

Total No. of Printed Pages—11

MBOSE Class 10  
Additional English  
(New Course)  
Question Paper  
2019

**X/19/M (N)**

20

**MATHS**

( New Course )

**( FOR REGULAR CANDIDATES WITH PRACTICALS/  
INTERNAL ASSESSMENT )**

*Full Marks : 80*

*Pass Marks : 24*

*Time : 3 hours*

*The figures in the margin indicate full marks for the questions*

*General Instructions :*

- (i) The question paper consists of 30 questions divided into five Sections—A, B, C, D and E.
- (ii) Section—A contains 8 questions of 1 mark each.  
Section—B contains 7 questions of 2 marks each.  
Section—C contains 8 questions of 3 marks each.  
Section—D contains 4 questions of 4 marks each.  
Section—E contains 3 questions of 6 marks each.
- (iii) There is no overall choice. However an internal choice has been provided in three questions of 3 marks each, two questions of 4 marks each and two questions of 6 marks each.
- (iv) In question on construction, the drawing should be neat and exactly as per the given measurements.
- (v) Questions which are meant for Visually Handicapped (Blind) Students, should be answered by them only.
- (vi) Use of Calculator/Mobile Phone is not permitted.

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SECTION—A

( Marks : 8 )

( Question Nos. 1 to 8 carry 1 mark each )

1. If  $\frac{a}{b}$  is a rational number ( $b \neq 0$ ) in its lowest form, then what is the condition on  $b$  so that the decimal representation of  $\frac{a}{b}$  is terminating?
2. Check, whether  $x = -2$  is a solution of the equation  $x^2 - 3x + 2 = 0$  or not.
3. Find the 17th term of the sequence  $a_n = 4n - 3$ .
4. Find the value of  $x$  ( $0^\circ < x < 90^\circ$ ) in  $\tan 5x = 1$ .
5. Determine whether the given sides  $a = 7$  cm,  $b = 24$  cm and  $c = 25$  cm are sides of a right-angled triangle or not.
6. State SSS-similarity criterion.

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7. Find the circumference of a circle whose diameter is 35 cm.  
(Use  $\pi = \frac{22}{7}$ )

8. Define class-mark of a class interval.

SECTION—B

( Marks : 14 )

( Question Nos. 9 to 15 carry 2 marks each )

9. Determine  $k$  so that  $k+2$ ,  $4k-6$ ,  $3k-2$  are the three consecutive terms of an A.P.

10. Evaluate :

$$\frac{4}{\cot^2 30^\circ} + \frac{1}{\sin^2 60^\circ} - \cos^2 45^\circ$$

11. Prove that

$$2 \cos^2 \theta + \frac{2}{1 + \cot^2 \theta} = 2$$

12. Find the coordinates of the centroid of the triangle whose vertices are  $(-2, 3)$ ,  $(2, -1)$  and  $(4, 0)$ .

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- 13.** If the point  $P(x, y)$  is equidistant from the points  $A(5, 1)$  and  $B(1, 5)$ , then prove that  $x = y$ .
- 14.** The areas of two similar triangles  $ABC$  and  $PQR$  are in the ratio  $9 : 16$ . If  $BC = 4.5$  cm, find the length of  $QR$ .
- 15.** If the tangent at a point  $P$  to a circle with centre  $O$  cuts a line through  $O$  at  $Q$  such that  $PQ = 24$  cm and  $OQ = 25$  cm, then find the radius of the circle.

**[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 15 given above ]**

- 15. (a)** Define a circle. 1
- (b)** How many tangents can be drawn from a point outside the circle? 1

SECTION—C

( Marks : 24 )

( Question Nos. **16** to **23** carry 3 marks each )

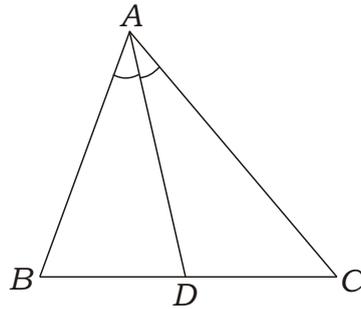
- 16.** Using ruler and compass only, construct a  $\Delta PQR$  with sides  $QR = 7$  cm,  $PQ = 6$  cm and  $\angle PQR = 60^\circ$ . Then construct another triangle whose sides are  $\frac{3}{5}$ th of the corresponding sides of  $\Delta PQR$ . (Only traces of construction are required.)

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[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 16 given in Page No. 4 ]

16. (a) In a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. ( State whether True or False ) 1
- (b) Define similar triangles. 2

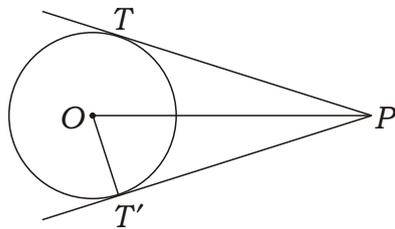
17. In the adjoining figure,



$\Delta ABC$  is such that  $\frac{BD}{DC} = \frac{AB}{AC}$ ,  $\angle B = 70^\circ$ ,  $\angle C = 50^\circ$ . Find  $\angle BAD$ .

