PM SHRI KENDRIYA VIDYALAYA GACHIBOWLI,GPRA CAMPUS,HYD-32
SAMPLE PAPER TEST 11 FOR BOARD EXAM 2024

SUBJECT: MATHEMATICS **MAX. MARKS : 80**
CLASS : X **DURATION : 3 HRS**

General Instruction:

1. This Question Paper has 5 Sections A-E.
2. **Section A** has 20 MCQs carrying 1 mark each.
3. **Section B** has 5 questions carrying 02 marks each.
4. **Section C** has 6 questions carrying 03 marks each.
5. **Section D** has 4 questions carrying 05 marks each.
6. **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.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION – A
Questions 1 to 20 carry 1 mark each.

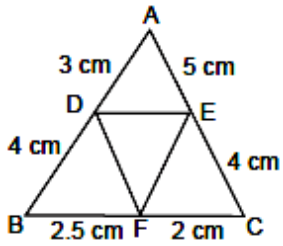
1. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is
(a) 1/5 (b) 3/5 (c) 4/5 (d) 1

2. If two positive integers p and q can be expressed as $p = ab^3$ and $q = a^3 b$; a, b being prime numbers, then HCF (p, q) is
(a) ab (b) $a^2 b^2$ (c) $a^3 b^2$ (d) $a^3 b^3$

3. If triangles ABC and DEF are similar and AB=4 cm, DE=6 cm, EF=9 cm and FD=12 cm, the perimeter of triangle ABC is:
(a) 22 cm (b) 20 cm (c) 21 cm (d) 18 cm

4. If r = 3 is a root of quadratic equation $kr^2 - kr - 3 = 0$, then the value of k is:
(a) 3/2 (b) 1/2 (c) 2 (d) 5/2

5. In the below figure, AD = 3 cm, AE = 5 cm, BD = 4 cm, CE = 4 cm, CF = 2 cm, BF = 2.5 cm, then
(a) DE || BC (b) DF || AC (c) EF || AB (d) none of these



6. If for some angle θ, $\cot 2\theta = \frac{1}{\sqrt{3}}$, then the value of cos3θ, where $3\theta \leq 90^o$, is

(a) $\frac{1}{\sqrt{2}}$ (b) 1 (c) 0 (d) $\frac{\sqrt{3}}{2}$

7. In ΔABC, right-angled at C, if tan A=1, then the value of 2sin A cos A is

(a) 1 (b) $\frac{1}{2}$ (c) 2 (d) $\frac{\sqrt{3}}{2}$

8. Volumes 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

9. The LCM of smallest two digit composite number and smallest composite number is:

(a) 12 (b) 4 (c) 20 (d) 44

10. Find the value of k so that the following system of equations has no solution:

$3x – y – 5 = 0$, $6x – 2y + k = 0$

(a) $k \neq 10$ (b) $k \neq -10$ (c) $k \neq 12$ (d) $k \neq -12$

11. The mean and median of a distribution are 14 and 15, respectively. The value of the mode is:

(a) 16 (b) 17 (c) 18 (d) 13

12. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then:

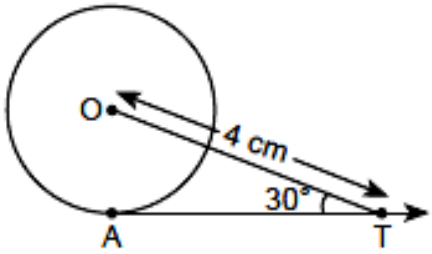
(a) $R_1 + R_2 = R$

(b) $R_1 + R_2 > R$

(c) $R_1 + R_2 < R$

(d) Nothing definite can be said about the relation among R_1, R_2 and R.

13. In figure AT is a tangent to the circle with centre O such that OT = 4 cm and OTA = 30°. Then AT is equal to



(a) 4 cm (b) 2 cm (c) $2\sqrt{3}$ cm (d) $4\sqrt{3}$ cm

14. Mode and mean of a data are 12k and 15k. Median of the data is

(a) 12k (b) 14k (c) 15k (d) 16k

15. $4 \tan^2 A – 4 \sec^2 A$ is equal to:

(a) 2 (b) 3 (c) 4 (d) –4

16. Which of the following equations has 2 as a root?

(a) $x^2 – 4x + 5 = 0$ (b) $x^2 + 3x – 12 = 0$

(c) $2x^2 – 7x + 6 = 0$ (d) $3x^2 – 6x – 2 = 0$

17. The radii of two concentric circles are 4 cm and 5 cm. The difference in the areas of these two circles is:

(a) π (b) 7π (c) 9π (d) 13π

18. If the distance between the points (x, –1) and (3, 2) is 5, then the value of x is

(a) –7 or –1 (b) –7 or 1 (c) 7 or 1 (d) 7 or –1

Direction : In the question number 19 & 20 , A statement of Assertion (A) is followed by a statement of Reason(R) . Choose the correct option

(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 but 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.

