Matrix-Match Type

Q 20

if $y = cos^{-1}\left(\frac{a\cos x + b}{a + b\cos x}\right) - 2tan^{-1}\left(\sqrt{\frac{a-1}{a+b}}\, tan\frac{x}{2}\right)$,then match the following:

Column I	**Column II**
a. y	(p) 0
b. y at 0	(q) 1
c. $\frac{dy}{dx}$	(r) $\frac{a}{\sqrt{a^2+b^2}}$
d. $\frac{d^2y}{dx^2}$	(s) $\frac{b}{\sqrt{a^2+b^2}}$

Q 21

Match the following remainders, when 7^{1000} divided by 2, 3, 5 and 11

Column I	**Column II**
a. 2	(p) 4
b. 3	(q) 3
c. 5	(r) 2
d. 11	(s) 1

Q 22

If $2 \sin 2° + 4 \sin 4° + 6 \sin 6° + \ldots + 178 \sin 178° = A \cot(Bx° + C) + D$, where A, B, C, D are numerical quantities, then match the following :

Column I	**Column II**
a. A	(p) 0
b. B	(q) 1
c. C	(r) 180
d. D	(s) 90