Mathematics Class 10 Board Sample paper-2

Time allowed: 3 hours Maximum Marks: 80

General Instructions:
a) All questions are compulsory.
b) The question paper consists of 30 questions divided into four sections – A, B, C and D.
c) Section A contains 6 questions of 1 mark each which are multiple choice questions, Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 8 questions of 4 marks each.
d) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You must attempt only one of the alternatives in all such questions
e) Use of calculator is not permitted.

Section A

1. The nth term of an A. P. is 6n + 11. Find the common difference?

2. Three solid of diameters 6 cm, 8 cm and 10 cm are melted to form a single solid sphere. The diameter of the new sphere is
(a) 6cm
(b) 4.5cm
(c) 3cm
(d) 12cm

3. If P(A) = 0.11, what is the probability of 'not A'

4. The areas of two similar triangles ABC and PQR are in the ratio 9 : 16. If BC = 4.5 cm, find the length of QR.

5. Write whether the rational number 7/75 will have a terminating decimal expansion or a nor-terminating repeating decimal expansion.

6. Please check if the below equation has a unique solution
ax+by=a-b
bx-ay=a+b

Section B

7. The length of a rectangle exceeds its width by 8 cm and the area of the rectangle is 240 sq. cm. Find the dimensions of the rectangle

8. Find the sum of the first 23 terms of the AP 7, 21/2, 14…………?

9. A box contains cards numbered 11 to 123. A card is drawn at random from the box. Find the probability that the number on the drawn card is (i) a square number (ii) a multiple of 7

10. Two circles touch externally. The sum of their areas is $130\,\pi$ cm^2 and the distance between their centers is 14cm. Find the radii of the circles

11 If two positive integers p and q are written as p= a^2 b^3 and q =a^3 b. a, b are prime numbers, then verify: LCM (p, q) × HCF (p, q) = pq

12. If Sin A+ Sin^{2}A = 1, then find the value of (cos^{2}A+cos^{4}A).

Section C

13. For what values of p, the roots of the quadratic equation (p + 4) x^2 + (p+ 1) x + 1 = 0 are equal?

14. A rectangular courtyard is 18m 72 cm long and 13m 20cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles

15. Find the area of ABCD quadrilaterals whose coordinates are   A (-3,2) B (5,4) C (7, -6) and D (-5, -4)

16. From the top of a hill 200 m high, the angles of depression of the top and the bottom of a pillars are 30^0 and 60^0 respectively. Find the height of the pillar and its distance from the hill

17. In an AP, if Sn = 3n^2 + 5n and a_k = 164, find the value of k.

18. If points A (1,-2) B(2,3) C(p,2) and D(-4,-3) forms a parallelogram. Find the value of p and Height of the parallelogram with AB as base
Or
The opposite angular points of a square is (3,4) and (1.-1). Find the coordinates of the other angular points

19. Prove that

$$(1 + \cot \theta)(1 + \tan \theta + \sec \theta) = 2$$

Or
Prove that

$$\cot^4 A - 1 = \cosec^4 A - 2\cosec^2 A$$

20. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
Or

Draw a line segment AB of length 11 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle

21. A right triangle whose sides are 15cm and 20cm, is made to revolve about its hypotenuse. Find the volume and total surface area of the double cone so formed

22. In a quadrilateral ABCD, given that <A + <D = 90°. Prove that $AC^2 + BD^2 = AD^2 + BC^2$
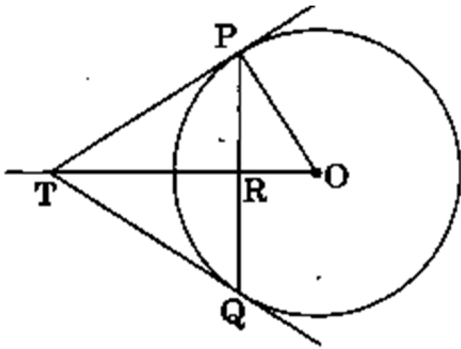
Section D
23. A train travels 360km at a uniform speed. If the speed had been 5km/hr more, it would have taken 1 hour less for the same journey. Find the speed of the train

Or
If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that
$c^2 = a^2 (1 + m^2)$

24. If the pth, q^{th} & r^{th} term of an AP is x, y and z respectively,
show that x(q-r) + y(r-p) + z(p-q) = 0

25. PQ is a chord of length 4.8 cm of a circle of diameter 6 cm. The tangent at P and Q intersect at point T as shown in below figure. Find the length of TP

26. Compute the Median for the given data

Class – interval	100-110	110-120	120-130	130-140	140-150	150-160
Frequency	6	35	48	72	100	4

27. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠ PTQ = 2∠ OPQ.

Or

Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
Using the above result, find the length of PQ, if a tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm.

28. A right circular cylinder volume 540π cm² is full of ice-cream. The ice-cream is to be filled in cones of height 12cm and radius 3 cm having a hemispherical shape on the top. Fin d the Number of such cones which can be filled with ice-cream

Or
A gulabjamun when completely ready for eating contains sugar syrup up to about 30% of its volume. Find approximately how many syrup would be found in 45 gulabjamun shaped like a cylinder with two hemisphere ends, if complete length of the gulabjamun us 5 cm and its radius is 2.4cm

29. The angle of elevation of the top of tower from point A due south of tower is α and from point B due east of tower is β. What is the height of the tower?

30. A die is thrown once. Find the probability of getting

(i) a prime number
(ii) a number lying between 1 and 6
(iii) an odd number.
iv) Odd number
v) Less than or equal to 6