

Half Yearly Examination 2024 – 2025**Time - 3:00 Hrs.****M.M. 80****General Instruction:**

1. This Question Paper has 5 Sections A-E.
2. **Section A** has 20 MCQs carrying 1 mark each.
3. **Section B** has 5 questions carrying 02 marks each.
4. **Section C** has 6 questions carrying 03 marks each.
5. **Section D** has 4 questions carrying 05 marks each.
6. **Section E** has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION – A**Questions 1 to 20 carry 1 mark each.**

- Q.1 The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 280, then the other number is –
(a) 20 (b) 28 (c) 60 (d) 80
- Q.2 When 3120 is expressed as the product of its prime factors we get
(a) $2 \times 5^3 \times 53$ (b) $2^3 \times 5 \times 53$ (c) $5 \times 7^2 \times 31$ (d) $2^4 \times 3 \times 5 \times 13$
- Q.3 If p and q are the zeroes of the quadratic polynomial $f(x) = 12x^2 - 24x + 13$, the value of p + q is
(a) 1 (b) 2 (c) 3 (d) 4
- Q.4 The pair of linear equations $12x + 3y = 15$ and $41x + 6y = 10$ is
(a) inconsistent (b) consistent (c) dependent consistent (d) Dependent variable
- Q.5 Points A(3, 1), B(5, 1), C(a, b) and D(4, 3) are vertices of a parallelogram ABCD taken in order. The values of a and b are respectively
(a) a = 6, b = 3 (b) a = 2, b = 1 (c) a = 4, b = 2 (d) None of these
- Q.6 A flag pole 18 m high casts a shadow 9.6 m long. Find the distance of the top of the pole from the far end of the shadow.
(a) 54 m (b) 88 m (c) 96 m (d) none of these
- Q.7 If $\tan A = 3/4$, find the value of cosecA.
(a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) $\frac{7}{15}$ (d) $\frac{3}{7}$
- Q.8 In ABC, DE \parallel AB. If CD = 3 cm, EC = 4 cm, BE = 6 cm, then DA is equal to
(a) 10 cm (b) 15 cm (c) 20 cm (d) 4.5
- Q.9 In the $\triangle ABC$, D and E are points on side AB and AC respectively such that DE \parallel BC. If AE = 2 cm, AD = 3 cm and BD = 4.5 cm, then CE equals
(a) 12 cm (b) 92 cm (c) 69 cm (d) 3 cm
- Q.10 ABCD is a trapezium with AD \parallel BC and AD = 4cm. If the diagonals AC and BD intersect each other at O such that AO/OC = DO/OB = 1/2, then BC =
(a) 36cm (b) 77cm (c) 9 8cm (d) none of these
- Q.11 The common difference of AP 2,4,6.....is
(a) 2 (b) 5 (c) 21 (d) 12
- Q.12 The n^{th} term of an A.P. is given by $a_n = 3 + 4n$. The common difference is
(a) 4 (b) 24 (c) 75 (d) 14
- Q.13 The 10th term from the end of the A.P. -5, -10, -15, ..., -1000 is :
(a) -256 (b) -955 (c) 64 (d) 955
- Q.14 $\sin 30^\circ =$

- (a) 1 (b) 2 (c) 5 (d) $\frac{1}{2}$
- Q.15 Find the sum of 12 terms of an A.P. whose n th term is given by $a_n = 3n + 4$
 (a) 282 (b) 235 (c) 284 (d) 287
- Q.16 $\tan 45^\circ + \cot 45^\circ$ equals to
 (a) 1 (b) 2 (c) 3 (d) $\sqrt{2}$
- Q.17 HCF of smallest prime number and smallest composite number is
 (a) 1 (b) 2 (c) 0 (d) 4
- Q.18 If $4 \tan \theta = 3$, then the value of $\frac{4\sin\theta - \cos\theta}{4\sin\theta + \cos\theta}$ is
 (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{6}$

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option

Q.19 **Statement A (Assertion):** The number 6^n never end with digit 0 for any natural number n .

Statement R (Reason) : The number 9^n never end with digit 0 for any natural number n .

Q.20 **Statement A (Assertion):** The value of y is 6, for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10.

Statement R (Reason) : Distance between two given

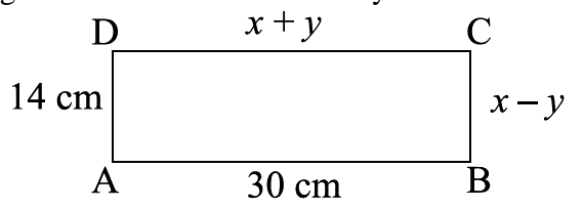
points $A(x_1, y_1)$ and $B(x_2, y_2)$ is given by $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

- (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.

