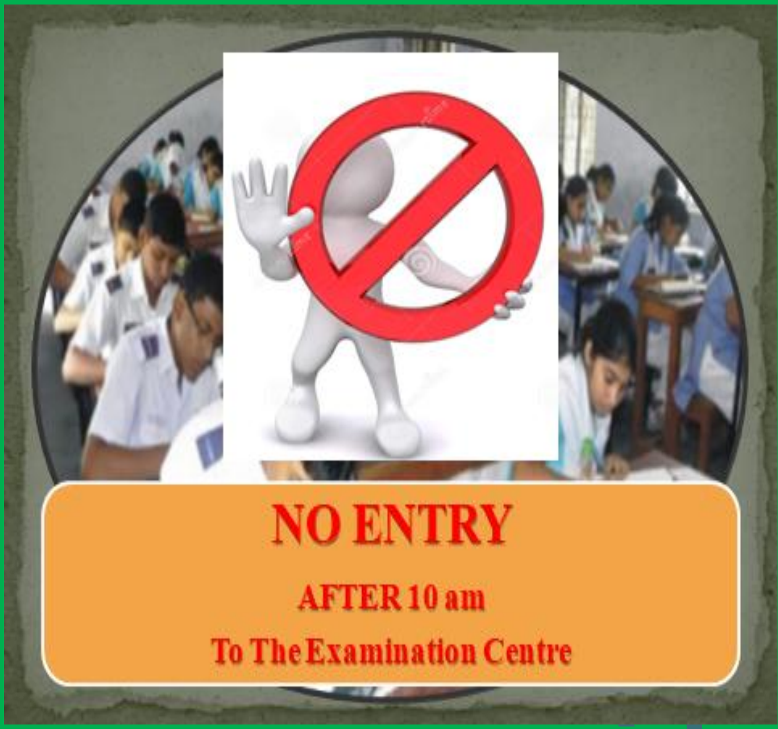


Session: 2018-19

Subject: Mathematics

Class – X

Time: 3 hrs. M.M: 80

General Instructions:

(i) All questions are compulsory.

(ii) The question paper consists of 30questions divided into four sections A, B, C and D. Section-A comprises of 6 questions of 1 mark each, Section-B comprises of questions of 2 marks each, Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 8 questions of 4 marks each.

(iii) There is no overall choice.

(iv) Use of calculator is not permitted

(v) Do not write anything on the question paper other than your Roll No.

Section A

1 The decimal expansion of the rational number $\frac{53}{2^k \times 5^3}$, will terminate after 4 places of decimal, what is the value of k?

2 For what value of k does the pair of equations x – 2y = 3, 3x + ky = 1 has no unique solution.

OR

If one zero of the quadratic polynomial $x^2 - 5x - 6$ is 6, then find the other zero.

3 If the mid-point of the line segment joining the points P(6, b – 2) and Q(-2, 4) is (2, -3), find the value of b.

4 The perimeter of 2 similar Δ^s are 25cm &15cm. one side of 1st Δ is 9cm, what is the corresponding side of other Δ.

5 In ΔABC rt. angled at C, if 3 cotA = 4, find the value of sinB.

OR

In Δ ABC right angled at C, find the value of cos (A + B).

