ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 12]

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ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 40]

Total No. of Questions : 40]

ಸಂಕೇತ ಸಂಖ್ಯೆ : 81-E

Code No. : 81-E

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Question Paper Serial No. **70**

ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯ ಕ್ರಮ ಸಂಖ್ಯೆ

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

(ಹಳೆ ಪಠ್ಯಕ್ರಮ / Old Syllabus)

(ಪುನರಾವರ್ತಿತ ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / Regular Repeater)

ದಿನಾಂಕ : 21. 09. 2020] [Date : 21. 09. 2020

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ–1-45 ರವರೆಗೆ] [Time : 10-30 A.M. to 1-45 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks : 80

TEAR HERE TO OPEN THE QUESTION PAPER
ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಇಲ್ಲಿ ಹರಿಯಿರಿ

Tear here

General Instructions to the Candidate :

1. This Question Paper consists of 40 objective and subjective types of questions.
2. This question paper has been sealed by reverse jacket. You have to cut on the right side to open the paper at the time of commencement of the examination. Check whether all the pages of the question paper are intact.
3. Follow the instructions given against both the objective and subjective types of questions.
4. Figures in the right hand margin indicate maximum marks for the questions.
5. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

I. *Four* alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate. Choose the correct alternative and write the complete answer along with its letter of alphabet.

$8 \times 1 = 8$

1. If $A = \{ a, b, c, d, e \}$ and $B = \{ a, m, n, d \}$ then $A \cap B$ is

   (A) $\{ a, d, e \}$

   (B) $\{ m, n \}$

   (C) $\{ a, d \}$

   (D) $\{ a, b, c, d, e, m, n \}$

2. If two lines are mutually perpendicular, then the product of their slopes is

   (A) – 1

   (B) 0

   (C) $\frac{1}{2}$

   (D) 1.

3. The sum of first 20 natural numbers is

   (A) 142

   (B) 210

   (C) 254

   (D) 310.

4. If ${}^{n}P_{2} = 90$, then the value of n is

   (A) 8 (B) 9

   (C) 10 (D) 12.

5. A cubical die whose faces numbered from 1 to 6 is rolled once. The probability of getting a perfect square number on its top face is

(A) $\frac{1}{6}$

(B) $\frac{2}{6}$

(C) $\frac{3}{6}$

(D) 1.

6. If the mean of 5 scores is 6, then the sum of all the scores is

(A) 11

(B) 26

(C) 30

(D) 42.

7. If $p(x) = 3x^2 - 2x + 5$, then the value of $p(-1)$ is

(A) 4

(B) 6

(C) 8

(D) 10.

8. The distance of the point $P(3, 4)$ from y-axis is

(A) 3 units

(B) 4 units

(C) 5 units

(D) 7 units.

II. Answer the following questions : $6 \times 1 = 6$

9. Write the H.C.F. of any two prime numbers.

10. Write the degree of the polynomial $g(x) = 4x^5 - 6x^3 + 2x^2 + 5$.

11. Define concentric circles.

12. If $\cos x = \frac{24}{25}$, then what is the value of $\sec x$?

13. In $\triangle ABC$, if $AB^2 + BC^2 = AC^2$, then name the right angle.

14. The area of the base of a right circular cone is 100 cm^2 and height is 3 cm. Find its volume.

III. Answer the following questions :

15. Classify the following situations as examples of Permutations and Combinations : 2

i) Arranging 6 different books on a shelf

ii) Selecting 2 black balls from a bag containing 3 red and 4 black balls

iii) Forming a committee of 4 members from a group of 12 persons

iv) Forming 3-digit numbers using 1, 4, 5 and 7.

16. Find the sixth term of the Geometric Progression 2, 6, 18, ... by using a suitable formula. 2

OR

Find the sum of the Geometric series $1 + \frac{1}{2} + \frac{1}{4}$ + ... up to ∞ .

17. If 8, $x - 1$, 16 are in Arithmetic Progression, then find the value of x. 2

18. Prove that $(2 + \sqrt{3})$ is an irrational number. 2

19. Three fair coins are tossed together. Find the probability of getting utmost one head. 2

20. Find the product of $\sqrt{2}$ and $\sqrt[3]{3}$. 2

21. Rationalise the denominator and simplify : 2

$$\frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}-\sqrt{5}}$$

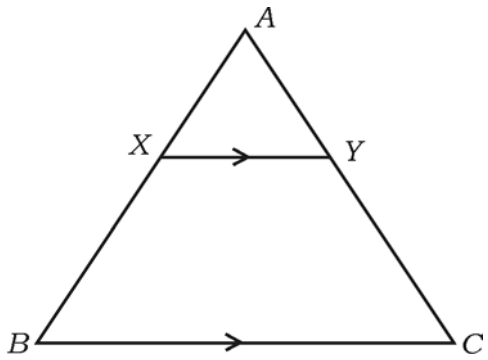
22. Find the remainder obtained when $p(x) = 3x^2 - 5x + 6$ is divided by $g(x) = (x - 2)$ using Remainder theorem. 2

