Shree Bharathi Vidyalaya
Hampinagar, Bangalore
II Preparatory Examination, January- 2023
Subject: Mathematics

Class: X (ICSE) **Max. Marks: 80**

General Instructions:

1. You will not be allowed to write during the first 15 minutes. This time is to be spent inreading the question paper.
2. The time given at the head of this Paper is the time allowed for writing the answers.
3. Attempt all questions from Section A and any four questions from Section B.
4. The intended marks for questions or parts of questions are given in brackets [ ]
5. All working including rough work must be clearly shown and must be done on the same sheet as the rest of the answer.
6. Omission of essential working will result in loss of marks.

Section A

(Attempt all questions from this section.)

Question 1

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

i) For a transaction within Delhi, MRP = Rs. 12,000, Discount % = 30%, GST = 18%, then CGST =?

(a) 756
(b) 765
(c) 786
(d) 768

ii) The value of 'x' which satisfies the equation $(x + 5)(x - 5) = 24$ will be

a) 5
b) 6
c) 7
d) 8

iii) If on dividing $2x^3 + 3x^2 - kx + 5$ by $x - 2$, leaves a remainder 7, then the value of k is

a) 13
b) 7
c) 3
d) 17

iv) If matrix Ais of the order 2×3 and matrix B is of order 3×2 then the order of AB is

(a) 3×3
(b) 2×2
(c) 3×2
(d) 2×3

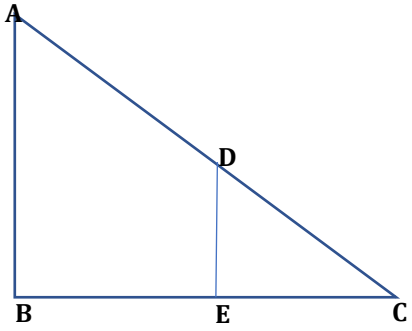
v) Find the 5^{th} term of the AP 30, 28, 26, 24,…

(a) 25
(b) 23
(c) 26
(d) 22

vi) The reflection of point (1, 2) about y-axis is

(a) (–1, –2)
(b) (1, 2)
(c) (1, –2)
(d) (–1, 2)

vii) In the given figure, AB and DE are perpendiculars to BC. If AB = 5 cm, DE = 4 cm and AC = 13 cm, then $\Delta ABC \sim \Delta DEC$ by_____



(e) SSS postulate
(f) AA postulate
(g) SAS postulate
(h) RHS postulate

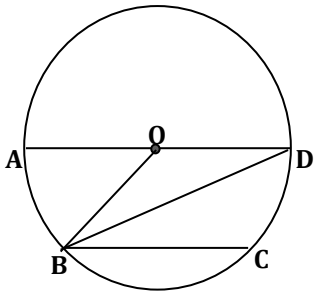
viii) The height of a circular cylinder is 20 cm and the radius of its base is 7 cm, then the volume will be

(a) 3080 cm^3
(b) 3800 cm^3
(c) 3880 cm^3
(d) 3380 cm^3

ix) If $x + 7 \leq 11$, then value of x will be

a) $x \leq 4$
b) $x < 4$
c) $x > 4$
d) $x \geq 4$

x) In the given figure, AD is a diameter. O is the centre of the circle. AD is parallel to BC and $\angle CBD = 32°$. Then measure of $\angle OBD$ is:



(a) 64°
(b) 32°
(c) 58°
(d) 30°

xi) The common difference of the A.P. 4, 6, 8, …… is

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

xii) Class mark of the class interval 105.5 – 110.5 is

(a) 107.5
(b) 108
(c) 108.5
(d) 106

xiii) The equation of line parallel to x –axis and passing thorough (3, 4) is ;

a) $x = 3$
b) $x = 4$
c) $y = 4$
d) $y = 3$

xiv) Which of the following cannot be the probability of an event?

a) 0.75
b) 0.3 %
c) - 1.5
d) 5 /6

xv) Which of the following order is not possible if the matrix has 6 elements?

a) 3×2
b) 2×2
c) 2×3
d) 6×1

Question 2

i) Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest.If he gets Rs. 1,200 as interest at the time of maturity, find: [4]

(a) The monthly instalment

(b) The amount of maturity.

ii) If a,b,c are in continued proportion prove that: [4]

$\mathbf{a : c = (a^2 + b^2) : (b^2 + c^2)}$

iii) Prove that: [4]

$$\frac{\cot A - 1}{2 - \sec^2 A} = \frac{\cot A}{1 + \tan A}$$

Question 3

i) A conical tent is to accommodate 77 persons. Each person must have $16m^3$ of air to breath. Given the radius of the tent as 7m, find the height of the tent and also its curvedsurface area. [4]

ii) If P (–b, 9a – 2) divides the line segment joining the points A (–3, 3a + 1) and B (5, 8a) in the ratio 3: 1, find the values of a and b. [4]

iii) Use graph paper for this question. [5]

(Take 2 cm = 1 unit along both x-axis and y-axis.)

a) Plot the points O (0, 0), A (–4, 4), B(–3, 0) and C (0, –3).

b) Reflect points A and B on the y-axis and name them A' and B' respectively.

c)Write downtheir co-ordinates.

d)Name the figure OABCB' A'.

Section B

(Attempt any four questions from this Section.)