19. **Assertion (A):** The number 6^n, n being a natural number, ends with the digit 5.
Reason (R): The number 9^n cannot end with digit 0 for any natural number n.

20. **Assertion (A):** The point (3, 0) lies on x -axis.
Reason (R): The x co-ordinate on the point on y -axis is zero.

SECTION-B
Questions 21 to 25 carry 2M each

21. If $\sin(A + B) = 1$ and $\sin(A - B) = \frac{1}{2}$, $0 \le A + B \le 90°$ and $A > B$, then find A and B.

OR

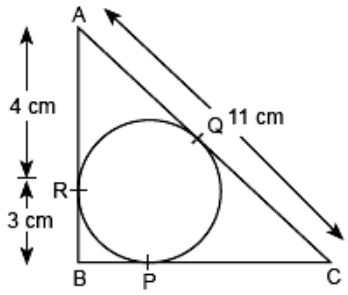
Prove that: $\frac{1+\tan^2 A}{1+\cot^2 A} = \tan^2 A$

22. The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. Find the area of the sector.

OR

If the perimeter of a semi-circular protractor is 108 cm, find the diameter of the protractor. (Take $\pi = 22/7$))

23. In the below figure, ΔABC is circumscribing a circle. Find the length of BC.



24. Determine the values of a and b for which the following system of linear equations has infinite solutions: $2x - (a - 4)y = 2b + 1$; $4x - (a - 1)y = 5b - 1$

25. In Δ ABC, DE || AB. If AD = 2x, DC = x + 3 , BE = $2x - 1$ and CE = x, then find the value of 'x'

SECTION-C
Questions 26 to 31 carry 3 marks each

26. A man wished to give Rs. 12 to each person and found that he fell short of Rs. 6 when he wanted to give to all the persons present. He, therefore, distributed Rs. 9 to each person and found that Rs. 9 were left over. How much money did he have and how many persons were there?

OR

A father's age is three times the sum of the ages of his children. After 5 years, his age will be two times the sum of their ages. Find the present age of the father.

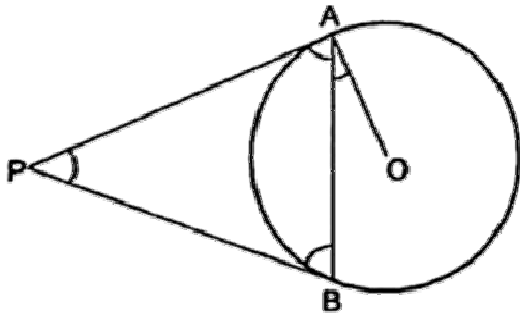
27. Prove that $\frac{\sin\theta - \cos\theta + 1}{\cos\theta + \sin\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

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

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

30. Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is
(i) not divisible by 3.
(ii) a prime number greater than 7.
(iii) not a perfect square number.

31. Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that $\angle APB = 2\angle OAB$.

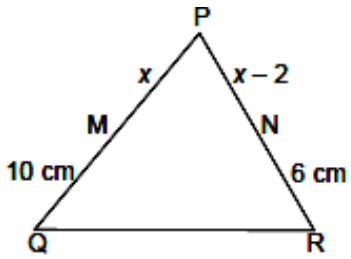


OR

Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

SECTION-D
Questions 32 to 35 carry 5M each

32. If a line is drawn parallel to one side of a triangle, prove that the other two sides are divided in the same ratio. Using this theorem, find x in below figure, if MN || QR, PM = x cm, MQ = 10 cm, PN = (x – 2) cm, NR = 6 cm



33. A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72 km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed?

OR

In a flight of 600 km, an aircraft was slowed due to bad weather. Its average speed for the trip was reduced by 200 km/hr and time of flight increased by 30 minutes. Find the original duration of flight.

34. If the median of the following distribution is 46, find the missing frequencies p and q if the total frequency is 230.

