BUDHA DAL PUBLIC SCHOOL PATIALA
PRE BOARD EXAMINATION (8 January 2024)
Class – X
### Paper-Mathematics Basic

Time: 3hrs.

M.M. 80

General Instructions:
1. This Question Paper has 5 Sections A, B, C, D and 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.

Section-A

1. Let a and b be two positive integers such t hat $a = p^3q^4$ and $b = p^2q^3$ where p and q are prime numbers. If HCF (a, b) = p^mq^n and LCM (a, b) = p^rq^s then $(m + n)(r + s) = $ _____

   a) 15   b) 30   c) 35   d) 72

2. The exponent of 2 in the prime factorization of 144 is

   a) 4   b) 5   c) 6   d) 3

3. The discriminant of $4x^2 + 3x - 2 = 0$ is

   a) -23 b) 41   c) 39   d) -31

4. The graph of the equations $2x + 3y - 2 = 0$ and $x - 2y - 8 = 0$ are two lines which are

   a) perpendicular to each other   b) parallel

   c) coincident   d) intersecting exactly at one point

5. The roots of a quadratic equation are 5 and -2 then, the equation is

   a) $x^2 - 3x + 10 = 0$ b) $x^2 - 3x - 10 = 0$ c) $x^2 + 3x + 10 = 0$ d) $x^2 + 3x - 10 = 0$

6. The distance between points (2, 3) and (4, 1) is

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

7. In $\triangle ABC$ it is given that AB = 9 cm, BC = 6 cm and CA = 7.5cm. Also $\triangle DEF$ is given such that EF = 8cm and $\triangle DEF \sim \triangle ABC$. Then perimeter of $\triangle DEF$ is

   a) 30 cm   b) 22.5 cm   c) 27 cm   d) 25 cm

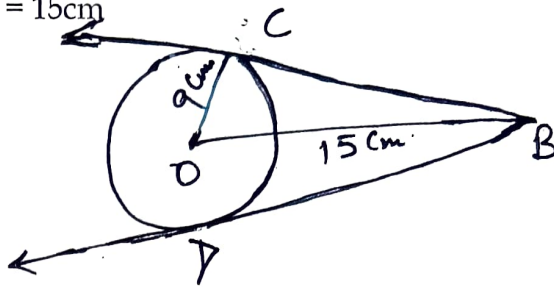8. In the given figure of $\angle ADE = \angle ABC$

   then CE is equal to

1
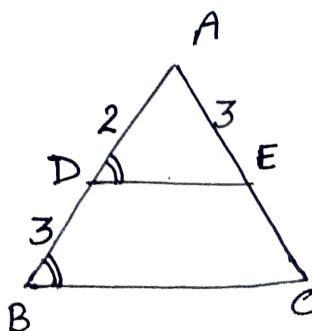
a) 4.5	b) 3	c) 2	d) 5

9. In given figure of OC = 9 cm and OB = 15cm then BC + BD is equal to

a) 24 cm	b) 18 cm

c) 12 cm	d) 36 cm

10. If $(\cos\theta + \sec\theta) = \frac{5}{2}$ then $(\cos^2\theta + \sec^2\theta) =$ _____

a) $\frac{33}{4}$	b) $\frac{21}{4}$	c) $\frac{17}{4}$	d) $\frac{29}{4}$

11. If an angle of elevation of a tower from a distance 100 meters from its foot is 60^0, then the height of the tower is

a) $\frac{200}{\sqrt{3}}m$	b) $50\sqrt{3}m$	c) $100\sqrt{3}m$	d) $\frac{100}{\sqrt{3}}m$

