



# VIBGYOR High

Second Preliminary Examination  
2013-2014

**MATHEMATICS**

Grade: X

Date : 13/01/2014

Max. Marks : 80

Time Allowed : 2 ½ hours

**INSTRUCTIONS:-**

- Answers 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.
- The intended marks for the questions or parts of questions are given alongside the questions.
- 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 the loss of marks.
- Geometrical figures to be constructed wherever applicable.
- For geometry, figures are to be copied to the answer script.

**SECTION A [40 marks]**

Attempt all questions from this section

**Question 1**

a) If  $A = \begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 6 \\ 1 \end{bmatrix}$ ,  $C = \begin{bmatrix} -4 \\ 5 \end{bmatrix}$ ,  $D = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$ . Find  $AB + 2C - 4D$ . [3]

b) Solve the following quadratic equation. Give your answer correct to 2 decimal places.

$$4x^2 - 7x + 2$$

[3]

c) A certain sum of money, lent out at compound interest, amounts to Rs 5400 in 2 years and to Rs 8575 in 3 years. Find the rate of interest per annum and the sum.

[4]

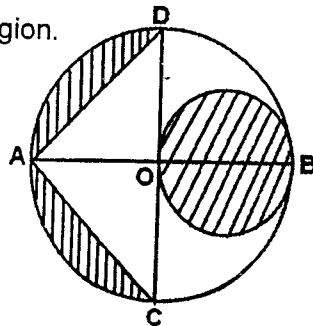
- a) Prove that:  $\frac{1}{1-\sin\theta} + \frac{1}{1+\sin\theta} = 2\sec^2\theta$  [3]
- b) If  $(4a+3):(9a+10)$  is the triplicate ratio of 3:4, find the value of a. [3]
- c) A man standing on the bank of the river observes that the angle of elevation of the tree on the opposite bank is  $60^\circ$  when he moves 50 m away from the bank he finds the angle of elevation to be  $30^\circ$ . Calculate:
- the width of the river
  - the height of the tree
- [4]

**Question 3**

- a) Solve the given inequation and graph the solution set on the number line.  
 $-1 \leq -3+4x < 23; x \in \mathbb{R}$  [3]
- b) A bag contains 12 balls out of which x are white
- If one ball is drawn at random what is the probability that it will be a white ball?
  - If 6 more white balls are put in the bag, the probability of drawing a white ball will double than that in (i). Find x. [3]
- c) A man invested Rs 9000 in 3% Rs 100 shares at a discount of 10%. He sold all the shares at the rate of Rs 95 each and invested the proceeds in 4% Rs 50 shares at par. Find the change in his income. [4]

**Question 4**

- a) ABCD is a rhombus. The co-ordinates of A and C are (3,6) and (-1,2) respectively. i) Write down the equation of AC.  
ii) Find the slope of BD. [3]
- b) In the figure AB is the diameter of the circle with centre O and  $OA=7$  cm. Find the area of the shaded region. [3]



- c) Show that  $x-2$  is a factor of  $2x^3+5x^2-11x-14$ . Hence factorise the given expression completely. [4]

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