Roll No.

Serial No. of Q. C. A. B.

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 58]

[ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 40

Total No. of Questions : 58]

[Total No. of Printed Pages : 40

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

ವಿಷಯ : **ಗಣಿತ**

Code No. : **81-E**

Subject : **MATHEMATICS**

(ಇಂಗ್ಲೀಷ್ ಭಾಷಾಂತರ / English Version)

ದಿನಾಂಕ : 01. 04. 2014]

[Date : 01 04. 2014

ಸಮಯ : ಬೆಳಿಗ್ಗೆ 9-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12-45 ರವರೆಗೆ]

[Time : 9-30 A.M. to 12-45 P.M.

ಪರಮಾವಧಿ ಅಂಕಗಳು : 100]

[Max. Marks : 100

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Q. No.	Marks	Q. No.	Marks	Q. No.	Marks	Q. No.	Marks	Q. No.	Marks
1.		14.		27.		40.		53.	
2.		15.		28.		41.		54.	
3.		16.		29.		42.		55.	
4.		17.		30.		43.		56.	
5.		18.		31.		44.		57.	
6.		19.		32.		45.		58.	
7.		20.		33.		46.		×	
8.		21.		34.		47.		×	
9.		22.		35.		48.		×	
10.		23.		36.		49.		×	
11.		24.		37.		50.		×	
12.		25.		38.		51.		×	
13.		26.		39.		52.		×	

		Total Marks	

Total Marks in words			Grand Total	
1. ✓				
2. ✓		✓	✓	
Signature of Evaluators	*Registration No.*	*Signature of the Deputy Chief*	*Signature of the Room Invigilator*	

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[Turn over

General Instructions :

i) The Question-cum-Answer Booklet consists of objective and subjective types of questions having 58 questions.

ii) Space has been provided against each objective type question. You have to choose the correct choice and write the complete answer along with its alphabet in the space provided.

iii) For subjective type questions enough space for each question has been provided. You have to answer the questions in the space.

iv) Follow the instructions given against both the objective and subjective types of questions.

v) Candidate should not write the answer with pencil. Answers written in pencil will not be evaluated. (Except Graphs, Diagrams & Maps)

vi) In case of Multiple Choice, Fill in the blanks and Matching questions, scratching / rewriting / marking is not permitted, thereby rendering to disqualification for evaluation.

vii) Candidates have extra 15 minutes for reading the question paper.

viii) **Space for Rough Work** has been printed and provided at the bottom of each page.

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 alphabet in the space provided against each question. 20 × 1 = 20

1. In a sequence if $T_n = 4n^2 - 1$ and $T_n = 35$ then the value of n is

(A) 9 (B) 5

(C) 6 (D) 3 .

Ans. : _____

(**SPACE FOR ROUGH WORK**)

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2.   The value of $\sum 18 + \sum 19$ is

     (A)   324   (B)   361

     (C)   703   (D)   743.

Ans. : _____

3.   In a Geometric progression, if n approaches ∞ then S_∞ is

     (A) ar^0 (B) ar^{n-1}

     (C) $\dfrac{1-r}{a}$ (D) $\dfrac{a}{1-r}$.

Ans. : _____

4.   The formula to find n^{th} term of Harmonic progression is

     (A) $\dfrac{1}{a-(n-1)d}$ (B) $\dfrac{1}{a+(n+1)d}$

     (C) $\dfrac{1}{a+(n-1)d}$ (D) $\dfrac{1}{a-(n+1)d}$.

Ans. : _____

5.   If $3p = \begin{bmatrix} 6 & 0 \\ -9 & 12 \end{bmatrix}$, then the matrix $2p$ is

     (A) $\begin{bmatrix} 4 & -6 \\ 0 & 8 \end{bmatrix}$ (B) $\begin{bmatrix} 12 & 0 \\ -18 & 24 \end{bmatrix}$

     (C) $\begin{bmatrix} 12 & -18 \\ 0 & 24 \end{bmatrix}$ (D) $\begin{bmatrix} 4 & 0 \\ -6 & 8 \end{bmatrix}$.