12. $(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) =$

a) 1	b) −1	c) 0	d) none of these

13. The area of a sector of a circle with radius 6cm if the angle of the sector is 60^0

a) $-\frac{152}{7}$	b) $\frac{132}{7}$	c) $\frac{142}{7}$	d) $\frac{122}{7}$

14. The chord of a circle of radius 10cm subtends a right angle at centre. The area of the minor segment $(\pi = 3.14)$ is

a) 32.5 cm²	b) 34.5 cm²	c) 30.5 cm²	d) 28.5 cm²

15. Raju bought a fish from a shop for his aquarium. The shop keeper takes out one fish from a tank containing 15 male fish and 18 female fish. The probability that the fish taken out is a male fish is

a) $\frac{5}{11}$	b) $\frac{6}{11}$	c) $\frac{5}{12}$	d) $\frac{7}{11}$

16. The mean of the data when $\sum fidi = 435, \sum fi = 30$ and a = 47.5 is

a) 47.5	b) 62	c) 30	d) 63

17. A solid is hemispherical at the bottom and conical (of same radius) above it. If the surface areas of the two parts are equal then the ratio of its radius and the slant height of the conical part is

a) 4 : 1	b) 1 : 4	c) 1 : 2	d) 2 : 1

2

18. Consider the following frequency distribution

Class	0-5	6-11	12-17	18-23	24-29
Frequency	13	10	15	8	11

The upper list is medium class

a) 18.5   b) 17.5   c) 18   d) 17

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

a) Both A and R are true and Reason (R) is correct explanation of A

b) Both A and R are true but Reason (R) is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

19. **Statement A (Assertion) :** Distance of (5, 12) from y-axis is 5 units.

   Statement R (Reason) : Distance of point (h, k) from y-axis always k units.

20. **Statement A (Assertion) :** The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M. = 162.

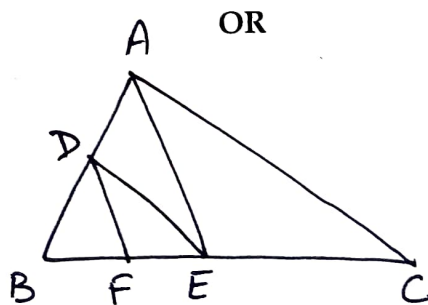   **Statement R (Reason):** If a, b are two positive integers, then H.C.F. × L.C.M. = a × b.

Section – B

21. Is the pair of linear equation consistent/ inconsistent? If consistent, obtain the solution graphically $2x - 2y - 2 = 0$; $4x - 4y - 5 = 0$

22. In a $\triangle ABC, AD$ is the bisector of $\angle A$, meeting the side BC and D. If AB = 5.6 cm, BC = 6 cm and BD = 3.2 cm find AC

A   OR

DE ∥ AC and DF ∥ AE

Prove BF/FE= BE/EC

23. The length of a tangent from a point A at distance 5cm from the centre of the circle is 4 cm. Find the radius of the circle.

24. Prove $\dfrac{\cot A - \cos A}{\cot A + \cos A} = \dfrac{\csc A - 1}{\csc A + 1}$

3

25. Find the area of quadrant of a circle who circumference is 22 cm.

OR

Find the area of sector of a circle with radius 6 cm if angle of sector is 60^0.

Section – C

26. Prove that $\frac{1}{\sqrt{2}}$ is irrational.

27. Write the quadratic polynomial having $-\frac{1}{4}$ and 1 as its zeros.

28. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of m for which $y = mx + 3$

OR

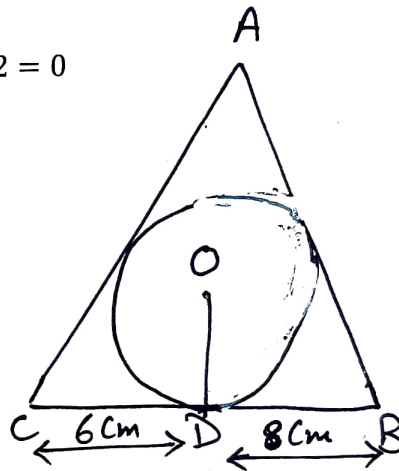Solve graphically $2x - 3y + 13 = 0$ and $3x - 2y + 12 = 0$

29. A triangle ABC is drawn to circumciscribe a circle of radius 4cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the side AB and AC.

