# R. D. RAJPAL SCHOOL PREBOARD EXAM - I (2020-21) 

## CLASS: X <br> TIME ALLOWED: 2HRS

SUBJECT: MATHS
MAXIMUM MARKS: 50

## General Instructions:

1. All questions are compulsory.
2. Section A Q1 - Q4 carries 2 marks each.
3. Section B Q5 - Q9 carries 3 marks each.
4. Section C Q10-Q12 carries 4 marks each.
5. Section D Q13-Q15 carries 5 marks each.

## SECTION - A

(1) Find the least number that is divisible by first six even numbers.
(2) If the system of equations $4 \mathrm{x}+\mathrm{y}=5$ and $(2 m-1) \mathrm{x}+(m-1) \mathrm{y}=2 m+1$ represent parallel lines, then find $m$.
(3) Find the value(s) of $c$ for which the quadratic equation $4 \mathrm{x}^{2}-2(c+1) \mathrm{x}+(c+1)=0$ has equal roots, which are real.
(4) The king, queen and jack of clubs are removed from a deck of 52 cards. The remaining cards are mixed together and then a card is drawn at random from it. Find the probability of getting :
(i) A face card
(ii) a card of clubs

## SECTION - B

(5) Find the sum of natural numbers between 101 and 999 which are divisible by both 2 and 5 .
(6) A man on the deck of a ship is 10 m above the water level. He observes that angle of elevation of the top of a cliff is $45^{\circ}$ and the angle of depression of the base is $30^{\circ}$. Calculate the distance of the cliff from the ship and the height of the cliff.
(7) PQRS is a square lawn with the side $\mathrm{PQ}=14 \mathrm{~m}$. Two circular flower beds are there on the sides PS and QR with centre at O, the intersection of its diagonals. Find the total area of the two flower beds(shaded parts).

(8) ABC is a triangle in which $\angle \mathrm{B}=90^{\circ}, \mathrm{BC}=16 \mathrm{~cm}$ and $\mathrm{AB}=12 \mathrm{~cm}$. A circle is inscribed in the triangle, whose centre is O . Find radius of the incircle.
(9) Construct tangents to a circle of radius 3 cm from a point on the concentric circle of radius 5 cm . (No need to write steps of construction)

## SECTION - C (CASE STUDY BASED QUESTIONS)

(10)

(i) How much cloth material will be required to cover 1 big dome of radius 4.2 metres?
(ii) Find the lateral surface area of 4 pillars if height of the pillar is 20 m and radius of the base is 1.4 m .
(iii) How much is the volume of 2 small hemispheres each of radius 2.1 m ?
(iv) What is the ratio of sum of volumes of four hemispheres of radius 1 m each to the volume of a sphere of radius 2 m ?
(11) Mr. R.K Agrawal is owner of a famous amusement park in Delhi. Generally he does not go to park and it is managed by team of staff. The ticket charge for the park is Rs 150 for children and Rs 400 for adults. One day Mr. Agrawal decided to random check the park and

went there. When he checked the cash counter, he found that 480 tickets were sold and Rs 134500 was collected.
(i) Let the number of children visited the park be $x$ and number of adults be $y$. Which of the following is the correct system of equation that model the problem?
(a) $x+y=480$ and $3 x+8 y=2690$
(b) $x+2 y=480$ and $3 x+4 y=2690$
(c) $x+y=480$ and $3 x+4 y=2690$
(d) $x+2 y=480$ and $3 x+8 y=2690$
(ii) How many children attended the park on that day?
(a) 250
(b) 500
(c) 230
(d) 460
(iii) How many adults attended the park on that day?
(a) 250
(b) 500
(c) 230
(d) 460
(iv) How much amount will be collected if 300 children and 350 adults attended the park?
(a) 225400
(b) 154000
(c) 112500
(d) 185000
(12)

## A 100 m Race was organized in a school sports meet. The time was recorded with the help of a stopwatch.



A table shown below describes the time in which the race was finisned by 40 students.

| Time (sec) | $0-20$ | $20-40$ | $40-60$ | $60-80$ | $80-100$ |
| :--- | :---: | :---: | :---: | :---: | :---: |
| No. of students | 6 | 13 | 10 | $p$ | 8 |

Based on the above data answer the questions :
(i) What will be the value of $p$ ?
(a) 4
(b) 3
(c) 2
(d) 6
(ii) The average time taken by the student to finish the race is
(a) 40
(b) 30
(c) 47
(d) 50
(iii) How many students finished the race in 1 minute 20 seconds?
(a) 40
(b) 32
(c) 29
(d) 19
(iv) What will be the sum of the lower limit of median class and upper limit of modal class?
(a) 120
(b) 100
(c) 80
(d) 60

## SECTION - D

(13) (i) Find $A$ and $B$, if $\sin (A+2 B)=\sqrt{3} / 2$ and $\cos (A+4 B)=0$, where $A$ and $B$ are acute angles.
(ii) Prove $\sqrt{\operatorname{cosec}^{2} x+\sec ^{2} x}=\tan x+\cot x$
(14) The line joining the points $(2,-1)$ and $(5,14)$ is trisected by the points $P$ and $Q$. If the point P lies on the line $3 \mathrm{x}-2 \mathrm{y}+k=0$, find the value of $k$.
(15) $A B C$ is a triangle in which $P$ and $Q$ are points on $A B$ and $A C$ such that $P Q \| B C$ and it divides $\triangle A B C$ into two parts of equal areas. Find the ratio of $B P / A B$.

