SATLUJ PUBLIC SCHOOL

PRE-BOARD 2 (JANUARY 2023)

Set-B

STANDARD MATHEMATICS (X)

Time: 3 Hours

MM: 80

General Instructions:

(i) This Question Paper has 5 Sections A-E. Section A has 20 MCQs carrying 1 mark each. Section B has 5 questions carrying 02 marks each. Section C has 6 questions carrying 03 marks each. Section D has 4 questions carrying 05 marks each. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

(ii) All Questions are compulsory. However, internal choices have been provided.

(iii) Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION -A

1. Given that $\sin A = \frac{1}{2}$ and $\cos B = 1/\sqrt{2}$, then the value of A+B is:
(a) 30° (b) 45° (c) 75° (d) 15°

2. In the relation between mean, mode and median.
Mode+ 2 Mean=
(a) 3 Median (b) 4 Median (c) 2 Median (d) 5 Median

3. HCF(120,225)=15, then LCM of 120 and 225 is :
(a) 60 (b) 450 (c) 1200 (d) 1800

4. The value of k for which the equation $4x^2+kx+9=0$ has equal roots, is:
(a) -12 (b) +12 (c) ±12 (d) ±10

5. $\Delta ABC \sim \Delta PQR$, such that 2AB=DE and BC= 8cm, then EF=:
(a) 12cm (b) 4 cm (c) 16 cm (d) 8 cm

6. For the following distribution:

Classes	0-5	6-11	12-17	18-23	24-29
Frequencies	13	10	15	8	11

The upper limit of the median classes is:
(a) 17 (b) 17.5 (c) 18 (d) 18.5

7. Volume of two spheres are in the ratio 64:27. The ratio of their surface areas is:
(a) 3:4 (b) 4:3 (c) 9:16 (d) 16:9

8. If the perimeter of a semicircular protractor is 36 cm, then it's diameter is:
(a) 10 cm (b) 12 cm (c) 14 cm (d) 15 cm

9. In a throw of a pair of dice, what is the probability of getting a doublet?
(a) 1/6 (b) 7/36 (c) 11/36 (d) 13/36

10. Find the value of m for which the system of equations 2x+4y=5 and 5x+ my=9 are inconsistent
(a) -10 (b) 11 (c) -11 (d) 10

11. Total surface area of a cube is 216 cm^2, its volume is:
(a)216 cm^3 (b)144cm^3 (c)196cm^3 (d)212 cm^3

12. If two solid hemispheres of same base radius r are joined together along their bases, then curved surface area of this new solid is :
(a) $4\pi r^2$ (b) $6\pi r^2$ (c) $3\pi r^2$ (d) $8\pi r^2$

13. If a pair of linear equation is inconsistent, then the lines will be :
(a) parallel (b) always coincident
(c) intersecting or coincident (d) always interesting

14. The sum of first five multiples of 3 is :
(a) 45 (b) 65 (c) 75 (d) 90

15. The distance between the points (0,5) and (-5,0) is :
(a) 5 units (b) $5\sqrt{2}$ units (c) $2\sqrt{5}$ units (d) 10 units

16. The ratio of LCM and HCF of the least composite and the least prime number is :
(a) 1:2 (b) 2:1 (c) 1:1 (d) 1:3

17. A quadratic polynomial, whose zeroes are -3 and 4, is
(a) x^2-x+12 (b) x^2+x+12 (c) $x^2/2-x/2-6$ (d) $2x^2+2x-24$

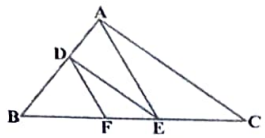
18. The value of $(11/\cot^2\theta - 11/\cos^2\theta)$ is:
(a) 11 (b) 0 (c) 1/11 (d) -11

19. Statement A (assertion): If the circumference of two circles are in the ratio of 3:4 then the ratio of their areas is 9:16.
Statement R (Reason): The area and circumference of a circle of radius r is respectively πr^2 and $2\pi r$.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

20. Statement A (assertion):If 12k and 15k are respectively the mode and mean of a data, then 14k is the median.
Statement R (Reason): Emperical relationship between mean, median and mode is
Mode= 3 Median-2 Mean.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

SECTION B

21. If DE ll AC and DF IIAE. Prove that BF/FE=BE/EC.



OR

S and T are point on sides PR and QR of ΔPQR such that ∠P = ∠RTS. Show that ΔRPQ ~ ΔRTS.

22 If 217x+131y=913, 131x+217y=827 then find the value of x and y.

23. Find the 11^{th}term from the last term of the AP: 10, 7, 4……,-62.

OR

If m^{th} term of an AP is 1/n and n^{th} term is 1/m, then show its $(mn)^{th}$ term is 1.

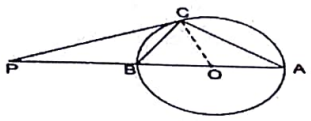
24. Evaluate
$2\tan^2 45° + \cos^2 30° - \sin^2 60°$.

25. The LCM of two numbers is 14 times of their HCF. The sum of LCM and HCF is 600. If one number is 280, then find the other number.

SECTION C

26. Given that$\sqrt{2}$is irrational, prove that $3+5\sqrt{2}$is irrational.

27. The tangent at a point C of a circle and a diameter AB when extended intersect at P. If ∠PCA=110°, find $\angle CBA$.



OR

Prove that the parallelogram circumscribing a circle is a rhombus.

