SEVEN ELEVEN SCHOLASTIC SCHOOL (ICSE)
SECOND PRELIMINARY EXAMINATION
2020-21

Name: _____
Grade: X Div : _____Roll no___
Subject : MATHEMATICS

Date: 22nd February, 2021
Marks: 80
Duration: 2:30 hrs

Answer 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 this paper is the time allowed for writing the answers.
Section I compulsory. Attempt any **four** questions from **Section II**.
The intended marks for questions or parts of questions are given

Section I [40 marks]
(Answer all questions from this Section.)

Question 1.

(a) Solve the following in equation and write down the solution set :
$11x - 4 < 15x + 4 \leq 3x + 14, x \in W$ [3]
Represent the solution on a real number line.

(b)Sumit ordered some medicine the bill was rs. 840 , which included 12 % GST .Find the actual cost of medicine [3]

(c) In a class of 40 students, marks obtained by the students in a class test (out of 10)are given below : [4]

Marks	1	2	3	4	5	6	7	8	9	10
Number of Students	1	2	3	3	6	10	5	4	3	3

Calculate the following for the given distribution :
(i) Median
(ii) Mode

Question 2.

(a) Using the factor theorem, show that $(x - 2)$ is a factor of $x^3 + x^2 - 4x - 4$. [3]
Hence, factorise the polynomial completely.

(b) Prove that :
$(\text{cosec}\,\theta - \sin\theta)(\sec\theta - \cos\theta)(\tan\theta + \cot\theta) = 1$ [3]

(c) In an Arithmetic Progression (A.P.) the fourth and sixth terms are 8 and 14 respectively. Find the : [4]
(i) first term(ii) common difference(iii) sum of the first 20 terms.

Question 3.

(a) Simplify :

$$\sin A\begin{bmatrix}\sin A & -\cos A\\ \cos A & \sin A\end{bmatrix}+\cos A\begin{bmatrix}\cos A & \sin A\\ -\sin A & \cos A\end{bmatrix}$$ [3]

(b) M and N are two points on the X axis and Y axis respectively.
P(3, 2) divides the line segment MN in the ratio 2 : 3. Find [3]
(i) the coordinates of M and N
(ii) slope of the line MN.

(c) A solid metallic sphere of radius 6 cm is melted and made into a solid cylinder of height 32 cm. Find the :
(i) radius of the cylinder [4]
(ii) curved surface area of the cylinder
Take $\pi = 3.14$

Question 4.

(a) The following numbers, K + 3, K + 2, 3K – 7 and 2K – 3 are in proportion. Find K. [3]
(b) Solve for x the quadratic equation $x^2 - 4x - 8 = 0$ [3]
Give your answer correct to three significant figures.
(c) Without solving find the value of P for which equation having equal and real roots [4]
$x^2 + (p-3)x + p = 0$

SECTION II (Attempt any four question)

Question 5.

(a) There are 25 discs numbered 1 to 25. They are put in a closed box and shaken thoroughly. A disc is drawn at random from the box.
Find the probability that the number on the disc is :
(i) an odd number [3]
(ii) divisible by 2 and 3 both
(iii) a number less than 16.

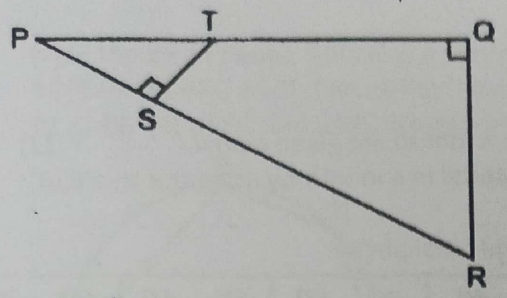
(b) Rekha opened a recurring deposit account for 20 months. The rate of interest is 9% per annum and Rekha receives 441 as interest at the time of maturity. Find the amount She deposited each month

(c) Use a graph sheet for this question. [3]
Take 1 cm = 1 unit along both x and y axis. [4]
(i) Plot the following points :
A(0, 5), B(3, 0), C(1, 0) and D(1, -5)
(ii) Reflect the points B, C and D on the y-axis and name them as B′, C′, D′ respectively.
(iii) Write down the coordinates of B′, C′ and D′.
(iv) Join the points A, B, C, D, D′, C′, B′, A in order and give a name to the closed figure ABCDD′C′B′.

Question 6.

