Tender Heart High School, Sector 33B, Chd.

Class : 10th **Date : 23.12.2024**
Subject : Mathematies **Maximum Marks 80**

Practice Paper 4

Answer to this paper must be written on the paper provided separately.
*You will **not** be allowed to write during the first **15** minutes.*
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allowed for writing the answers.

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*Attempt **all** questions from Section A and any **four** questions from Section B.*
All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.
Omission of essential working will result in loss of marks.
The intended marks for questions or parts of a question are given in the brackets [ ]

SECTION – A (40 Marks)

*(Attempt **all** questions from this Section.)*

Question 1

Choose the correct answers to the questions from the given options: [15]

i) The total bill of a car service given by Mr.Vikas is ₹ 6720 including tax. If the rate of GST is 12%, then the actual amount of the bill excluding tax is

(a) ₹ 5800 (b) ₹ 6000
(c) ₹ 7526.40 (d) ₹ 7000

ii) The fourth proportional to $4x$y, $2x^2$y and 8 is

(a) $4x^2$ (b) $4x$y
(c) $4x$ (d) 4

iii) Assertion (A): If one root of quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$ then the value of k is 2.
Reason (R): The quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ has utmost two roots.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

iv) If $A = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$, then A^2 is :

(a) A (b) 0
(c) I (d) 1

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v) In an A.P. $a = 4$, $d = 2$ and $a_n = 48$, then n is

(a) 22 (b) 23

(c) 21 (d) 24

vi) The coordinates of the point (4, 3) after reflection in the line $y = 2$ is:

(a) (1, 4) (b) (4, 1)

(c) (4, 3) (d) (3, 4)

vii) The ratio of volumes of two cones is 2: 3, the ratio of their radii is 1: 2. The ratio of their heights is

(a) 3 : 8 (b) 8 : 1

(c) 1 : 8 (d) 8 : 3

viii) If $x < 0$, $y < 0$, then $(x + y)^2$ is

(a) less than 0 (b) greater than or equal to 0

(c) less than or equal to 0 (d) greater than 0

ix) A die is rolled once. The probability of getting a perfect square is:

(a) 1 (b) 0

(c) $\frac{1}{3}$ (d) $\frac{2}{3}$

x) The vertices of a triangle are (2, -5), (3, 9) and (-8, 11). The centroid is

(a) (1, 5) (b) (-1, 5)

(c) (3, 5) (d) (5, 3)

xi) The 10^{th} term of the G.P. 2, 4, 8, 16 ..... is:

(a) 1022 (b) 1024

(c) 1023 (d) 1204

xii) The mean of 8 numbers is 15. If each number is multiplied by 2, what will be the new mean?

(a) 120 (b) 30

(c) 45 (d) 60

xiii) Assertion (A): At some time of the day, the length of the shadow of a tower is equal to its height, then the sun's altitude is 45°.

Reason (R): The angle which the line of sight makes with the horizontal line passing through the eye of the observer, when the object is above the observer is called the angle of elevation.

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

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

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

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

xiv) A man wants to buy 62 shares available at ₹ 132 (par value of ₹ 100). How much should he invest?

(a) ₹ 8184
(b) ₹ 6200
(c) ₹ 4092
(d) ₹ 3245

xv) Assertion (A): There is one and only one tangent at any point on the circumference of a circle.
Reason (R): The perpendicular at the point of contact of the tangent to a circle never passes through the centre.
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

Question 2

i) Sanjay has a Recurring Deposit Account in a bank of ₹ 2,000 per month at the rate of 10% per annum. At the time of maturity, he receives ₹ 83,100. Find the time for which account was held. [4]

ii) Using componendo and dividendo, find the value of x. [4]

iii) $\frac{\sqrt{3x+4}+\sqrt{3x-5}}{\sqrt{3x+4}-\sqrt{3x-5}} = 9$

Given that $\tan\theta = \frac{p}{q}$. Find the value of $\frac{p\sin\theta - q\cos\theta}{p\sin\theta + q\cos\theta}$. [4]

Question 3

i) A hemispherical bowl of diameter 7.2 cm is completely filled with chocolate sauce. This sauce is poured into an inverted cone of radius 4.8 cm. Find the height of the cone. [4]

ii) A line passes through the points P (2, -5) and Q (4,3) find: [4]
a) the slope of the line
b) the equation of the line
c) the value of 'a' if PQ passes through the point (a – 1, a+4)

iii) The point P (3,4) is reflected to P' in the x-axis and O' is the image of O (the origin) when reflected in the line PP'. Using graph paper, give [5]
a) the coordinates of P' and O'.
b) the perimeter of quadrilateral POP'O'.
c) the geometrical name of the figure POP'O'

SECTION – B

*(Attempt **any four** questions from this Section)*

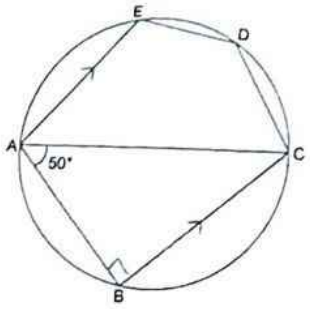
Question 4

i) 'A' manufactures an article in Jaipur and sells it to 'B' in Bikaner at ₹ 10,000. If the rate of GST is 18%, calculate GST charged by Central government and total amount paid by 'B'. [3]

ii) Without solving the following quadratic equation, find the value of 'm' for which the given equation has real and equal roots: [3]
$x^2 + 2(m-1)x + (m+5) = 0$

iii) In the given figure, ABCDE is a pentagon inscribed in a circle such that AC is a diameter and side BC ∥ AE. If ∠BAC = 50°, find: [4½]

a) ∠ACB
b) ∠EDC
∠BEC. Hence prove that BE is also a diameter.