If the zeroes of the polynomial x^2+px+q are double in value to the zeroes of the polynomial $2x^2-5x-3$, then find the value of p and q.

OR

Find the zeroes of the polynomial $6x^2-3-7x$ and verify the relationship between the zeroes and the coefficients.

29. Prove that $(\sin A+ \operatorname{cosec} A)^2+ (\cos A + \sec A)^2 = 7+\tan^2 A+ \cot^2 A$.

30. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household: Find Mode

Family-size	1-3	3-5	5-7	7-9	9-11
No. of families	7	8	2	2	1

31. Two coins are tossed simultaneously. What is the probability of getting
(i) both heads (ii) at least one heads (iii) a head and a tail.

SECTION D

32 Sushant has a vessel in the form of an inverted cone, open at the top, of height 11 cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of diameter 0.5 cm are put in the vessel due to which $2/5^{th}$ of the water in the vessel flows out. Find how many balls were put in the vessel.

OR

A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1m and 4 m respectively, and the slant height of the top is 2.8m, find the area of the canvas used for making the tent. Also, find

the cost of the canvas of the tent at the rate of Rs 500 per m^2.

33 Show that the points (1,7), (4,2), (-1,-1) and (-4,4) are the vertices of a square.

34. If the mean of the following frequency distribution is 91, find the missing frequency x and y.

Class Interval	0-30	30-60	60-90	90-120	120-150	150-180	Total
Frequency	12	21	x	52	y	11	150

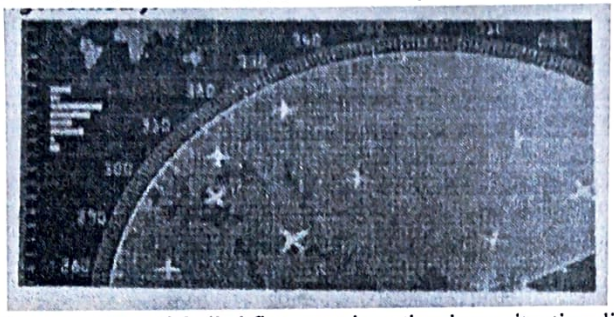
35. A plane left 30 minutes late than it's scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by 100 km/hr from the usual speed. Find its usual speed.

OR

A motor boat whose speed is 18 km/ h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

SECTION E

36. Air Traffic Control (ATC) is a service provided by ground based air traffic controllers who direct aircraft on the ground and through a given section of controlled airspace, and can provide advisory services to aircraft in non- controlled airspace, all this air traffic is managed and regulated by using various concepts based on coordinate geometry and trigonometry.
At a given instance, ATC finds that the angle of elevation of an airplane from a point on the ground is 60°. After a flight of 30 seconds, it is observed that the angle of elevation changes to 30°. The height of the plane remains constantly as $3000\sqrt{3}$m.
Use the above information to answer the questions given below:



(i) Draw a labelled figure to show the above situation diagrammatically.

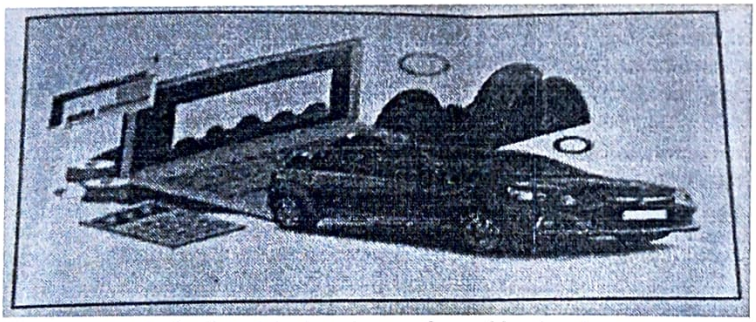
(ii) What is the distance travelled by the plane in 30 seconds.

Or

Keeping the height constant, during the above flight, it was observed that after $15(\sqrt{3}-1)$ seconds the angle of elevation changed to 45°. How much is the distance travelled in that duration.

(iii) What is the speed of the plane in km/h ?

37. Rajeev wants to buy an electric car and plans to take loan from a bank for her electric car. She repays her total loan of Rs 3,21,600 by paying every month starting with the first instalment of Rs 2,000 and it increases the instalments by Rs 200 every month.
Use the above information to solve the following questions:



(i) what is the list of the instalments formed by the given statement ?

(ii) What is the amount paid him in 25^{th} instalment ?

(iii) What is the difference of the amount in 4^{th} and 6^{th} instalmentpaid by Rajeev ?

OR

In how many instalment, he clear his total bank loan and what is the sum of the first seven instalments ?

38. Sunny goes to a store to purchase juice cartons for his shop. The shop has 80 cartons of Litchi juice, 90 cartons of pineapple juice, 38 cartons of mango juice and 42 cartons of banana juice. Each cartons has 10 tetra pack and Sunny chooses a carton at random.

Use the above information to solve the following question:

(i) What is the probability that the selected carton is of pineapple juice ?

(ii) What is the probability that selected carton is of banana juice ?

(iii) Sunny buys 4 cartons of pineapple juice, 3 cartons of litchi juice and 3 cartons of banana juice. A customer comes to Sunny's shop and picks a tetra pack of juice at random. What is the probability that the customer picks a banana juice

OR

If Sunny bought 10 cartons (i.e. 4 pineapple, 3 litchi and 3 banana cartons)from the store and the storekeeper bought 14 more cartons of pineapple juice, then what is the probability oh selecting a tetra pack of pineapple from the store?