CLASS X (2019-20)
MATHEMATICS STANDARD(041)
SAMPLE PAPER-8

Time : 3 Hours **Maximum Marks : 80**

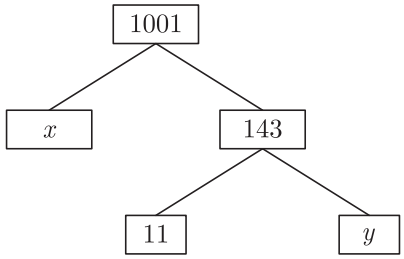
General Instructions :

(i) All questions are compulsory.
(ii) The questions paper consists of 40 questions divided into 4 sections A, B, C and D.
(iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
(iv) There is no overall choice. However, an internal choices have been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

Q1. The values of x and y is the given figure are [1]



(a) 7, 13 (b) 13, 7
(c) 9, 12 (d) 12, 9

Q2. If the sum of the zeroes of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is [1]
(a) 2 (b) -2
(c) 4 (d) -4

Q3. If $3x + 4y : x + 2y = 9 : 4$, then $3x + 5y : 3x - y$ is equal to [1]
(a) 4 : 1 (b) 1 : 4
(c) 7 : 1 (d) 1 : 7

Q4. The quadratic equation $2x^2 - \sqrt{5}\,x + 1 = 0$ has [1]
(a) two distinct real roots
(b) two equal real roots
(c) no real roots
(d) more than 2 real roots

Q5. There are 60 terms is an A.P. of which the first term is 8 and the last term is 185. The 31^{st} term is [1]
(a) 56 (b) 94
(c) 85 (d) 98

Q6. The point on the X-axis which if equidistant from the points $A(-2, 3)$ and $B(5, 4)$ is [1]
(a) (0, 2) (b) (2, 0)
(c) (3, 0) (d) $(-2, 0)$

Q7. The height of a tree, if it casts a shadow 15 m long on the level of ground, when the angle of elevation of the sun is 45°, is [1]

(a) 10 m (b) 14 m
(c) 8 m (d) 15 m

Q8. Volume of a spherical shell is given by [1]
(a) $4\pi(R^2 - r^2)$ (b) $\pi(R^3 - r^3)$
(c) $4\pi(R^3 - r^3)$ (d) $\frac{4}{3}\pi(R^3 - r^3)$

Q9. The mean of discrete observations y_1, y_2 ..... y_n is given by [1]
(a) $\frac{\sum_{i=1}^{n} y_i}{n}$ (b) $\frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} i}$
(c) $\frac{\sum_{i=1}^{n} y_i f_i}{n}$ (d) $\frac{\sum_{i=1}^{n} y_i f_i}{\sum_{i=1}^{n} f_i}$

Q10. A single letter is selected at random from the word "PROBABILITY". The probability that the selected letter is a vowel is [1]
(a) $\frac{2}{11}$ (b) $\frac{3}{11}$
(c) $\frac{4}{11}$ (d) 0

(Q.11-Q.15) Fill in the blanks.

Q11. Two polygons of the same number of sides are similar, if all the corresponding angles are ..... [1]

Q12. Points (1, 5), (2, 3) and $(-2, -11)$ are ..... [1]

OR

The value of the expression $\sqrt{x^2 + y^2}$ is the distance of the point $P(x, y)$ from the .....

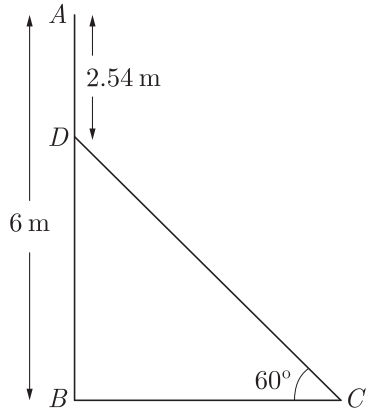
Q13. The value of $\sin A$ or $\cos A$ never exceeds ..... [1]

Q14. Tangent is perpendicular to the ..... through the point of contact. [1]

Q15. Two circles are drawn with same centre then the ..... circle have bigger radius. [1]

(Q.16-Q.20) Answer the following

Q16. In the given figure, AB is a 6 m high pole and DC is a ladder inclined at an angle of 60° to the horizontal and reaches up to point D of pole. If $AD = 2.54$ m, find the length of ladder. (use $\sqrt{3} = 1.73$) [1]



Q17. If the circumferences of two concentric circles forming a ring are 88 cm and 66 cm respectively. Find the width of the ring. [1]

Q18. Volume of two spheres are in the ratio $64 : 27$, find the ratio of their surface areas. [1]

OR

Find the volume (in cm^3) of the largest right circular cone that can be cut off from a cube of edge 4.2 cm.

Q19. Following distribution gives cumulative frequencies of 'more than type' : [1]

Marks obtained	**Marks obtained 5**	**More than of equal to 10**	**More than or equal to 15**	**More than of equal to 20**
Number of student (cummulative frequency)	30	23	8	2

Change the above data to a continuous grouped frequency distribution.