Question 5

i) If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$, then find the value of k so that $A^2 = 8A + kI$. [3]

ii) If 7 times the 7^{th} term of an A.P. is equal to 11 times its 11^{th} term, then show that its 18^{th} term is zero. [3]

iii) When divided by x -3, the polynomials $x^3 - p\,x^2 + x + 6$ and $2x^3 - x^2 - (p+3)\,x - 6$ leave the same remainder. Find the value of 'p'. [4]

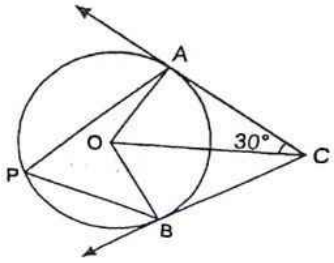
Question 6

i) Determine the ratio in which the line $3x + y - 9 = 0$ divides the segment joining the points (1,3) and (2,7). [3]

ii) Chikoo and Gulu are friends. Find the probability that both of them have [3]
a) same birthdays
b) different birthdays. } (Ignore a leap year)

iii) In the given figure, O is the centre of the circle. Tangents at A and B meet at C. If ∠ACO = 30°, find: [4½]

a) ∠BCO
b) ∠AOB
c) ∠APB



Question 7

i) Attempt this question on graph paper. The table shows the distribution of daily wages, earned by 160 workers in a building side. Draw smooth ogive through the points. Find from the graph the median wage. [5]

Wages in ₹ per day	No. of workers
0 – 10	12
10 – 20	20
20 – 30	30
30 – 40	38
40 – 50	24
50 – 60	16
60 – 70	12
70 – 80	8

ii) The mean of the following frequency table is 50. But the frequencies f_1 and f_2 in the classes 20 – 40 and 60-80 are missing. Find the value of f_1 and f_2. [5]

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	f_1	32	f_2	19	120

Question 8

i) Use ruler and compass only for this question. [3]
   a) Construct ΔABC, where AB = 3.5 cm, BC = 6 cm and $\angle ABC = 60^0$.
   b) Construct the locus of points inside the triangle which are equidistant from BA and BC.

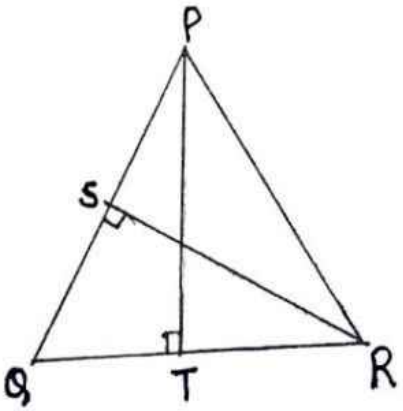
ii) If P is the solution set of $-3x + 4 < 2x - 3, x \in N$ and Q is the solution set of $4x - 5 < 12, x \in W$, find Q – P. [3]

iii) Mr. Sharma buys 60 shares of nominal value of ₹ 100 and he decides to sell them when they are at a premium of 60%. He invests the proceeds in shares of nominal value of ₹ 50, quoted at 4% discount, paying 18% dividend annually. Calculate: [4]
   a) the sale proceeds,
   b) the number of shares he buys and
   c) the annual dividend from these shares.

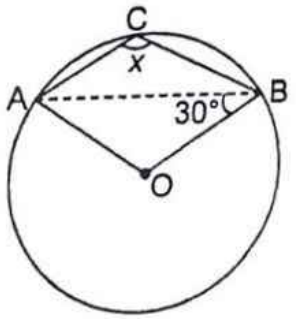
Question 9

i) Which term of the G.P. 10, 20, 40,.... is 2560? [3]

ii) RS and PT are altitudes of ΔPQR. Prove that: [3]
   a) $\Delta QTP \sim \Delta QSR$
   b) PQ x QS = RQ x QT.

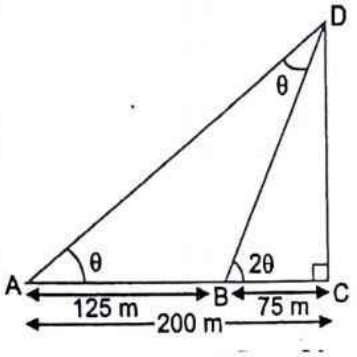


iii) In the given figure, O is the centre of the circle. If $\angle OBA = 30^0$, then find the value of x. [4]



Question 10

i) AB is a straight road leading to C, the foot of a tower. 'A' being at a distance of 200 m from C and 125 m from B. If the angle of elevation of the top of the tower at B is double the angle of elevation at A, find the height of the tower. [3]



ii) Construct a triangle ABC in which BC = 6.3 cm, ∠B = 120^0 and BA = 4.6 cm. Draw its circumcircle. [3]

iii) Car A travels x km for every litre of petrol, while car B travels $(x + 5)$ km for every litre of petrol. [4]

a) Write down the number of litres of petrol used by car A and car B in covering a distance of 400 km.

b) If car A uses 4 litres of petrol more than car B in covering 400 km, write down an equation in x and solve it to determine the number of litres of petrol used by car B for the journey.

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[6]