6 Find the value(s) of k, if the quadratic equation has equal roots $3x^2 - k\sqrt{3}\,x + 4 = 0$

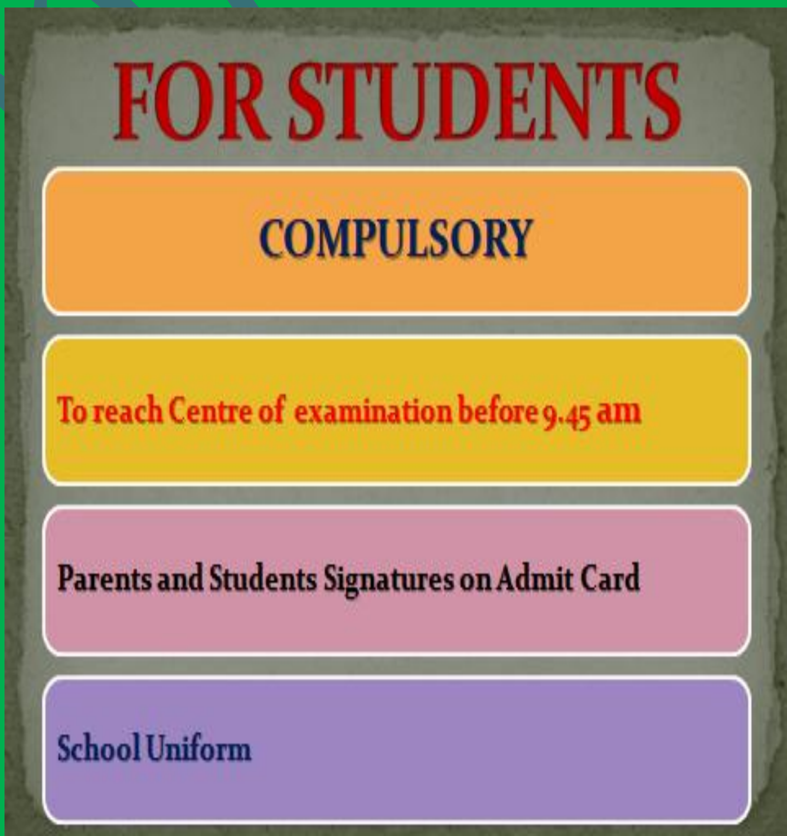
Section B

7 Given that $\sqrt{3}$ is an irrational number, prove that $(2 - \sqrt{3})$ is an irrational number.

8 If coordinates of two adjacent vertices of a parallelogram are (3, 2), (1, 0) and diagonals bisect each other at (2, –5), find coordinates of the other two vertices.

OR

If P(a, b) is the midpoint of the line segment joining A(10, -6) and (k, 4) and a – 2b = 18, find the value of k and the distance AB.



9 A box contains cards numbered from 14 to 30. A card is drawn at random from the box.
Find the probability that number on the drawn card is
(i) a composite number
(ii) a number in neither divisible by 3 nor by 5
(iii) a prime number
(iv) a number divisible by 3

10 The King, Queen, ace and Jack of clubs are removed from a pack of 52 cards and then the remaining cards are well shuffled. A card is selected from the remaining cards. Find the probability that the card drawn is
(i) not a spade (ii) a court card
(iii) a club (iv) a picture card

11 Find the sum of two middle terms of the AP: $\frac{-4}{3}, -1, \frac{-2}{3}, \ldots\ldots\ldots, 4\frac{1}{3}$.

OR

Which term of the AP: 3, 15, 27, 39,........ will be 120 more than its 21st term?

12 Solve: $148x + 231y = 527$; $231x + 148y = 610$.

Section C

13 Prove that $\sqrt{3}$ is not rational. Hence prove that $2 - \sqrt{27}$ is not rational.

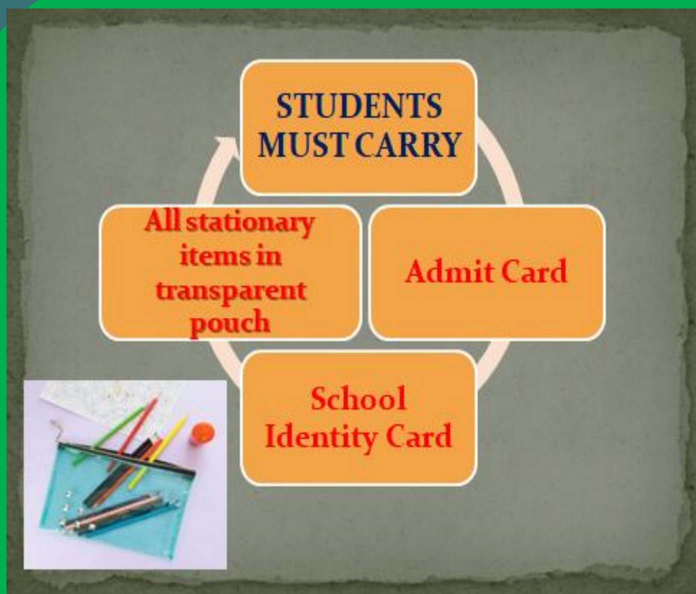
14 If the remainder on division of $x^3 + 2x^2 + kx + 3$ by $x - 3$ is 21, find the value of k. Hence, find the zeroes of the cubic polynomial $x^3 + 2x^2 + kx - 18$.

