

# Mathematics – Mock Test Paper

Time Allowed : 2 ½ hours

Max. Marks : 80

## General Instructions :

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 the loss of marks.  
**Mathematical tables are provided.**

## Section A (40 Marks)

Attempt **all** questions from this section

1. (a) A shopkeeper buys an article at a discount of 25% from the wholesaler. The printed price of the article is Rs 5000 and the rate of sales tax is 10%. The shopkeeper sells it to the customer at a discount of 5% of the printed price and charges the sales tax at the same rate. Find :  
(i) the amount paid by the customer  
(ii) the VAT (Value Added Tax) paid by the shopkeeper. [4]  
(b) Find the remainder when  $2x^3 - 3x^2 + 7x - 8$  is divided by  $x - 1$ . [3]  
(c) Find the value of :  $\operatorname{cosec}(65^\circ + \theta) - \sec(25^\circ - \theta)$ . [3]
2. (a) Manoj opened a recurring deposit account with Punjab National Bank and deposited Rs 500 per month for 3 years. The bank paid him Rs 20220 on maturity. Find the rate of interest paid by the bank. [3]  
(b) A solid consisting of a right circular cone, standing on a hemisphere, is placed upright in a right circular cylinder full of water and touches the bottom. Find the volume of water left in the cylinder having given that the radius of the cylinder is 3 cm and its height is 6 cm, the radius of the hemisphere is 2 cm and the height of the cone is 4 cm. Give your answer to nearest cubic centimetre. [4]  
(c) The volume and curved surface of a cylinder are equal numerically. If the height is  $3\frac{1}{2}$  times the radius of the base, find the radius. [3]

3. (a) Solve the inequation :

$$12 + 1\frac{5}{6}x \leq 5 + 3x, x \in \mathbb{R}$$

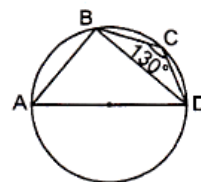
Represent the solution on a number line. [4]

- (b) Using factor theorem show that  $(x - 3)$  is a factor of  $x^3 - 7x^2 + 15x - 9$ . Hence, factorise the given expression completely. [3]

- (c) Find the  $2 \times 2$  matrix  $X$  which satisfies the equation

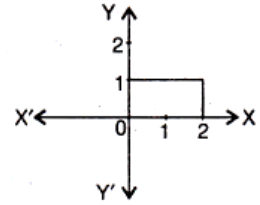
$$\begin{bmatrix} 3 & 7 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix} + 2X = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix} \quad [3]$$

4. (a) In the figure, AD is the diameter of the circle. If  $\angle BCD = 130^\circ$ , calculate : (i)  $\angle DAB$  (ii)  $\angle ADB$  [3]



- (b) Part of a geometrical figure is given in the diagram alongside.

Complete the figure so that both the  $x$ -axis and  $y$ -axis are lines of symmetry of the completed figure. [3]



- (c) Calculate the mean wage correct to the nearest rupee for the following data :

Category	A	B	C	D	E	F	G
Wages in Rs per day	50	60	70	80	90	100	110
No. of workers	2	4	8	12	10	6	8

[4]

## Section B (40 Marks)

Attempt **any four** questions from this section

5. (a) Use graph paper for this question.

(i) Plot the points A (3, 5) and B (−2, −4). Use 1 cm = 1 unit on both the axes.

(ii) A' is the image of A when reflected in the  $x$ -axis. Write down the coordinates of A' and plot it on the graph paper.

(iii) B' is the image of B when reflected in the  $y$ -axis followed by reflection in the origin. Write down the coordinates of B' and plot it on the graph paper.

