Time: $2\frac{1}{2}$:00 HOURS   **MM: 60**

General Instructions:

1. This Question paper contains – five sections A, B, C, D and E.

2. Section A has 12 MCQ's and 02 Assertion-Reason based questions of 1 mark each.

3. Section B has 4 Very short answer type questions of 2 marks each.

4. Section C has 5 Short Answer (SA)- type questions of 3 marks each.

5. Section D has 3 Long Answer (LA) – type questions of 5 marks each.

6. Section E has 2 sources based /case based /passage based/ integrated units of assessment (4 marks each) with subparts.

SECTION- A

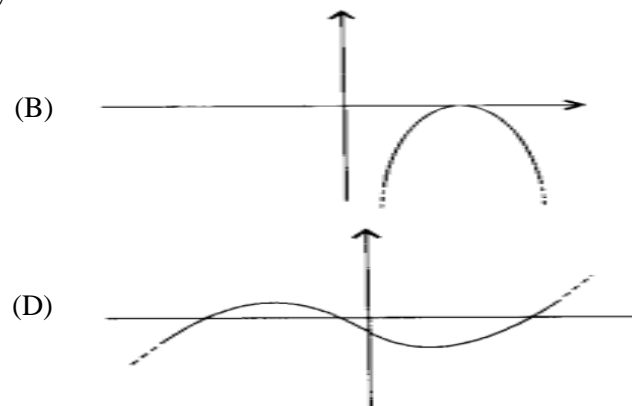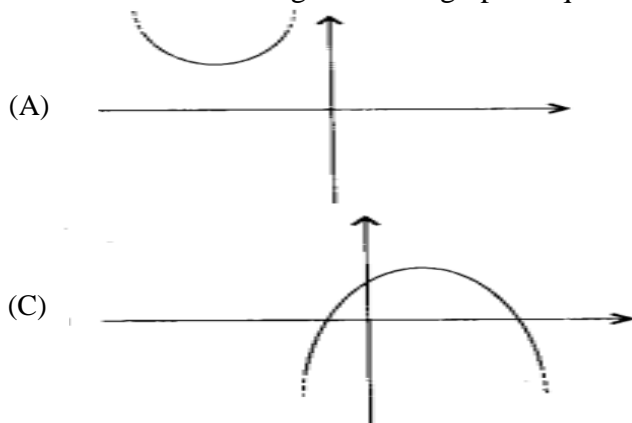**(Multiple Choice Questions)**

1- If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x, y are prime numbers, then LCM (a, b) is

(A) x^4y^5 (B) xy^2 (C) x^3y^3 (D) x^2y^2

2- If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

(A) 10   (B) -10   (C) 5   (D) -5

3- Which of the following is not the graph of quadratic polynomial?

4- What will be the solution of these equations? $ax + by = a - b$, and $bx - ay = a + b$

(A) $x = 1, y = 2$ (B) $x = 2, y = -1$

(C) $x = -2, y = -2$ (D) $x = 1, y = -1$

5- If in two triangles ABC and PQR, $\dfrac{AB}{QR} = \dfrac{BC}{PR} = \dfrac{CA}{PQ}$

then *(A)* $\Delta PQR \sim \Delta CAB$ (B) $\Delta PQR \sim \Delta ABC$ (C) $\Delta CBA \sim \Delta PQR$ (D) $\Delta BCA \sim \Delta PQR$

6-. Roots of quadratic equation $x^2 - 3x = 0$, will be
   (A) 3   (B) 0, –3   (C) 0, 3   (D) none of these

7-The area of a quadrant of a circle whose circumference is 44 cm.
(A) 38.5 cm^2(B) 12 cm^2(C) 22 cm^2 (D) 24.5 cm^2

8-The distance of the point (α, β) from the origin is
(A) $\alpha + \beta$ (B) $\alpha^2 + \beta^2$ (C) $|\alpha| + |\beta|$ (D) $\sqrt{\alpha^2 + \beta^2}$

9- -If the perimeter and the area of a circle are numerically equal, then the radius of the circle is
(A) 2 units (B) π units (C) 4 units (D) 7 units

10-Given that $\sin \theta = \dfrac{a}{b}$ then $\tan \theta =$

(A) $\dfrac{b}{\sqrt{b^2-a^2}}$ (B) $\dfrac{\sqrt{b^2-a^2}}{b}$ (C) $\dfrac{a}{\sqrt{b^2-a^2}}$

     (D) $\dfrac{\sqrt{b^2-a^2}}{a}$

11- If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80°, then $\angle$ POA is equal to
(A) 50° (B) 60°(C) 70° (D) 80°

12- From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. The radius of the circle is
(A) 7 cm (B) 12 cm(C) 15 cm (D) 24.5 cm

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(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 but 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.