15 Draw the graph of the following pair of linear equations: $x + 3y = 16$; $2x - 3y = 12$. Hence, find the area of the region bounded by the lines $x = 0$, $y = 0$ and $2x - 3y = 12$.

16 Find the area of the triangle ABC with A(1, -4) and the midpoints of sides through A being (2, -1) and (0, -1).

OR

If A(6, 1), B(8, 2) and C(9, 4) are three vertices of a parallelogram ABCD. If E is the midpoint of DC, find the area of ΔADE.



17 Through the midpoint M of the side of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced in E. Prove that EL = 2 BL.

OR

The perpendicular from A on the side BC of a ΔABC intersects BC at D such that DB = 3 CD. Prove that $2AB^2 = 2AC^2 + BC^2$.

18 An ice cream cone full of ice cream with hemisphere on the top has radius 5 cm and total height 10 cm. Calculate the volume of ice cream, provided that its 1/6 th part is left unfilled with ice cream.

19 In fig. 1, O is the centre of a circle of radius 5 cm, T is a point such that OT = 13 cm and OT intersects the circle at E. If AB is the tangent to the circle at E, find the length of AB.

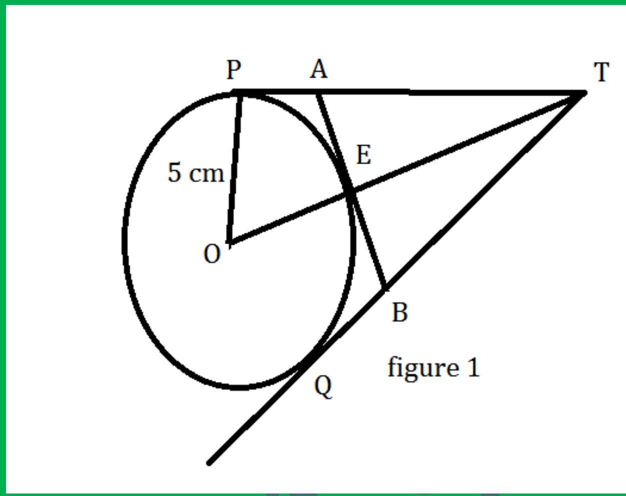


figure 1

20 Find the value of sin 45^0 geometrically.

OR

If A + B = 90^o, then prove that

$$\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A.$$

21 In given figure 2, two circles cut at A and B, P and Q are the centres of the circles. If $\angle APB = 90^o$ and $\angle AQB = 60^o$ then find the area of the shaded portion if AP = 4 cm.

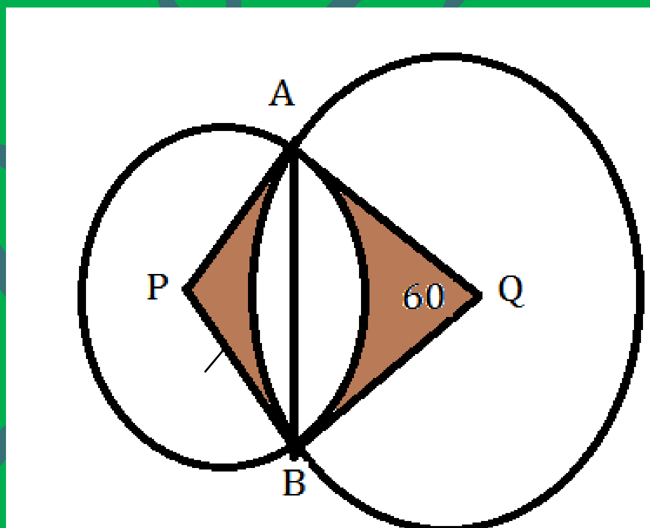


figure 2

OR

The side of a square is 10 cm. Find the area between inscribed and circumscribed circles of the square.