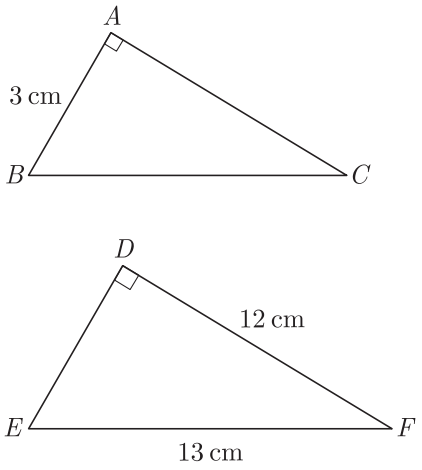
Q20. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting neither a red card nor a queen. [1]

SECTION B

Q21. Find the HCF and LCM of 90 and 144 by the method of prime factorization. [2]

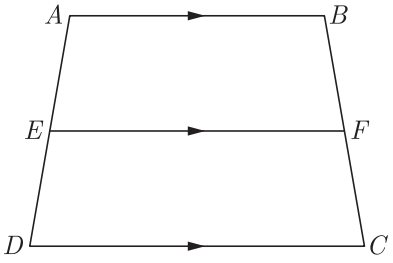
Q22. Find the roots of the quadratic equation $\sqrt{3}\,x^2 - 2x - \sqrt{3}$. [2]

Q23. Given $\Delta\, ABC \sim \Delta\, DEF$, find $\frac{\Delta\, ABC}{\Delta\, DEF}$ [2]



OR

In the given figure, if $ABCD$ is a trapezium in which $AB \,||\, CD \,||\, EF$, then prove that $\frac{AE}{ED} = \frac{BF}{FC}$



Q24. There are two small boxes A and B. In A, there are 9 white beads and 8 black beads. In B, there are 7 white and 8 black beads. We want to take a bead from a box. [2]

(a) What is the probability of getting a white bead from a box?

(b) A white bead and a black bead are added to box B and then a bead is taken from it. What is the probability of getting a white bead from it ?

Q25. Find the value of λ, if the mode of the following data is 20 :
15, 20, 25, 18, 13, 15, 25, 15, 18, 17, 20, 25, 20, λ, 18. [2]

OR

Find the unknown values in the following table :

Class Interval	Frequency	Cumulative Frequency
0-10	5	5
10-20	7	x_1
20-30	x_2	18
30-40	5	x_3
40-50	x_4	30

Q26. Two ships are approaching a light-house from opposite directions. The angle of depression of two ships from top of the light-house are 30º and 45°. If the distance between two ships is 100 m, find the height of light-house. [2]

SECTION C

Q27. Use Euclid division lemma to show that the square of any positive integer cannot be of the form $5m+2$ or $5m+3$ for some integer m. [3]

OR

Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time will they next toll together?

Q28. Solve for x : $\frac{1}{x}+\frac{2}{2x-3}=\frac{1}{x-2}, x \neq 0, \frac{2}{3}, 2$. [3]

Q29. Determine an A.P. whose third term is 9 and when fifth term is subtracted from 8^{th} term, we get 6. [3]

OR

If 7^{th} term of an A.P. is $\frac{1}{9}$ and 9^{th} term is $\frac{1}{7}$, find 63^{rd} term.

Q30. In $\Delta ABD, AB = AC$. If the interior circle of ΔABC touches the sides AB, BC and CA at D, E and F respectively. Prove that E bisects BC. [3]

Q31. Roja, Renu and Reena are three friends. They decided to sweep a circular park near their homes. They divided the park into three parts by two equal chords AB and AC for convenience. [3]
(i) Prove that the centre of the park lies on the angle bisector of $\angle BAC$.
(ii) Which mathematical concept is used in the above problem?

Q32. An aeroplane, when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60º and 45º respectively. Find the vertical distance between the aeroplanes at that instant. (Use $\sqrt{3}$ = 1.73) [3]

OR

Two men on either side of a 75 m high building and in line with base of building observe the angles of elevation of the top of the building as 30º and 60º. find the distance between the two men. (Use $\sqrt{3}$ = 1.73)

Q33. A tent is in the shape of cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of Rs.500 per square meter. Use $\pi = \frac{22}{7}$ [3]

Q34. A circular sheet of radius 18 centimetre is divided into 9 equal sectors. [3]
(a) Find the measure of the central angle of a sector.
(b) Find the slant height of a cone which can be made by a sector.
(c) Find the lateral surface area of the cone thus formed.

SECTION D

Q35. Find the other zeroes of the polynomial $x^4-5x^3+2x^2+10x-8$ if it is given that two zeroes are $-\sqrt{2}$ and $\sqrt{2}$. [4]

OR

Find all the zeros of the polynomial $3x^4+6x^3-2x^2-10x-5$ it two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$

Q36. Solve the following pairs of linear equations by elimination method. [4]

(a) $x+y=5$ and $2x-3y=4$

(b) $3x+4y=10$ and $2x-2y=2$

(c) $3x-5y-4=0$ and $9x=2y+7$

Q37. In ΔABC, the mid-points of sides BC, CA and AB are D, E and F respectively. Find ratio of $ar(\Delta DEF)$ to $ar(\Delta ABC.)$ [4]

OR

In $\Delta ABC, AD$ is the median to BC and in $\Delta PQR, PM$ is the median to QR. If $\frac{AB}{PQ}=\frac{BC}{QR}=\frac{AD}{PM}$. Prove that $\Delta ABC\sim\Delta PQR$. Prove that $\Delta ABC\sim\Delta PQR$.

Q38. Given that $\tan(A+B)=\frac{\tan A+\tan B}{1-\tan A\tan B}$,
find the values of $\tan 75^{\circ}$ and $\tan 90^{\circ}$ by taking suitable values of A and B. [4]

OR

In an acute angled triangle ABC, if $\sin(A+B-C)=\frac{1}{2}$ and $\cos(B+C-A)=\frac{1}{\sqrt{2}}$, find $\angle A, \angle B$ and $\angle C$.

Q39. Find the area of a quadrilateral $ABCD$, the co-ordinates of whose vertices are $A(-3,2), B(5,4), C(7,-6)$ and $D(-5,-4)$. [4]

Q40. Four equal circles are described at the four corners of a square so that each touches two of the others. The shaded area enclosed between the circle is $\frac{24}{7}$ cm2. Find the radius of each circle. [4]