Or

In the given figure,



find  $PT$ , if  $OP = 41$  cm and  $OT' = 9$  cm.

[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 17 given in Page No. 5 ]

17. (a) Define secant of a circle. 1
- (b) A tangent to a circle is \_\_\_\_\_ to the radius through the point of contact. ( Fill in the blank ) 1
- (c) Two triangles are said to be equiangular, if their corresponding angles are \_\_\_\_\_. ( Fill in the blank ) 1
18. A steel wire when bent in the form of a square encloses an area of  $121 \text{ cm}^2$ . If the same wire is bent in the form of a circle, then find the area of the circle. (Use  $\pi = \frac{22}{7}$ )

Or

The minute hand of a clock is 7 cm long. Find the area of the face of the clock by the minute hand between 9 A.M. and 9:35 A.M. (Use  $\pi = \frac{22}{7}$ )

19. A box contains 20 cards numbered from 1 to 20. A card is drawn at random from the box. Find the probability that the number on the drawn card is—
- (a) divisible by 2 or 3;
- (b) a prime number.
20. Using Euclid's division algorithm, find the HCF of 9367 and 3451.

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21. Find the sum of the following series :

$$72 + 70 + 68 + \dots + 40$$

22. If  $\alpha, \beta$  are zeroes of the polynomial  $p(x) = 3x^2 - 2x - 6$ , then find  $\alpha^2 + \beta^2$ .

23. Prove that

$$\frac{\sin 70^\circ}{\cos 20^\circ} + \frac{\operatorname{cosec} 20^\circ}{\sec 70^\circ} - 2 \cos 70^\circ \cdot \operatorname{cosec} 20^\circ = 0$$

Or

If  $\tan \theta = \frac{a}{b}$ , then show that

$$\frac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta} = \frac{a^2 - b^2}{a^2 + b^2}$$

SECTION—D

( Marks : 16 )

( Question Nos. 24 to 27 carry 4 marks each )

24. The product of Reena's age (in years) 5 years ago and her age 8 years later is 30. Find her present age.

Or

The area of a rectangle gets reduced by 80 square units, if its length is reduced by 5 units and the breadth is increased by 2 units. If we increase the length by 10 units and decrease the breadth by 5 units, the area is increased by 50 square units. Find the length and breadth of the rectangle.

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- 25.** A kite is flying at a height of 75 m from the level ground, attached to a string inclined at  $60^\circ$  to the horizontal. Find the length of the string, assuming that there is no slack in it. (Use  $\sqrt{3} = 1.73$ )

Or

A vertically straight tree, 15 m high, was broken by the wind in such a way that its top just touched the ground and made an angle of  $60^\circ$  with the ground. At what height from the ground did the tree break? (Use  $\sqrt{3} = 1.732$ )

**[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 25 given above ]**

- 25. (a)** If  $\sec \theta + \tan \theta = m$  and  $\sec \theta - \tan \theta = n$ , then prove that  $mn = 1$ . 2

- (b)** If  $\sin \theta = \cos \theta$ , then  $\theta = 45^\circ$ .  
( State whether True or False ) 1

- (c)**  $1 + \cot^2 \theta = \underline{\hspace{2cm}}$ . ( Fill in the blank ) 1

- 26.** Find the value of 'p' for which the given points  $(-3, 9)$ ,  $(2, p)$  and  $(4, -5)$  are collinear.

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**27.** Prove that, if a line is drawn parallel to one side of a triangle intersecting the other two sides, then the other two sides are divided in the same ratio.

**[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 27 given above ]**

- 27.** (a) What is the length of the altitude of an equilateral triangle of side 2 cm? 2
- (b) State mid-point theorem. 2

SECTION—E

( Marks : 18 )

( Question Nos. **28** to **30** carry 6 marks each )

**28.** Solve the following system of linear equations graphically :

$$\begin{aligned}x - y + 1 &= 0 \\3x + 2y - 12 &= 0\end{aligned}$$

Find the area of the triangle formed by the lines and  $x$ -axis (plot at least three points for each graph).

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[ For Visually Handicapped (Blind) Students only,  
instead of Question No. 28 given in Page No. 9 ]

28. Solve the following system of linear equations :

$$2x - 3y = 13$$

$$7x - 2y = 20$$

29. A metallic bucket, open at the top, of height 24 cm is in the form of the frustum of a cone, the radii of whose lower and upper circular ends are 7 cm and 14 cm respectively.

(a) Find the volume of water which can completely fill the bucket.

(b) Find the area of the metal sheet used to make the bucket.  
(Use  $\pi = \frac{22}{7}$ )

Or

From a solid cylinder whose height is 8 cm and radius 6 cm, a conical cavity of height 8 cm and of base radius 6 cm is hollowed out. Find the volume of the remaining solid. Also, find the total surface area of the remaining solid. (Use  $\pi = 3.14$ )

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30. The following distribution shows the daily pocket allowances of children of a locality. The mean pocket allowance is ₹ 18. Find the missing frequency  $f$  :

Daily pocket allowance (in ₹)	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	7	6	9	13	$f$	5	4

Or

The following table shows the ages of the patients admitted in a hospital during a year :

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of patients	6	11	21	23	14	5

Find the mode of the data given above.

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