SAMPLE QUESTION MATHEMATICS
Class: X

Time : 3 1/4 hrs
Marks :80

General Instructions

1. All questions are compulsory

2. The question paper consists of 25 questions divided in to three sections A, B and C .Section A

contains 7 questions of 2 marks each .Section B is of 12 Questions of 3 marks each and section

C of 6 Questions of 5 marks each

3. There is no overall choice .However ,internal choice has been provided in two

questions of two   marks each, two questions of three marks each, two questions of five marks each

4. In question on construction ,drawing should be neat exactly as per the given measurements.

5. Use of calculators is not permitted.

1. If $3x + 7y = 14$, express y in terms of x: Check whether (3, -2) is the point on the given line.

    OR

    Solve for x and y : $ax + by = a - b$, $bx - ay = a + b$

2. Simplify $(x - 2)(x + 2)(x^2 + 4)(x^4 + 16)$.

3. The sum of first n even natural number is given by the relation $S = n(n + 1)$ Find n, if the sum is 420.

4. A tangent to a circle of radius 3 cm from an external point P is of length 4 cm. Find the distance of P from the nearest point of the circumference

5. The probability of India winning the match is 5 times its loosing it. Find its probability of winning the match.

6. In the adjoining figure. PQTS is a cyclic quadrilateral and O is the centre of the circle. Find . $\angle RTQ$ and $\angle RQT$

7. The LCM and GCD of two polynomials, P(x) and Q(x) are $56(x^4 + x)$ and $4(x^2 - x + 1)$ respectively. If $P(x) = 28(x^3 + 1)$, find Q(x).

8. Find the value of each of the following :

$$\frac{5\sin 17^0}{\cos 73^0} + \frac{2\cos 31^0}{\sin 59^0} - \frac{7\sin 80^0}{\cos 10^0}$$

OR

If $x = p \sec \theta + q \tan \theta$, $y = p \tan \theta + q \sec \theta$, then prove that $x^2 - y^2 = p^2 - q^2$

9. A part of monthly hostel charges are fixed and the remaining depend on the number of days one has taken food in the mess. When a student A takes food for 20 days, he has to pay Rs 1000 as hostel charges whereas a student B, who takes food for 26 days pays Rs 1180 as hostel charges. Find the fixed charge and the cost of food per day.

10. Draw a circle of diameter 12cm. From a point P, 10cm away from its centre, construct a pair of tangent to the circle. Measure the lengths of the tangent segments.

11. Using remainder theorem, find the value of a if the division of x³ +5 x² -ax +6 by (x -1) leaves the remainder 2 a.

12. In a △ABC, DE || BC. If AD = (4x- 3) cm, DB = (3x -1) cm, AE = (8x -7) cm and EC = (5x-3) cm, find the value of x.

13. Three numbers are in the ratio 1/15:1/10:1/6. If the sum of their squares is 152, find the numbers

OR

Peter bought a watch for Rs 70x and sold it for Rs (750 +2x) at a profit of x%. Find

the cost price of the watch.

14. Find the arithmetic progression of 6 terms if first term is 2/3 and the last is 22/3.

15. PQRS is a rhombus and the diagonals PR and SQ intersect at O. Prove that
OP² +OR² = PS² +SR² -SQ²/2

16. A cone and a hemisphere have equal bases and equal volumes. Find the ratio of their heights.

17. In a single throw of 2 dice, what is the probability of
(a) An odd number on one dice and 6 on the other
(b) A number greater than on each dice
(c) A total of 11
(d) Getting same number on either dice.

18. A is a point on the y axis whose ordinate is 5 and B is the point (3, 1). Calculate the length of AB.

19. Find the co-ordinates of the points of trisection of the line segment joining the points   (3, -3) and (6, 9).

20. A housing society charges for a flat Rs. 16,00,000 or Rs. 5,85,999 cash down payment and three equal half yearly installments. If the society charged 16% p.a. compounded half yearly, calculate the value of each installment and the total interest charged.

21. A 7m long flagstaff is fixed on the top of a tower on the horizontal plane. From a point on the ground, the angles of elevation of the top and bottom of the flagstaff are 60^0 and 45^0 respectively. Find the height of the tower correct to one place of decimal.

       OR

The angle of elevation of a cloud from a point 200m above the lake is 30^0 and the angle of depression of the reflection of the cloud in the lake is 60^0. Find the height of the cloud.

22. State and prove Pythagoras theorem

        OR

State and prove basic proportionality theorem.

23. The pie-chart, as shown in the figure, represents the amount spent on different sports by a sports club in a year
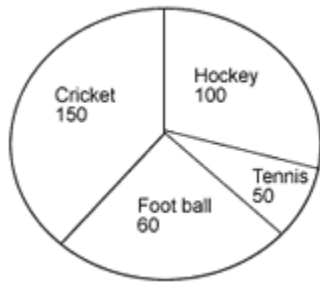
a) If the total money spent by the club on cricket is Rs. 1,18,000, find the amount spent on each sport .and find the total budget.
b) Draw a pie chart if there is increase of Rs.10,.000 in each sport

                                OR

The mean of the following frequency distribution is 97.3 and the sum of the observation is 120. Find the missing frequency f_1 and f_2.

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	17	f_1	19	f_2	18	22

24. A bucket of height 8cm and made up of copper sheet is in the form of frustum of a right circular cone with radii of its lower and upper ends as 3cm and 9cm respectively. Calculate:
(i) The height of the cone of which the bucket is a part
(ii) The volume of water which can be filled in the bucket.
(iii) The area of copper sheet required to make the bucket.

25. The annual income of NEEMA (aged 35 years) is Rs. 4,70,000 (exclusive of HRA). She contributes Rs.8,000 per month towards provident fund and pays an

annual premium of Rs. 19,000 towards her LIC policy. She pays.Rs. 4,500 per month as income tax for the income tax payable by her in the last month of the year.

Use the following for calculating income tax

    i) Savings upto 1,00,000 are exempted from income tax

    ii) Rates of income tax

Slab	Rate
a)Taxable income up to 1,35,000	No tax
b)Taxable income from Rs 1,35,001 to amount exceeding 1,50,000	10% of the Rs 1,35,000
c) Taxable income from Rs 1,50,001 1,500+20% of the amount 2,50,000 1,50,000	Rs exceeding Rs
d) Taxable income above Rs 2,50,000 21,500+30% of the amount	Rs