Ans. : _____

(**SPACE FOR ROUGH WORK**)

6. The LCM of $(a^2 - b^2)$, $(a - b)$ and $(a^2 - 2ab + b^2)$ is

   (A) $(a^2 - b^2) (a - b)$ (B) $(a - b)$

   (C) $(a^2 - b^2)$ (D) $(a^2 - b^2) (a + b)$.

   Ans. : _____

7. If $\displaystyle\sum_{a,b,c} a = 0$ then the value of $\displaystyle\sum_{a,b,c} a^3 - abc$ is

   (A) 0   (B) abc

   (C) $2abc$ (D) $3abc$.

   Ans. : _____

8. If $a + b + c = 2s$ then the value of $(b + c)^2 - a^2$ is

   (A) $4s (s - a)$ (B) $4 (s - a)$

   (C) $2s (s - a)$ (D) $2 (s - a)$.

   Ans. : _____

9. The product of $\sqrt[3]{2}$ and $\sqrt{2}$ is

   (A) $\sqrt[6]{32}$ (B) $\sqrt[6]{24}$

   (C) $\sqrt[6]{16}$ (D) $\sqrt[6]{4}$

   Ans. : _____

10. The product of two consecutive natural numbers is 12. The equation form of this statement is

   (A) $x^2 + 2x - 12 = 0$ (B) $x^2 + 1x - 12 = 0$

   (C) $x^2 + 1x + 12 = 0$ (D) $x^2 + 2x + 12 = 0$.

   Ans. : _____

(SPACE FOR ROUGH WORK)

11. The roots of the quadratic equation $ax^2 + bx = 0$ are

(A) $0, -\dfrac{b}{a}$

(B) $0, +\dfrac{b}{a}$

(C) $+\dfrac{b}{a}, -\dfrac{b}{a}$

(D) $-\dfrac{b}{a}, -\dfrac{b}{a}$.

Ans. : _____

12. The pure quadratic equation in the following is

(A) $x + \dfrac{1}{x} = 4$

(B) $x + \dfrac{1}{x} = 0$

(C) $x - \dfrac{3}{4} = 2x$

(D) $3x(x-1) = 0$.

Ans. : _____

13. The quadratic equation having the roots $\left(1 + \sqrt{2}\right)$ and $\left(1 - \sqrt{2}\right)$ is

(A) $x^2 + 2x + 1 = 0$

(B) $x^2 + 2x - 1 = 0$

(C) $x^2 - 2x - 1 = 0$

(D) $x^2 - 2x + 1 = 0$.

Ans. : _____

14. If $2y \otimes y \equiv 3 \,(\bmod 5)$ then the value of y is

(A) 2

(B) 0

(C) 4

(D) 1.

Ans. : _____

15. The value of $\left(4 \oplus_5 2\right) \oplus_5 3$ is
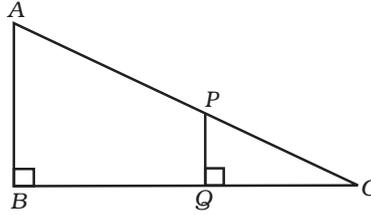
(A) 4

(B) 2

(C) 1

(D) 0.

Ans. : _____
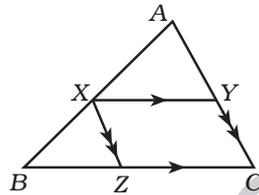
(**SPACE FOR ROUGH WORK**)

16. In the given figure, $AB \mid\mid PQ$. If $PQ = 1\cdot5$ cm, $QC = 2$ cm and $BQ = 8$ cm, then the measure of AB is

(A) 10 cm

(B) 7·5 cm

(C) 9·5 cm

(D) 3·5 cm.

