



ATUL VIDYALAYA
SECOND PRELIMINARY EXAMINATION-2012-13
MATHEMATICS

STD: X
DATE: 26/11/2012

MM: 80
TIME: 2hr 30 mins

GENERAL INSTRUCTION
(Two hours and a half)

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 the paper is the time allowed for writing the answers.

Attempts 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 answers. Omission of essential working will result in loss of marks.

The intended marks of questions or parts of questions are given in brackets [].
Mathematical tables are provided .

SECTION – A [40 Marks]

Question 1.

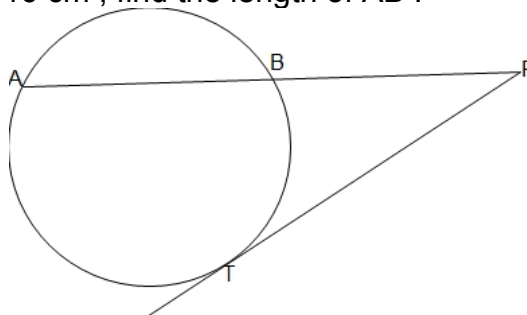
- a) If $(x + 2)$ and $(x - 3)$ are factors of $x^3 + ax + b$, find the values of a and b . Hence factorise the given polynomial . [3]
- b) Find the matrix A such that $2A - 6P = Q$, where $P = \begin{bmatrix} 1 & -3 \\ 5 & 3 \end{bmatrix}$ and $Q = \begin{bmatrix} 4 & -2 \\ 0 & 6 \end{bmatrix}$. [3]
- c) Two circles touch externally . The sum of their areas is $130\pi \text{ cm}^2$ and the distance between their centres is 14 cm . Find the diameters of the circles . [4]

Question 2.

- a) Shankar purchased a colour T.V. for ` 25,758 , which includes 10% rebate on the list price and then 8% sales tax on the remaining amount. Find the list price of the T.V. [3]
- b) If 4 , 25 and x^2 are in the continued proportion, find the value(s) of x . [3]
- c) In what time will a sum of ` 20,000 produce ` 3,152.50 at 20% p.a. compounded semi-annually ? [4]

Question 3.

- a) Mrs. Shah has a recurring deposits account in a bank for 4 years at 10% p.a. simple interest .She gets ` 38,220 at the time of maturity , find the monthly instalment . [3]
- b) In the adjoining figures , ABP is a secant of the circle and PT is tangent to it . If $PT = 12 \text{ cm}$ and $AP = 16 \text{ cm}$, find the length of AB . [3]



- c) A trader takes a sample of 50 eggs and weighs them , the following table gives his findings : [4]

Weights of eggs (in gms)	80-84	85-89	90-94	95-99	100-104	105-109	110-114
No. of eggs	2	6	12	14	10	5	1

Calculate the mean weight , correct to the nearest gram.

Question 4.

- a) If $3 \tan^2 \theta - 1 = 0, 0^\circ < \theta < 90^\circ$, then find the values of $\sin 2\theta$ and $\cos 3\theta$. [3]
- b) Solve the inequation $x - 3 \leq 3x - 4(2x + 1), x \in R$. Also represent its solution on the number line . [3]

- c) Use graph paper for this question. Take 2 cm = 1 unit on both axes. Plot the points A (3 , 3) , B (-2 , 1) and C (4 , 1) .
- Write the co-ordinates of A_1 , the image of A under reflection in the y-axis .
 - Write the co-ordinates of A_2 , the image of A under reflection in the origin .
 - Write the co-ordinates of A_3 , the image of A under reflection in the line BC .
 - Write the co-ordinates of the point which is invariant under reflection in the lines AA_3 and BC .
 - Assign the special name to quadrilateral $AA_1A_2A_3$ and find its area. [4]

SECTION B [40 Marks]

[Answer any four questions from this section.]

Question 5.

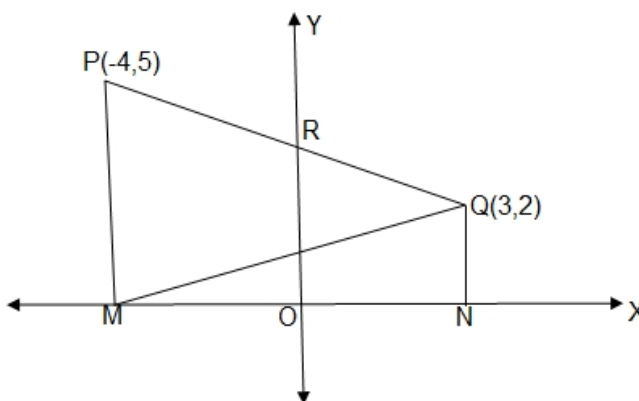
- a) Mr. Pratik has a saving bank account in Bank of Maharashtra . His passbook had the following entries :

Date	Particulars	Amount Withdrawn		Amount Deposited		Balance	
		Rs	P	Rs	P	Rs	P
2007							
January 1	By Balance					2800.00	
January 8	By Cash				2000.00	4800.00	
February	By Cheque	2500.00				2300.00	
18	By Cash				1700.00	4000.00	
May 19	To Self	500.00				3500.00	
July 15	By Cash				1000.00	4500.00	
October 7							

On October 30,2007 he received his transfer order and closed the account. Find the amount he received on closing the account when the rate of interest was 5% p.a. [3]

- b) If $p = \frac{4xy}{x+y}$, find the value of $\frac{p+2x}{p-2x} + \frac{p+2y}{p-2y}$. [3]

- c) The join of P(- 4 , 5) and Q (3 , 2) intersect the y-axis at R . PM and QN are perpendiculars from P and Q on x-axis . Find
- The value of the ratio PR : RQ .
 - The co-ordinates of R .
 - The co-ordinates of the mid-point of the diagonal MQ. [4]



Question 6.

