NEW HORIZON GURUKUL

PREBOARD I / PERIODIC TEST III 2019-20

MARKS: 80

TIME: 3 HOURS

CLASS: X

SUBJECT: MATHEMATICS

General Instructions:

(i)   All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into four 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 choice has 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.

1. $n^2 - 1$ is divisible by 8, if n is
   (a) an integer
   (b) a natural number
   (c) an odd integer
   (d) an even integer

2. Which among the following is not a measure of central tendency?
   (a) Range   (b) Mean   (c) Median   (d) Mode

3. If the HCF of two numbers is 18, which among the following can be their LCM?
   (a) 380   (b) 180   (c) 280   (d) all the above

4. The 50 coins in Sid's piggy bank amounted to ₹75. If a coin was either ₹1 or ₹2, what is the respective number of coins of each type Sid had?
   (a) 35, 15   (b) 35, 20   (c) 15, 35   (d) 25, 25

5. What is the value of $\tan^3 60° - 2\sin 60°$?
   (a) $\sqrt{3}$ (b) $\sqrt{3}/2$ (c) $2\sqrt{3}$ (d) 0

6. For what value of θ is $2\sin^2\theta = 2 + \cos^2\theta$?
   (a) 0°   (b) 30°   (c) 90°   (d) none of the above

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7. Which among the following statements is not true?

   (a) If the length of the shadow of a tower is increasing, then the angle of elevation of the sun is also increasing.

   (b) If the height of a tower and the distance of the point of observation from its foot, both are increased by 10%, then the angle of elevation of its top remain unchanged.

   (c) $\sec A = \frac{4}{3}$ for some value of angle A

   (d) $\sin A = \frac{1}{\sqrt{\cot^2 A + 1}}$ for some angle A

8. The distance between the X axis and (-2, 3) is

   (a) 3 units   (b) 2 units   (c) -3 units   (d) -2 units

9. For what value of k are the points (1, 1), (3, k) and (-1, 4) collinear?

   (a) 2   (b) ½   (c) -2   (d) - ½

10. The abscissa of the centroid of a triangle whose vertices are (7, 5), (9, 10) and (2, -6) is

   (a) 18   (b) 9   (c) 3   (d) 6

Q 11 - Q 15: Fill in the blanks.

11. If the ratio of the volumes of two spheres is 1:8, the ratio of their surface areas is _____.

12. The zeroes of $x^2 - x - 6$ are _____ and _____.

13. If $\triangle ABC \sim \triangle PQR$ with $3BC = QR$ and $ar(\triangle ABC) = 10$ cm^2, then $ar(\triangle PQR) =$ _____.

14. The next term of the AP $\sqrt{8}$, $\sqrt{18}$, $\sqrt{32}$, ... is _____.

OR

If the common difference of an AP is 6, then $a_{18} - a_{14}$ is _____.

15. When two dice are thrown at the same time, the probability of getting a doublet is _____.

Q 16 - Q 20: Answer the following.

16. Express 3060 as a product of its prime factors.

17. ABC is an isosceles triangle, right angled at C. If AC = 3 cm, find the length of AB.

18. PQ is a common tangent to the circles which touch externally at C. If PR = 7.2 cm, find the length of PQ.
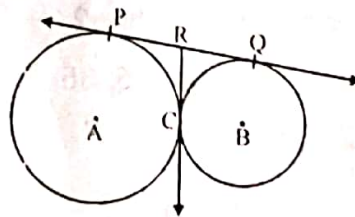
OR

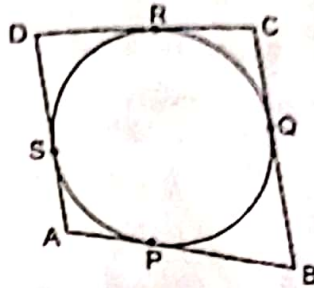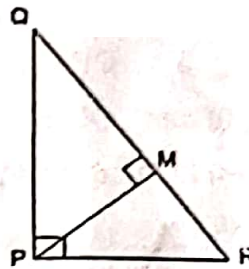PQ and PR are two tangents drawn from a point P to the circle with center O. If ∠QPR is 40°, find reflex ∠QOR.