Marks	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	12	30	*p*	65	*q*	25	18

35. Rasheed got a playing top (lattu) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere (see below figure). The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the area he has to colour. (Take $\pi = 22/7$)

OR

A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volumes of the cylinder and the toy. (Take $\pi = 3.14$)

SECTION-E (Case Study Based Questions)
Questions 36 to 38 carry 4M each

36. India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year.

On the basis of the above information, answer any four of the following questions:

(i) What is the production of first year? (1)

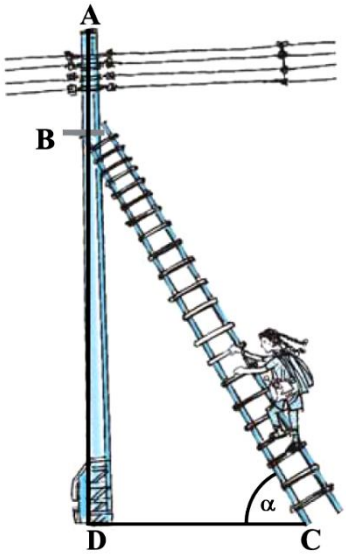
(ii) What is the production of 8th year? (1)

(iii) What is the production during first three years? (2)

OR

(iii) In which year, the production is 29,200? (2)

37. Raj is an electrician in a village. One day power was not there in entire village and villagers called Raj to repair the fault. After thorough inspection he found an electric fault in one of the electric pole of height 5 m and he has to repair it. He needs to reach a point 1.3m below the top of the pole to undertake the repair work.



Based on the above information answer the following questions.

(i) When the ladder is inclined at an angle of α such that $\sqrt{3}\tan\alpha + 2 = 5$ to the horizontal, find the angle α. (1)

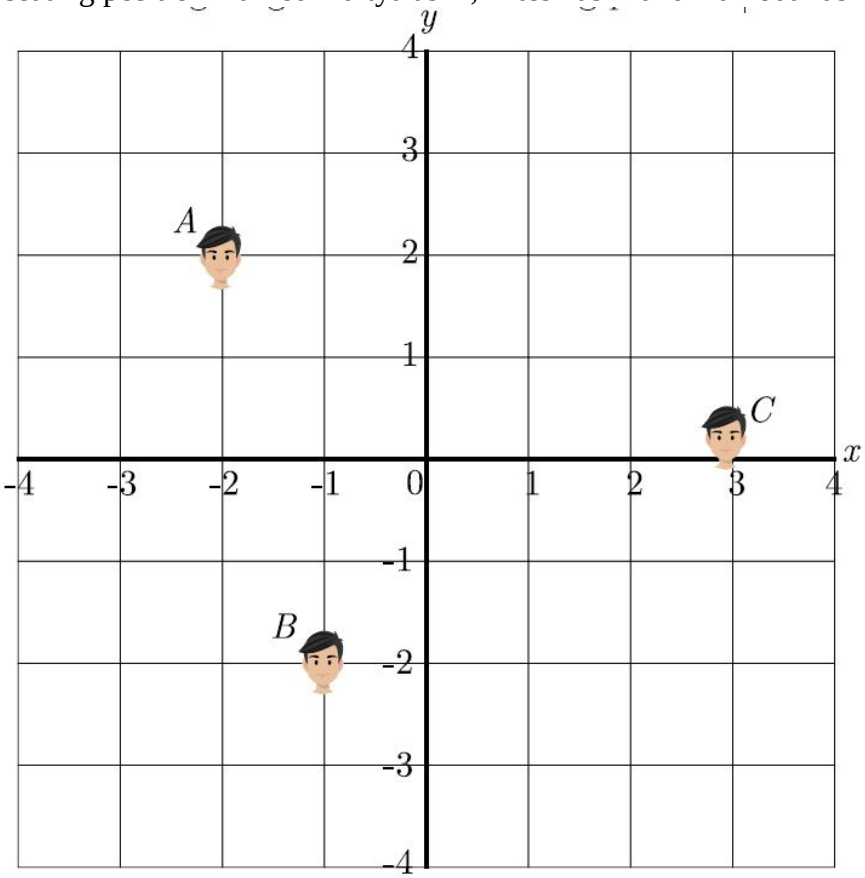
(ii) In the above situation if BD = 3 cm and BC = 6 cm. Find α (1)

(iii) How far from the foot of the pole should he place the foot of the ladder? (Use $\sqrt{3} = 1.73$) (2)

OR

(iii) Given $15\cot\alpha = 8$, find $\sin\alpha$. (2)

38. Aditya, Ritesh and Damodar are fast friend since childhood. They always want to sit in a row in the classroom . But teacher doesn't allow them and rotate the seats row-wise everyday. Ritesh is very good in maths and he does distance calculation everyday. He consider the centre of class as origin and marks their position on a paper in a co-ordinate system. One day Ritesh make the following diagram of their seating position marked Aditya as A, Ritesh as B and Damodar as C.



(i) What is the distance between A and B ? [1]

(ii) What is the distance between B and C ? [1]

(iii) A point D lies on the line segment between points A and B such that AD :DB = 4 : 3 . What are the the coordinates of point D ? [2]

OR

(iii) If the point P(k, 0) divides the line segment joining the points A(2, –2) and B(–7, 4) in the ratio 1 : 2, then find the value of k [2]