Steps to fill the Answer sheet

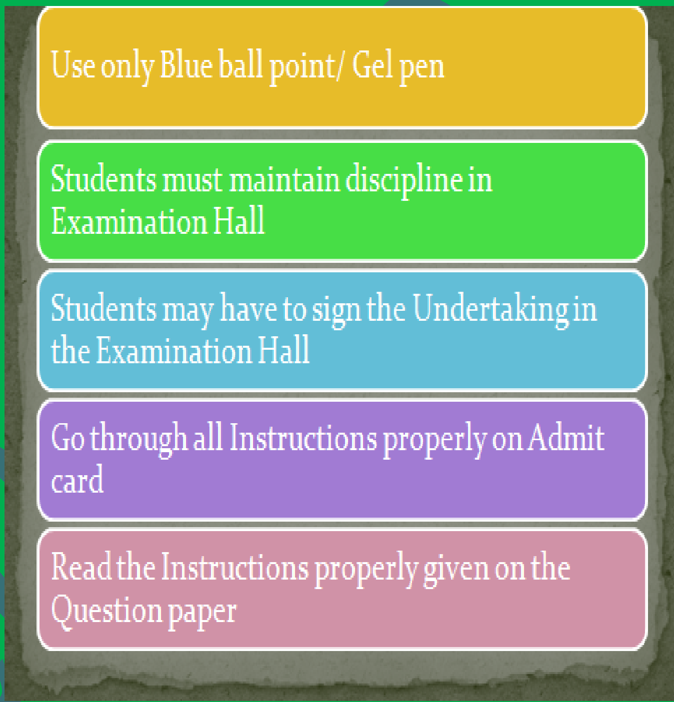
- Read the instructions given in the Answer Sheet before filling
- Write your correct Roll No. and encircle it properly (as per given in Admit Card)
- Write correct spelling of your name and encircle it properly (as per given in Admit Card)
- Write correct Set No. and encircle correct series
- Write correct subject code (as per given in Admit Card)

22 Draw more than ogive and hence find the median.

Group	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	4	4	7	10	12	8	5

Section D

23 Prove that in a right angled triangle square of the hypotenuse is equal to sum of the squares of other two sides.



24 In a class test, the sum of Kavita's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product would have been 210. Find her marks in the two subjects.

OR

If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are equal, then prove that $2b = a + c$.

25 Solve the equation: $1 + 4 + 7 + 10 + ...+ x = 287$.

26 At a point on a level ground, the angle of elevation α of a vertical tower is found to be such that $\tan\alpha = \frac{5}{12}$. On walking 192 m towards the tower, the angle of elevation becomes β such that $\tan\beta = \frac{3}{4}$. Find the height of the tower.

27 Construct a ΔABC in which CA = 6 cm, AB = 5 cm and angle BAC = 45°, then construct a triangle similar to the given triangle whose sides are 6/5 of the corresponding sides of the ΔABC.

28 A farmer connects a pipe of internal diameter 25 cm from a canal into a cylindrical tank in his field, which is 12 m in diameter and 2.5 m deep. If water flows through the pipe at the rate of 3.6 km/hr, in how much time will the tank be filled? Also find the cost of water, if the canal department charges at the rate of Rs 0.07 / m^3.

29 Prove that: $(\sin^4\theta - \cos^4\theta + 1)\cos ec^2\theta = 2$

OR

If 2cosA – sinA = x, cosA – 3sinA = y. Show that $2x^2 + y^2 - 2xy = 5$.

30 The mean of the following frequency distribution is 62.8 and the sum of all frequencies is 50. Compute the missing frequencies x and y.

Class	0-20	20-40	40-60	60-80	80-100	100-120	Total
Frequency	5	x	10	y	7	8	50

OR

Find mean, median and mode of given data

CI	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	12	15	13	10	12	9	10

Prepared by:
Deepak Dutta
PGT (Math)
9816055445