(iv) Write down the geometrical name of the figure AA'BB'. [4]

- (b) Solve using quadratic formula :  $6x^2 + (12 - 8a)x - 16a = 0$  [3]

- (c) Deepika opened a savings bank account in a bank. Her passbook entries are shown below :

Date	Particulars	Withdrawals Rs	Deposits Rs	Balance Rs
Jan 1	B/F	—	—	6360
Jan 12	By cash	—	750	7110
Feb 15	To self	5000	—	2110
June 6	To cheque	354	—	1756
July 18	By cheque	—	543	2299

She closed the account on 29 July and received Rs 2354.20 as balance. Calculate the rate of interest. [3]

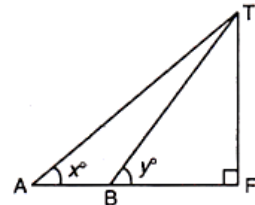
6. (a) In the figure, not drawn to scale, TF is a tower. The elevation of T

from A is  $x^\circ$ , where  $\tan x = \frac{2}{5}$  and AF = 200 m. The elevation of T

from B, where AB = 80 m, is  $y^\circ$ . Calculate :

(i) the height of the tower TF.

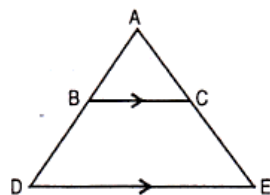
(ii) the angle  $y$ , correct to nearest degree. [4]



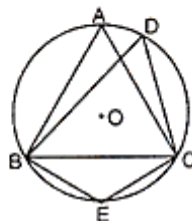
- (b) Construct a triangle ABC in which BC = 6 cm, AB = 9 cm, and  $\angle ABC = 60^\circ$ . Construct the locus of all points inside triangle ABC, which are equidistant from B and C. [3]

- (c) The compound interest, calculated yearly on a certain sum of money for the second year is Rs 880 and for the third year it is Rs 968. Calculate the rate of interest and the sum of money. [3]

7. (a) In the figure, BC is parallel to DE. Area of triangle ABC =  $25 \text{ cm}^2$ , area of trapezium BCED =  $24 \text{ cm}^2$ , DE = 14 cm. Calculate the length of BC. [4]



- (b) A bag contains 8 red, 6 white and 4 black balls. A ball is drawn at random from the bag. Find the probability that the drawn ball is :  
 (i) red or white (ii) not black (iii) neither white nor black. [3]
- (c) A can do a piece of work in  $x$  days and B can do it in  $(x + 16)$  days. If both working together can do it in 15 days, find  $x$ . [3]
8. (a) A man invests Rs 8800 on buying shares of face value of Rs 100 each at a premium of 10% in a company. If he earns Rs 1200 at the end of the year as dividend, find :  
 (i) the number of shares he has in the company,  
 (ii) the dividend percentage per share. [4]
- (b) Using ruler and compasses only, construct an isosceles  $\triangle ABC$  having base = 4 cm, vertical angle =  $45^\circ$  and median through vertex equal to 2.8 cm. Draw the incircle of the triangle. [3]
- (c) Using the properties of proportion, solve for  $x$  :  $\frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}} = b$  [3]
9. (a) A bucket is raised from a well by means of a rope which is wound round a wheel of diameter 77 cm. Given that the bucket ascends in 1 min 28 sec with a uniform speed of 1.1 m/sec; calculate the number of complete revolutions the wheel makes in raising the bucket. Take  $\pi = \frac{22}{7}$ . [4]
- (b) Show that the points A(1, 0), B(5, 3), C(2, 7) and D(-2, 4) are the vertices of a square. [3]
- (c) In the figure, O is the centre of the circle and  $\triangle ABC$  is equilateral. Find (i)  $\angle BDC$  (ii)  $\angle BEC$ . [3]



10. (a) Prove the following identity :

$$\frac{1}{\sin \theta + \cos \theta} + \frac{1}{\sin \theta - \cos \theta} = \frac{2 \sin \theta}{1 - 2 \cos^2 \theta} \quad [4]$$

- (b) The following table shows the distribution of the heights of a group of factory workers :

Height (in cm)	150-155	155-160	160-165	165-170	170-175	175-180	180-185
No. of workers	6	12	18	20	13	8	6

- (i) Determine the cumulative frequencies.  
 (ii) Draw the cumulative frequency curve on a graph paper. [6]
11. (a) Find the equation of the line passing through  $(-2, -4)$  and perpendicular to the line  $3x - y + 5 = 0$ . [4]
- (b) PAT is a tangent to the circumcircle of  $\triangle ABC$  such that  $PT \parallel BC$ . Show that  $AB = AC$ . [3]
- (c) A dice is thrown once. What is the probability that the number obtained is : [3]  
 (i) even? (ii) other than 4?