19. Find the value of k for which $k - 1, 2k, 7 + k$ are in AP.

20. What is the sum of odd natural numbers till 35?

21. How many terms of the AP $9, 17, 25, \ldots$ must be taken to give a sum of 636?

22. A quadrilateral ABCD circumscribes a circle. Prove that $AB + CD = AD + BC$.

23. In $\triangle PQR$, prove that $\dfrac{PQ^2}{PR^2} = \dfrac{QM}{RM}$.

OR

A 15 m high tower casts a shadow 24 m long at certain time of a day and at the same time, a telephone pole casts a shadow 16 m long. Find the height of the telephone pole.

24. An airplane is flying 20 km above the ground. The angle of depression to the nearest airport is $30°$. How far should the airplane fly to reach the airport? Give the answer in nearest kilometres.

25. Ram Prakash got ₹ 36000 as Diwali bonus. He donated ₹ 2000 to an orphanage, gave ₹ 12000 to his wife, ₹ 3000 to his servant and remaining was saved for his children. What is the probability of his children's share?

OR

What is the probability that a randomly selected leap year has 53 Tuesdays and 53 Wednesdays?

26. How many liters of milk can a container of height 16 cm, made of metal sheet in the form of frustum of a cone with radii 8 cm and 20 cm, hold? (Use $\pi = 3.14$)

SECTION C

27. Find the largest number which on dividing 1251, 9377 and 15628 leaves remainders 1, 2 and 3 respectively.

28. Find the sum of the two middle most terms of the AP $-\frac{4}{3}, -1, -\frac{2}{3}, \ldots 4\frac{1}{3}$.

OR

A thief runs with a uniform speed of 100m/minute. After one minute, a policeman runs after the thief to catch him. He goes with a speed of 100m/minute for a minute and then increases his speed by 10m/minute every succeeding minute. After how many minutes will the policeman catch the thief?

29. Solve: $\frac{7x-2y}{xy} = 5$; $\frac{8x+7y}{xy} = 15$

30. The zeroes of the polynomial $x^3 - 12x^2 + 39x - 28$ are in AP. Find them.

31. Find the ratio in which the join of A(3, -3) and B(-2, 7) is divided by the x – axis. Also, find the coordinates of the point of division.

OR

The points A(4,-2), B(7, 2), C(0, 9) and D(-3, 5) form a parallelogram. Find the length of the altitude of the parallelogram drawn to the base AB.

32. Prove: $\frac{(1+\cot\theta+\tan\theta)(\sin\theta-\cos\theta)}{(\sec^3\theta-\csc^3\theta)} = \sin^2\theta\cos^2\theta$

33. A chord of a circle of radius 21 cm subtends an angle 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\sqrt{3} = 1.73$)

OR

Three horses are tied at the corners of a triangular field, each with a rope 14 m long. Find the area that can be grazed by the horses.

34. Find the values of the frequencies x and y in the following distribution, if the median is 32.

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 – 60	Total
No. of students	10	x	25	30	y	10	100

SECTION D

35. Construct an isosceles triangle of base 12 cm and altitude drawn to it 9 cm. Then construct another triangle whose sides are $\frac{3}{5}$ of its corresponding sides of the given triangle.

OR

Construct the tangents to a circle of radius 3.5 cm that are inclined to each other at 75°. Measure their lengths.

36. Prove that the areas of two similar triangles are proportional to the squares of their corresponding altitudes.

37. Divide 56 into four parts which are in AP such that the ratio of product of extremes to the product of means is 5:6.
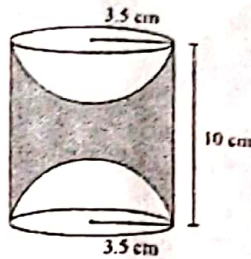
OR

Find the value of p for which the equation $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$ has equal roots. Also, find the roots.

38. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How many hectares of land will it irrigate in 30 minutes, if 8 cm of standing water is needed?

OR

A wooden article is made by scooping out a hemisphere from each end of a solid cylinder.

3.5 cm

10 cm

3.5 cm

If the height of the cylinder is 10 cm and its base radius is 3.5 cm, find the

i. Total surface area of the article

ii. Weight of the article, if the density of wood is 1.2 g/cm³

39. The angle of elevation of the top of an unfinished tower at a distance of 75 m from its base is 30°. How much higher should the tower be raised so that the angle of elevation of its top at the same point may be 60°?

40. Find the mean and the modal marks of the students from the distribution given below:

Marks	Number of Students
Below 10	5
Below 20	9
Below 30	17
Below 40	29
Below 50	45
Below 60	60
Below 70	70
Below 80	78
Below 90	83
Below 100	85