Question 4

i) A computer mechanic in Delhi charges repairing cost from five different persons A, B, C, D and E with certain discounts. The repairing costs and the corresponding discountsare as given below: [3]

Name of the person	A	B	C	D	E
Repairing cost (inRs.)	5500	6250	4800	7200	3500
Discount %	30	40	30	20	40

If the rate of GST is 18%, find the total money (including GST) received by the mechanic.

ii) One root of the quadratic equation $8x^2 + mx + 15 = 0$ is $\frac{3}{4}$. Find the value of m. Also, find the other root of the equation. [3]

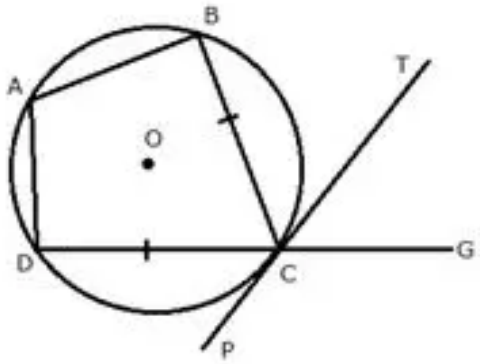
iii) The weight of 50 workers is given below: [4]

Weight (in Kg)	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	100 – 110	110 – 120
No. of workers	4	7	11	14	6	5	3

Draw a histogram of the given distribution using a graph sheet. Take 2 cm = 10 kg on one axis and 2 cm = 5 workers along the other axis. Use the graph drawn to estimate the mode.

Question 5

i) In the figure, ABCD is a cyclic quadrilateral with BC = CD. TC is tangent to the circle at point C and DC is produced to point G. If angle BCG = 108° and O is the centre of the circle, find:
i) angle BCT
ii) angle DOC [3]



ii) Given $A = \begin{bmatrix} 3 & 0 \\ 0 & 4 \end{bmatrix}, B = \begin{bmatrix} a & b \\ 0 & c \end{bmatrix}$ and that AB = A + B; find the values of a, b and c.

[3]

iii) What must be subtracted from $16x^3 - 8x^2 + 4x + 7$ so that the resulting expression has

$2x + 1$ as a factor? [4]

Question 6

i) A = (7, -2) and C = (-1, -6) are the vertices of square ABCD. Find the equations of diagonal BD and of diagonal AC. .[3]

ii) Prove : (1 + cot A – cosec A) (1 + tan A + sec A) = 2 [3]

iii) The sum of first 7 terms of an A.P is 49 and that of first 17 terms of it is 289. Find the sum of first n terms. [4]

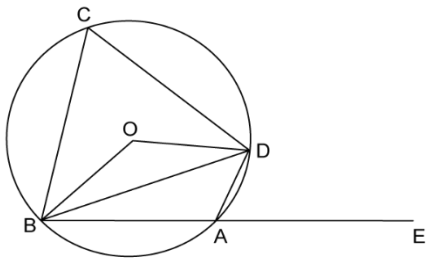
Question 7

i) Sixteen cards are labelled as a, b, c, … , m, n, o, p. They are put in a box and shuffled. A boy is asked to draw a card from the box. What is the probability that the card drawn is: [3]
(a) a vowel
(b) a consonant
(c) None of the letters of the word median.

ii) A metal pipe has a bore (inner diameter) of 5 cm. The pipe is 5 mm thick all round. Findthe weight, in kilogram, of 2 metres of the pipe if 1 cm^3 of the metal weights 7.7 g. [3]

iii) In the figure given, O is the centre of the circle. $\angle DAE = 70^0$. Find giving suitable reasons, the measure of [4]

i. $\angle BCD$
ii $\angle BAD$
ii. $\angle BOD$
iv $\angle OBD$



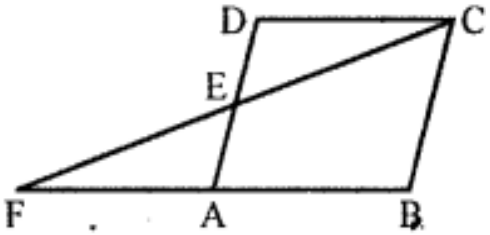
Question 8

i) P is the solution set of $7x - 2 > 4x + 1$ and Q is the solution set of $9x - 45 \geq 5(x - 5)$; where $x \in R$. Represent $\mathbf{P} \cap \mathbf{Q}$ on the number line. [3]

ii) The arithmetic mean of the following distribution is 50. Find the value of p [3]

Class	0 - 20	20-40	40 – 60	60 – 80	80 – 100
Frequency	17	p	32	24	19

iii)The given figure shows a parallelogram ABCD. E is a point in AD and CE produced meets BA produced at point F. If AE=4 cm, AF = 8 cm and AB = 12 cm, find the perimeter of the parallelogram ABCD. [4]



Question 9

i) One pipe can fill a cistern in 3 hours less than the other. The two pipes together can fill the cistern in 6 hours 40 minutes. Find the time that each pipe will take to fill the cistern. [4]

ii) The table shows the distribution of the scores obtained by 160 shooters in a shooting competition. Use a graph sheet and draw an ogive for the distribution.

(Take 2 cm = 10scores on the X-axis and 2 cm = 20 shooters on the Y-axis.)

Scores	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
No. of shooters	9	13	20	26	30	22	15	10	8	7

Use your graph to estimate the following: [6]

(a) The median
(b) The interquartile range.
(c) The number of shooters who obtained a score of more than 85%.

Question10

i) Use properties of proportion [3]

If $\frac{x^3 + 3xy^2}{3x^2y + y^3} = \frac{m^3 + 3mn^2}{3m^2n + n^3}$, show that:

$nx = my$.

ii) Construct a ΔABC with BC = 6.5 cm, AB = 5.5 cm, AC = 5 cm. Construct the incircle of the triangle. Measure and record the radius of the in circle. [3]

iii) An aeroplane, at an altitude of 250 m, observes the angles of depression of two boats on the opposite banks of a river to be 45° and 60° respectively. Find the width of the river. Write the answer correct to the nearest whole number. [4]