- a) A pair of coins is tossed simultaneously .Find the probability of getting :
- Two tails .
 - One tail.
 - At least one tail. [3]

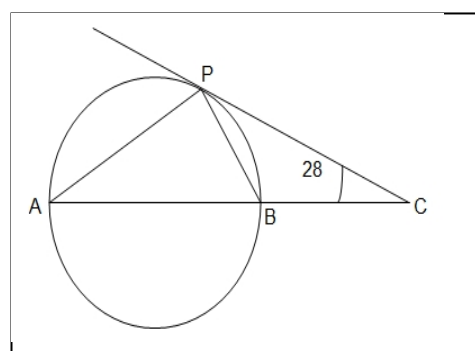
- b) Given $A = \begin{bmatrix} 3 & 2 \\ 4 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -3 \\ -4 & 5 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -3 \\ -4 & 4 \end{bmatrix}$, find $A^2 + BC$. [3]

- c) In the adjoining diagram , AB is a diameter

and the tangent at the point P to the circle

meets the diameter AB (produced) at C .

If $\angle BCP = 28^\circ$, calculate $\angle BAP$. [4]

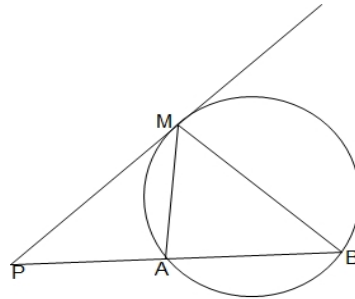


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Question 7.

- a) Arun owns 560 shares of a company . The face value of each share is ` 25 . . The company declares a dividend of 9% . Calculate
- The dividend Arun would receive and
 - The rate of return , on his investment , considering that Arun bought these shares at the premium of 20% from the market . [3]
- b) Prove that $(1 + \cot \theta - \operatorname{cosec} \theta)(1 + \tan \theta + \sec \theta) = 2$. [3]
- c) In the adjoining figure , PM is tangent to the circle and $PA = AM$.Prove that
- $\triangle PMB$ is isosceles .
 - $PA \times PB = MB^2$ [4]



Question 8.

- a) Solve the equation $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$. [3]
- b) A model of a ship is made to a scale of 1: 400 .
- The length of the model is 2 m , calculate the length of the ship .
 - The area of the deck of the ship is 160000 m². Find the area of the deck of the model.
 - The volume of the ship is 1600000 m³ ,find the volume of the model in litres.[3]
- c) From a solid cylinder of height 12 cm and base radius 5 cm , a conical cavity of the same base and height is carved out . Calculate
- The volume of the remaining solid .
 - The total surface of the remaining solid (leave your answer in π). [4]

Question 9.

- a) A shopkeeper bought a washing machine at a discount of 20% from the wholesaler , the printed price of the washing machine being ` 12 , 000 .The shopkeeper sells it to a consumer at a printed price .The rate of sales tax is 7.5 % .Find
- The amount of VAT paid by the wholesaler .
 - The amount of VAT paid by the shopkeeper .
 - The amount at which the consumer bought the washing machine . [3]
- b) Find the value(s) of k for which the quadratic equation $4x^2 + kx + 9 = 0$ has equal roots. Also , find the solutions(s) for the value of k. [3]
- c) In an auditorium , the seats are arranged in (complete) rows and columns .The number of rows was equal to the number of seats in each row . When the number of rows was increased to $1\frac{1}{2}$ times and the number of seats in each row was reduced by 10 , the total number of seats increased by 200. Find
- The number of rows in the original arrangement .
 - The number of seats in the auditorium after rearrangement. [4]

Question 10.

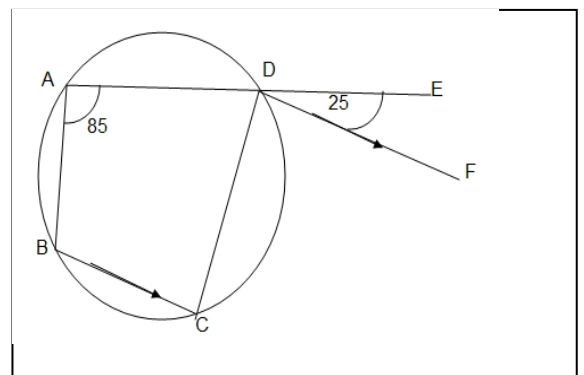
- a) In the adjoining figure , ABCD is a cyclic

quadrilateral .AD is produced to E and

DF is drawn parallel to BC .If $\angle BAD = 85^\circ$

and $\angle EDF = 25^\circ$, find $\angle ABC$.

[3]



- b) Find the equation of the straight line passing through the point (3 , - 2) and
- parallel to the line $x - 3y + 1 = 0$.

- ii. perpendicular to the line $2x + 7y - 3 = 0$ [3]
c) Use ruler and compass only for this question .

Atul Vidyalaya

Pg.3

Shaping the future

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Construct a triangle ABC such that $AB = 5$ cm , $\angle ABC = 60^\circ$ and the radius of the circum circle of ΔABC is 3.5 cm. [4]

Question 11.

- a) The angle of elevation of the top of the building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° .If the building is $16\frac{2}{3}$ m high , find the height of the tower . [4]

- b) Use graph paper for this question .Draw an ogive for the following data :

Daily Wages (In `)	30-50	50-70	70-90	90-110	110-130	130-150
No. Of worker	7	10	23	51	6	3

Find :

- The median .
- The wage which 20% of the worker exceed.
- The percentage of worker who get less than ` 100 . [6]

