

# Mathematics – Mock Test Paper

Time Allowed : 2½ 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 chord of length 16 cm is drawn in a circle of radius 10 cm. Calculate the distance of the chord from the centre of the circle. [4]
- (b) If  $2 \tan \theta = 5$ , find the value of  $\frac{3 \sin \theta - 4 \cos \theta}{\sin \theta + 4 \cos \theta}$ . [3]
- (c) Using factor theorem, show that  $(x - 2)$  is a factor of  $2x^3 + 5x^2 - 4x - 3$ . [3]

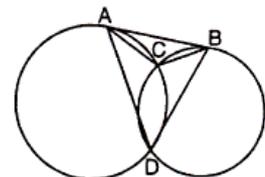
2. (a) Given below are the entries in a savings bank account pass book.

| Date           | Particulars | Withdrawal (Rs) | Deposit (Rs) | Balance (Rs) |
|----------------|-------------|-----------------|--------------|--------------|
| Jan. 9, 2010   | B/F         | —               | —            | 4000         |
| Feb. 20, 2010  | To self     | 1500            | —            | 2500         |
| April 15, 2010 | By cash     | —               | 1200         | 3700         |
| June 15, 2010  | To self     | 3000            | —            | 700          |
| July 10, 2010  | By cash     | —               | 5000         | 5700         |

Calculate interest from Jan. to July at 4.5% per annum on minimum balance on or after 10th day of each month. [3]

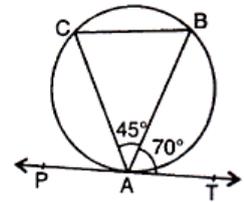
- (b) A cylindrical can whose base is horizontal and of radius 3.5 cm contains sufficient water so that when a sphere is placed in the can, the water just covers the sphere. Given that the sphere just fits into the can, calculate :
- (i) the total surface area of the can in contact with water when the sphere is in it. [4]
- (ii) the depth of water in the can before the sphere was put into the can. [4]
- (c) The circumference of the edge of a hemispherical bowl is 132 cm. Find the capacity of the bowl. [3]

3. (a) Draw a regular hexagon of side 3.5 cm. Circumscribe a circle to it. [4]
- (b) The numbers 13, 15, 17, 18 and  $n$  are arranged in ascending order. If the mean is equal to the median, find the value of  $n$ . [3]
- (c) In the figure, AB is a common tangent to two circles intersecting at C and D. Write down the measure of  $(\angle ACB + \angle ADB)$ . Justify your answer. [3]





- (c) A shopkeeper bought a coat at a discount of 20% from the wholesaler. The printed price of the coat is Rs 1600 and the rate of sales tax is 6%. The shopkeeper sold it to the customer at the printed price. Find the VAT paid by the shopkeeper to the government. Also, find the amount paid by the customer for the coat. [3]
8. (a) A boy standing on the bank of a river observes that the angle subtended by a tree on the opposite bank is  $60^\circ$ . When he moves 20 m back from the bank, he finds the angle to be  $30^\circ$ . Find the height of the tree and the breadth of the river. [4]
- (b) Construct an isosceles triangle ABC such that  $AB = 6$  cm,  $BC = AC = 4$  cm. Find a point P such that it is equidistant from A and B as well as from AC and BC. [3]
- (c) On a certain sum of money, the difference between the compound interest for a year, payable half-yearly and the simple interest for a year is Rs 180. Find the sum lent out if the rate of interest in both the cases is 10% p.a. [3]
9. (a) Three horses are tethered at three corners of a triangular plot having sides 20 m, 30 m and 40 m with ropes of 7 m length each. Find the area of this plot which can be grazed by the horses. [4]
- (b) Write down the equation of the line whose gradient is  $\frac{3}{2}$  and which passes through P, where P divides the line segment joining A (-2, 6) and B (3, -4) in the ratio 2 : 3. [3]
- (c) In the figure, PAT is a tangent at A. If  $\angle TAB = 70^\circ$  and  $\angle BAC = 45^\circ$ , find  $\angle ABC$ . [3]



10. (a) Determine whether the line through (-2, 3) and (4, 1) is perpendicular to the line  $3x = y + 1$ . Does the line  $3x = y + 1$  bisect the line joining (-2, 3) and (4, 1)? [3]
- (b) Calculate the mean daily wage of a worker from the following table :

| Daily wages (in Rs) | 40-45 | 45-50 | 50-55 | 55-60 | 60-65 |
|---------------------|-------|-------|-------|-------|-------|
| No. of workers      | 2     | 3     | 7     | 12    | 6     |

[4]

From the ogive find the median.

- (c) Manish deposits Rs 2000 per month in a Recurring Deposit Account for  $1\frac{1}{2}$  years at 8% p.a. Find the amount he will receive at the time of maturity [3]
11. (a) Prove that  $\frac{1 - \cos \theta}{1 + \cos \theta} = (\operatorname{cosec} \theta - \cot \theta)^2$  [4]
- (b) Draw an ogive for the following frequency distribution :

| Class     | 6500-7000 | 7000-7500 | 7500-8000 | 8000-8500 | 8500-9000 | 9000-9500 | 9500-10000 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Frequency | 10        | 18        | 22        | 25        | 17        | 10        | 8          |

[6]

From the ogive find the median.