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10 C 23

# Carmel Convent School
## UNIT TEST MAY 2023
## CLASS X (MATHEMATICS)

**TIME 1 hr 30 min** **MM 40**

General Instructions

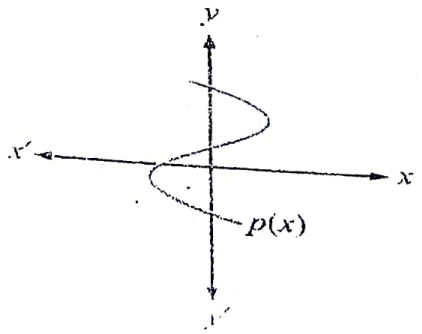
1. All questions are compulsory
2. SECTION A Q1 to Q8 — 1 mark each ( MCQ)
3. SECTION B Q 9 to Q 11 — 2 marks each
4. SECTION C Q 12 to Q 15 — 3 marks each
5. SECTION D Q 16 & 17 — 5 marks each
6. SECTION E Q 18 — 4 Marks( 1+1+2 ) Case Study

### SECTION A

Q1 If p and q are two consecutive natural numbers, then HCF of (p,q) is
a) q b) p c) 1 d) pq

Q2 The decimal expansion of the rational number $31 \div (2^2 \times 5)$ will terminate after
a) one decimal place b) two decimal places
c) 3 decimal places d) more than 3 decimal places

Q3 In the given figure, the graph of polynomial p(x) is shown. The number of zeros of p (x) is




a) 3 b) 4 c) 1 d) 2

Q4 If 1 is the zero of polynomial $P(x) = ax^2 - 3(a-1)x - 1$, then the value of a is

a) -1 b) 1 c) -2 d) 2

Q5 The value of k for which the pair of linear equations

$4x + 6y - 1 = 0$ $2x + ky - 7 = 0$

represent parallel lines is

a) 3 b) 2 c) -2 d) 4

Q6 In this question, a statement of assertion(A) is followed by a statement of reason(R) . Choose the correct option :

a) Both assertion(A) and reason ( R ) are true and reason(R) is the correct explanation of assertion (A)

b) Both assertion(A) and reason ( R ) are true and reason(R) is not the correct explanation of assertion(A)

c) Assertion(A) is true but reason (R ) is false

d) Assertion(A) is false but reason (R ) is true

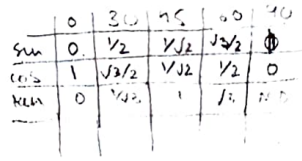
Assertion(A) : The area of trapezium formed by the lines $3x + 4y - 12 = 0$ and $3x + 4y = 6$ is 9/2 square units.

Reason (R ) : The system of equations $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$ is inconsistent, if $a_1 / a_2 = b_1 / b_2 = c_1 / c_2$

Q7 Which of the following is not defined?

a) sin 90° b) tan 0°

c) cot 90° d) cosec 0°



Q8 If $\sin\theta = 1/2$ then find the value of $\sin\theta\ (\sin\theta - \operatorname{cosec}\theta)$

a) 3/4 b) -3/4 c) $\sqrt{3}/2$ d) $-\sqrt{3}/2$

## SECTION B

Q9 A merchant has 120 L of oil of one kind , 180 L of another kind and 240 L of the third kind. He wants to sell the oil by filling the three kinds of oil in the tins of equal capacity. What should be the greatest capacity of such a tin?

Q10 Find a quadratic polynomial, the sum and product of whose zeros are $\sqrt{2}$ and $-3/2$ respectively.

Q11 Given that $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \sqrt{3}/2$ . Then find the value of $\alpha + \beta$

## SECTION C

Q12 Prove that $3 + \sqrt{2}$ is an irrational number.

Q13 Find the zeros of the following quadratic polynomial and verify the relationship between the zeros in the coefficient.
$3x^2 - x - 4$

Q14 Solve $x + y = 3$ and $2x + 5y - 12 = 0$ and hence find the value of m for which $y = mx + 5$.

Q15 If cosec A = 2 , then find the value of (cot A + sin A) / ( 1 + cos A)

## SECTION D

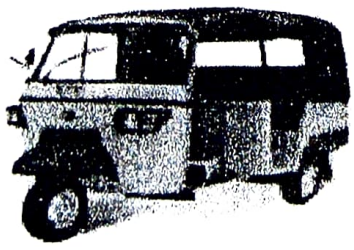
Q16 Solve the following pair of linear equations in two variables.
$3x + y - 11 = 0$
$x - y + 1 = 0$
Shade the region bounded by these lines along X axis and Y axis. Also find the area of the region bounded by the lines at both X axis and Y axis.

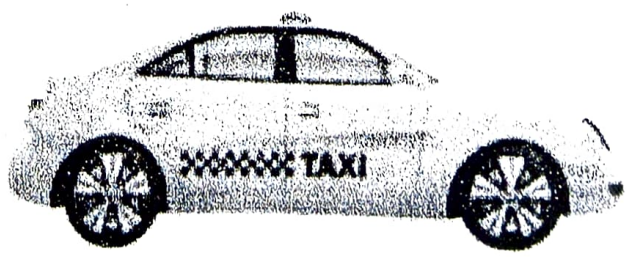
Q17 i) Find the value of
$$(1+\tan\theta + \sec\theta)(1+\cot\theta - \operatorname{cosec}\theta)$$

ii) Prove the following identity
$$(\operatorname{cosec}\theta - \cot\theta)^2 = (1 - \cos\theta) / (1 + \cos\theta)$$

## SECTION E ( Case Study)

Q18 It is common that Governments revise travel fares from time to time based on various factors such as inflation ( a general increase in prices and fall in the purchasing value of money) on different types of vehicles like auto, Rickshaws, taxis, Radio cab etc. The auto charges in a city comprise a fixed charge together with the charge for the distance covered. Study the following situations:





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