OR

Find the quotient and remainder using synthetic division.

$$(2x^3 + 3x^2 - x + 6) \div (x - 2).$$

23. In the given figure in ΔABC, $XY \parallel BC$. If BX = 7 cm, AX = 5 cm and AC = 18 cm, then find CY. 2



24. Prove that : $(1 - \cos^2 \theta)(1 + \cot^2 \theta) + \tan^2 \theta = \sec^2 \theta$. 2

25. Find the distance of the point $P(5, 12)$ from the origin. 2

26. In a class of 60 students, everyone should select to study either Mathematics or Science or both subjects. If 75% of students select Mathematics, 50% of students select Science, then find how many students select both the subjects. 2

27. The maximum number of diagonals that can be drawn in a polygon is 9. Find the number of sides. 2

28. The length of a rectangular field is three times its breadth. If the area of the field is 192 m^2, then find its breadth. 2

29. Draw a circle of radius 3 cm. Construct a pair of tangents to it such that the angle between them is 60°. 2

30. Draw a plan for the plane ground using the information given below : 2

(Scale 20 m = 1 cm)

	To C (in metre)	
To D 120	200 140 100	60 to B
To E 80	60	
	From A	

IV. Answer the following questions :

31. In a Harmonic Progression, the third term is $\frac{1}{7}$ and fifth term is $\frac{1}{11}$. Find its tenth term. 3

OR

The fourth term of an Arithmetic Progression is 6 more than its second term. If the eighth term is 26, then find the Arithmetic Progression.

32. The total runs scored by two cricket players *A* and *B* in 15 matches are 1050 and 900 with standard deviations 5·6 and 3·0 respectively.

i) Who is better run getter ?

ii) Find who is more consistent in performance. 3

33. If one root of the equation $x^2 + px + q = 0$ is 3 times the other, then prove that $3p^2 = 16\,q$. 3

OR

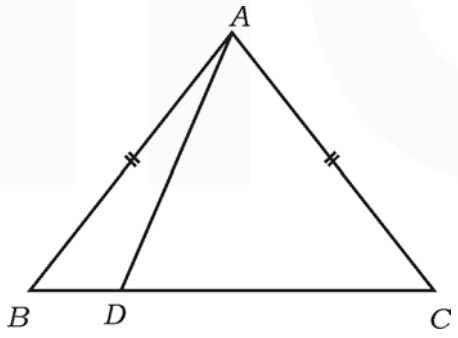
Solve by using formula : $(2m + 3)(3m - 2) + 2 = 0$.

34. Prove that "if two circles touch each other externally, then the centres and the point of contact are collinear". 3

35. In an equilateral triangle ABC, $AN \perp BC$. Prove that $AN^2 = 3BN^2$. 3

OR

In ΔABC, $AB = AC$ and D is any point on BC as shown in the figure. Prove that $AB^2 - AD^2 = BD \cdot DC$.



36. The angle of elevation of the top of a vertical pole from a point on a horizontal ground is 30°. On walking 5 m towards the pole the angle of elevation is found to be 45°. Find the height of the pole. 3

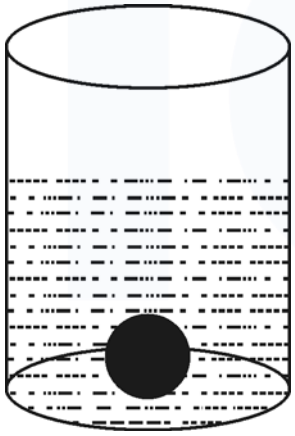
OR

Prove that $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2 \operatorname{cosec}\theta$.

V. Answer the following questions :

37. Prove that "the areas of two similar triangles are proportional to the squares on the corresponding sides". 4

38. A cylindrical vessel of base diameter 28 cm is filled with some quantity of water. A metallic solid sphere of radius 7 cm is completely immersed in the vessel so that no water expells from the vessel. Find the height of water level raised in the vessel. [Use $\pi = \frac{22}{7}$] 4



OR

The volume of a frustum of a cone shaped dustbin is 26,994 cm^3. If the radii of the two circular ends is 15 cm and 8 cm, then find the height of the dustbin. [Use $\pi = \frac{22}{7}$]

39. Solve graphically : $x^2 - x - 6 = 0$. 4

40. Construct a direct common tangent to two circles of radii 4 cm and 2 cm whose centres are 9 cm apart. 4