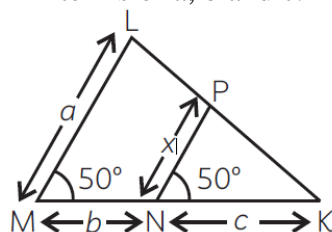
SECTION – B

Questions 21 to 25 carry 2 marks each

Q.21 In figure, ABCD is a rectangle. Find the values of x and y .



Q.22 In the given figure, find the value of x in terms of a , b and c .



Q.23 Find the LCM and HCF of 6, 72, 120 using the prime factorization method.

Q.24 Find the point on y axis which is equidistant from $(2, 5)$ and $(3, 9)$.

OR

Find the point on x - axis which is equidistant from $(1, -5)$ and $(-2, 3)$

Q.25 Find A and B , if $\sin(A + 2B) = \frac{\sqrt{3}}{2}$ and $\cos(A + B) = \frac{1}{2}$.

OR

If $(1 + \cos A)(1 - \cos A) = \frac{3}{4}$, find the value of $\tan A$.

SECTION – C

Questions 26 to 31 carry 3 marks each.

- Q.26 Prove that $\sqrt{2}$ is an irrational number.
- Q.27 Find the zeroes of the quadratic polynomial $x^2 - 5x + 6$ and verify the relationship between the zeroes and the coefficients of the polynomial.
- Q.28 A part of monthly hostel charges in a college is fixed and the remaining depends on the number of days one has taken food in the mess. When a student 'A' takes food for 22 days, he has to pay Rs. 1380 as hostel charges; whereas a student 'B', who takes food for 28 days, pays Rs. 1680 as hostel charges. Find the fixed charges and the cost of food per day.

OR

The ratio of income of two persons is 9 : 7 and the ratio of their expenditure is 4 : 3, if each of them manage to save Rs. 2000/month. Find their monthly incomes.

- Q.29 Prove that: $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \sec\theta + \tan\theta$
- Q.30 Find two numbers whose sum is 27 and product is 182
- Q.31 Find two consecutive positive integers sum of whose squares is 365.

SECTION – D

Questions 32 to 35 carry 5 marks each.

- Q.32 From the top of a 7m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

OR

The shadow of a tower standing on a level ground is found to be 40m longer when the sun's altitude is 30° than when it is 60° . **Find the height of the tower.**

- Q.33 Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.
- Q.34 Find the sum of integers between 1200 and 1500 which are divisible by 4.

OR

If the 9th term of an A.P. is zero, then show that its 29th term is double of its 19th term.

- Q.35 Solve the linear equation graphically $3x + y + 4 = 0$; $3x - y + 2 = 0$

SECTION – E (Case Study Based Questions)

Questions 36 to 38 carry 4 marks each.

- Q.36 The below pictures are few natural examples of parabolic shape which is represented by a quadratic polynomial. A parabolic arch is an arch in the shape of a parabola. In structures, their curve represents an efficient method of load, and so can be found in bridges and in architecture in a variety of forms.



- In the standard form of quadratic polynomial, $ax^2 + bx + c$, a, b and c are
(a) All are Polynomials. (b) All are rational numbers.
(c) 'a' is a non zero real number and b and c are any Polynomials. (d) none of these
- If the roots of the quadratic polynomial are equal, where the discriminant $D = b^2 - 4ac$, then
(a) $D > 0$ (b) $D < 0$ (c) $D \geq 0$ (d) $D = 0$
- If α and $1/\alpha$ are the zeroes of the quadratic polynomial $2x^2 - x + 8k$, then k is
(a) 4 (b) $1/4$ (c) $-1/4$ (d) None of these

OR

4. The graph of $x^2 + 1 = 0$

- (a) Intersects x-axis at two distinct points. (b) Touches x-axis at a point.
(c) Neither touches nor intersects x-axis. (d) Either touches or intersects x-axis.

Q.37 To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections- section A and section B of grade X. There are 32 students in section A and 36 students in section B. 2+1+1

1. What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?

OR

If the product of two positive integers is equal to the product of their HCF and LCM is true then, find the HCF (32, 36) is ----- .

2. 36 can be expressed as a product of its primes as
(a) $2^2 \cdot 3^2$ (b) 2 . 3 . 5 (c) $2^4, 7$ (d) None of these

OR

$7 \times 11 \times 13 \times 15 + 15$ is a

- (a) Prime number (b) Composite number
(c) Neither prime nor composite (d) None of the above

Q.38 Your friend Ravi wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds : 1+2+1

1. Which of the following terms are in AP for the given situation
(a) 51, 53, 55, (b) 51, 49, 47, (c) -51, -53, -55, (d) 51, 55, 59, ...
2. What is the minimum number of days he needs to practice till his goal is achieved
(a) 10 (b) 12 (c) 188 (d) none of these
3. If nth term of an AP is given by $a_n = 2n + 3$ then common difference of an AP is
(a) 2 (b) 3 (c) 5 (d) none of these

OR

The value of x, for which $2x$, $x + 10$, $3x + 2$ are three consecutive terms of an AP

- (a) 61 (b) -6 (c) 18 (d) none of these