13-Assertion: - The point (0,4) lies on y-axis
    Reason: - The y-co-ordinate of the point on x- axis is zero

14- Assertion: - The sum of first 20 positive integer is 220.

    Reason: -   The sum of first n positive integer is given by $\dfrac{n(n+1)}{2}$

SECTION-B

15- Find 12th term from the end of the AP : 7, 10 , 13,....,184.

<div align="center">OR</div>

Check whether 301 is a term of the list of the number 5,11,17, 23-------

16- Express 12600 as exponents of its prime factors.

17- Find the polynomial if its zeros are 3 & -5

18-The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

SECTION- C

19- Prove that $\sqrt{3}$ is an irrational number.

<div align="center">OR</div>

Show that (7 x 13 x 11) +11 and (7 x 6 x 5 x 4 x 3 x 2 x 1) + 3 are composite numbers.

20-The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

21-If sin A =cos A, find the value of $2\tan^2 A + \sin^2 A + 1$

22- Prove that: $-(\sin A + \csc A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

23- Prove that the parallelogram circumscribing a circle is a rhombus.

SECTION- D

24- A train, traveling at a uniform speed for 360km, would have taken 48 minutes less to travel the same distance if its speed were 5km/hr more. Find the original speed of train.

25- State and prove Basic Proportionality/ (Thales) Theorem.

26- From a point P on the ground the angle of elevation of the top of a 10 mtall building is 30°. A flag is hoisted at the top of the building and the angle of elevationof the top of the flagstaff from P is 45°. Find the length of the flagstaff and thedistance of the building from the point P. (You may take $\sqrt{3} = 1.732$)

<div align="center">OR</div>

Two poles of equal heights are standing opposite each other on either side of the road,which is 80 m wide. From a point between them on the road, the angles of elevation ofthe top of the poles are 60° and 30°, respectively. Find the height of the poles and thedistances of the point from the poles.

SECTION- E

27-

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Maximum Profit: An automobile manufacturer can produce up to 300 cars per day. The profit made from the sale of these vehicles can be modelled by the function

$P(x) = -x^2 + 350x - 6600$ Where $P(x)$ is the profit in thousand Rupees and $'x'$ is the number of automobiles made and sold. Answer the following questions based on this model:

(i) When no cars are produced what is a profit/loss?
(A) 350 thousand profit   (B) 350 thousand loss   (C) 6600 thousand profit   (D) 6600 thousand loss

(ii) When 10 cars are produced what is a profit/loss?
(A) 3500 thousand profit   (B) 3200 thousand loss   (C) 6000 thousand profit   (D) 6600 thousand loss

(iii) What is the break-even point?
(Zero profit point is called break-even)?
(A) 5   (B) 10   (C) 15   (D) 20

28-Aditya starts walking from his house to office. Instead of going to the office directly, he goes to a bank first, from there to his daughter's school and then reach to the office (assume that all the distance covered are in straight line). If the house is situated at (2,4), Bank at (5,8), school at (13, 14) and office at (13,26) and coordinates are in kilometers.
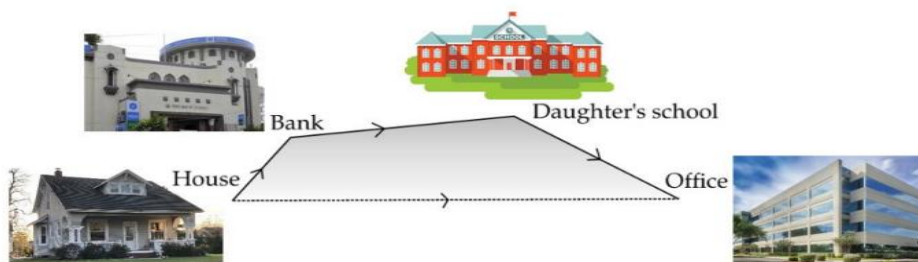
(i) What is the distance between house and Bank?
(A) 5   (B) 8   (C) 10   (D) 12
(ii) What is the distance between daughter's school and Bank?
(A) 10 km approx.   (B) 12 km approx. (C) 15 km approx.   (D) 20 km approx.

(iii) What is the total distance travelled by Aditya to reach the office?
(A) 22   (B) 28   (C) 25   (D) 27