(a) In the given figure, $\angle PQR = \angle PST = 90°$, PQ = 5 cm and PS = 2 cm.
(i) Prove that $\triangle PQR \sim APST$. [3]

(ii) Find Area of △PQR : Area of quadrilateral SRQT.



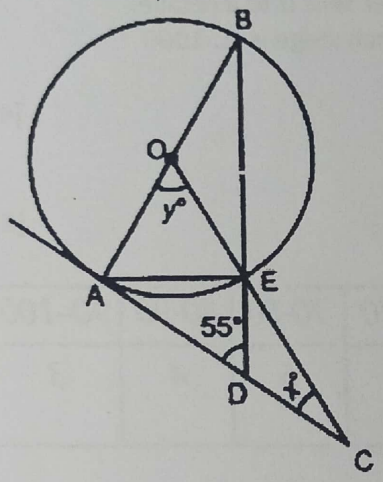
b) The 7^{th} term of an A.P. is 32 and the 13^{th} term is 62 . Find the A.P. [3]

(c) The volume of a cone is 1232 m 3 and area of its base is 154 m 2 . Calculate

(i) radius and height of the cone . (ii) Curved Surface area [4]

Question 7.

(a) In the given figure, AC is a tangent to the circle with centre 0. If ∠ADB = 55°, find x and y. Give reasons for your answers. [3]



(b) Find the probability of getting 53 Sundays in a leap year [3]

(c)

$$\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} \times M = 6I$$

Given M = 6I, where M is a matrix and I is unit matrix of order 2 x 2.

(i) State the order of matrix M.

(ii) Find the matrix M. [4]

Question 8.

(a) The sum of the first three terms of an Arithmetic Progression (A:P.) is 42 and the product of the first and third term is 52. Find the first term and the common difference. [3]

(b) The vertices of a ΔABC are A(3, 8), B(-1, 2) and C(6, -6). Find [3]

(i) Slope of BC.

(ii) Equation of a line perpendicular to BC and passing through A.

(c) A man bought some books for rs. 1200 when the price of each rose by rs. 30 he could buy 2 books less . Find the original number of books . [4]

Question 9.

(a) The data on the number of patients attending a hospital in a month are given below. [3]

Find the average (mean) number of patients attending the hospital in a month by using the shortcut method.

Take the assumed mean as 45. Give your answer correct to 2 decimal places.

Number of Patients	*10 – 20*	*20 – 30*	*30 – 40*	*40 – 50*	*50 – 60*	*60 – 70*
Number of Days	*5*	*2*	*7*	*9*	*2*	*5*

(b) Using properties of proportion solve for x, given [3]

$$\frac{\sqrt{5x} + \sqrt{2x - 6}}{\sqrt{5x} - \sqrt{2x - 6}} = 4$$

(c) A manufacturer sells a clock of rs. 5000to a wholesaler . The wholesaler sells it to a retailer and retailer sells to consumer . GST charged is 18 % and profit made at each stage is rs. 1000

Calculate (i) tax paid by wholesaler (ii) total GST paid to Government [4]

Question 10.

(a) Use graph paper for this question. [6]

The marks obtained by 120 students in an English test are given below :

Marks	*0–10*	*10–20*	*20–30*	*30–40*	*40–50*	*50–60*	*60–70*	*70-80*	*80-90*	*90–100*
No. of Students	*5*	*9*	*16*	*22*	*26*	*18*	*11*	*6*	*4*	*3*

Draw the ogive and hence, estimate :

(i) the median marks.

(ii) the number of students who did not pass the test if the pass percentage was 50.

(iii) the upper quartile marks.

(b) A man observes the angle of elevation of the top of the tower to be 45°. He walks towards it in a horizontal line through its base. On covering 20 m the angle of elevation changes to 60°. Find the height of the tower correct to 2 significant figures. [4]

Question 11.

(a) Using the Remainder Theorem find the remainders obtained when $x^3 + (kx + 8)x + k$ is divided by $x + 1$ and $x-2$

Hence, find k if the sum of the two remainders is 1. [3]

(b) The product of two consecutive natural numbers which are multiples of 3 is equal to 810. Find the two numbers. [3]

(c) In the given figure, ABCDE is a pentagon inscribed in a circle such that AC is a diameter and side BC||AE. If $\Delta BAC = 50°$, find giving reasons :

(i) $\angle ACB$ (ii) $\angle EDC$ (iii) $\angle BEC$ (Hence prove that BE is diameter) [4]