30. In ΔABC, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of $\sin A \cos C + \cos A \sin C$

31. In a bag there are 44 identical cards with figure of circle or square on them. There are 24 circles of which 9 are blue and rest are green and 20 squares of which 11 are blue and rest are green. One card is drawn from the bag at random. Find the probability that it has the figure of

(i) Square (ii) green colour (iii) blue circle (iv) green square

Section – D

32. The sum of squares of two consecutive multiples of 7 is 637. Find the multiples.

OR

Find the sum of first 22 terms of an AP in which d = 7 and 22nd term is 149.

33. Find two numbers whose sum is 27 and product is 182.

34. A tent is in the shape of cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively and slant height of the top is 2.8 m. Find area of canvas used for making the tent. Also find the cost of the canvas of the tent at rate of Rs. 200 per m².

OR
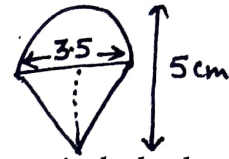
Salman got applying top (lattu) as his birthday present, which surprisely had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diameter of the top is 3.5 mc. Find the area he has no colour.

35. The following data gives the distribution of total monthly household expenditure of 200 failies of a village. Find the modal monthly expenditure of the families. Also find the mean monthly expenditure.

| Expenditure	Frequency
1000-1500	24
1500-2000	40
2000-2500	33
2500-3000	28
3000-3500	30
3500-4000	22
4000-4500	16
4500-5000	7

Section – E

Case Study Based Questions:

36. Read the text carefully and answer the questions:

Saving money is a good habit and it should be inculcated in children from the beginning. Mrs. Pushpa brought a piggy bank for her child Akshar. He puts one five-rupee coin of his savings in the piggy bank of the first day. He increases his savings by one five-rupee coin daily.
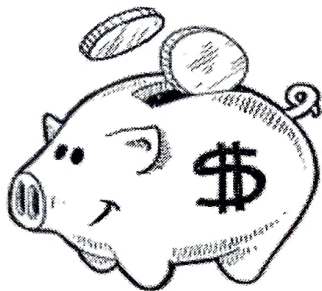
a) If the piggy bank can hold 190 coins of five rupees in all, find the number of days he can contribute to put the five-rupee coins into it.

b) Find the total money he saved.

OR

How many coins are there in piggy bank on 15th day?

c) How much money Akshar saves in 10 days?

37. Read the text carefully and answer the questions:

In order to conduct Sports Day activities in your School, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flowerpots have been placed at a distance of 1 m from each other along AD, as shown in given figure below. Niharika runs 1/4 th the distance AD on the 2nd line and posts a green flag. Preet runs 1/5th distance AD on the eighth line and posts a red flag.

Based on the above information, answer the following questions.

(i) Write the position of red flag.

(ii) What is the distance between both the flags?

(iii) If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?
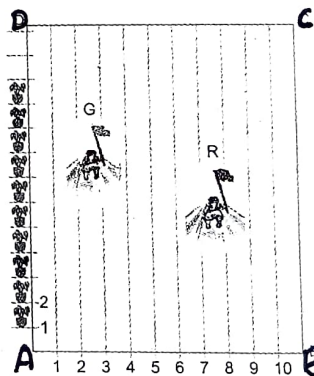
OR

If Joy has to post a flag at one-fourth distance from green flag in the line segment joining the green and red flags, then where should he post his flag?

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38.   **Sattelite Towers in Himalayas**

The sattellite image of Himalaya Mountain is shown below. In this image there are many signal towers are standing. The angle of elevation of the top of a hill from the foot of a tower is 60° and the angle of elevation of the top of the tower with height 50 m from the foot of the hill is 30°.

On the basis of above information, answer the following questions.

(i) Find the horizontal distance between hill and tower.   (2)

Or

Find the height of the hill, if the distance between bottom of hill and tower is $50\sqrt{3}$ m.   (2)

(ii) Find the distance from foot of tower to the top of the hill.   (1)

(iii) Find the distance from foot of the hill to the top of the tower.   (1)