Ans. : _____

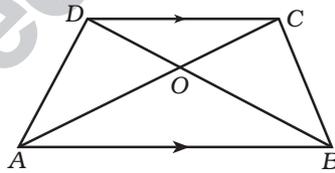17. In the given figure, $XY \mid\mid BC$ and $XZ \mid\mid AC$, then $\dfrac{AX}{AB}$ =

(A) $\dfrac{XZ}{AB}$

(B) $\dfrac{XY}{AC}$

(C) $\dfrac{CZ}{BC}$

(D) $\dfrac{BZ}{BC}$.

Ans. : _____

18. In trapezium $ABCD$, $AB \mid\mid DC$ and the diagonals intersect at O, then $\dfrac{OD}{OC}$ =
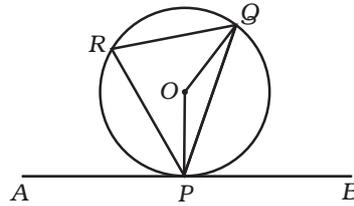

(A) $\dfrac{AB}{CD}$

(B) $\dfrac{OB}{OA}$

(C) $\dfrac{OC}{OD}$

(D) $\dfrac{AC}{BD}$.

Ans. : _____

(**SPACE FOR ROUGH WORK**)
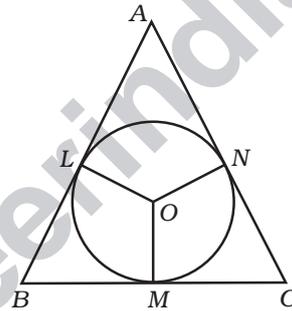
19. In the given figure, *APB* is tangent at *P* to the circle with centre *O*. If ∠ *QPB* = 60° then measure of ∠ *POQ* =

(A) 60° (B) 30°

(C) 120° (D) 90°.

Ans. : _____

20. In the given figure, *AB*, *BC* and *AC* touch the circle at *L*, *M* and *N* respectively. If ∠ *B* = 70° and ∠ *C* = 60°, then the measure of ∠ *LON* is

(A) 50° (B) 110°

(C) 120° (D) 130°.

Ans. : _____

(**SPACE FOR ROUGH WORK**)

II. Fill in the blanks with suitable answers : 10 × 1 = 10

21. If A is any square matrix then $(A - A')$ is always ....

Ans. : _____

22. The value of $^nP_0$ is ....

Ans. : _____

23. The value of $^nC_1$ is ....

Ans. : _____

24. $a^3 + b^3 + c^3$ can be written using $\sum$ notation as ....

Ans. : _____

25. The standard form of quadratic equation $x^2 = 2x - 3$ is ....

Ans. : _____

26. The sum of roots of a quadratic equation $ax^2 + bx + c = 0$ is ....

Ans. : _____

27. The biggest chord of a circle is called ....

Ans. : _____

28. Maximum number of tangents that can be drawn from an external point to circle is ....

Ans. : _____

29. The formula to find the volume of sphere is ....

Ans. : _____

30. Euler's formula for a Network (Graph) is ....

Ans. : _____

(SPACE FOR ROUGH WORK)

III. 31. If $A = \{ 0,\ 1,\ 2,\ 3 \}$ and $B = \{ 2,\ 3,\ 4,\ 5,\ 6 \}$ then verify that

$A - (A - B) = A \cap B.$ 2

(SPACE FOR ROUGH WORK)

32. Find the sum of all even natural numbers from 2 to 40 by using the formula. 2

(SPACE FOR ROUGH WORK)

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33. If *a, A, b* are in arithmetic progression, prove that $A = \dfrac{a + b}{2}$. 2

(**SPACE FOR ROUGH WORK**)

427210 [Turn over

34. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then, find $A'A$. 2

(**SPACE FOR ROUGH WORK**)

35. If $5 \cdot {}^{n}P_{3} = 4 \cdot {}^{n+1}P_{3}$ then find the value of n. 2

(SPACE FOR ROUGH WORK)

427210 [Turn over

36. Prove that $^nC_{n-r} - ^nC_r = 0$. 2

(SPACE FOR ROUGH WORK)

37. The H.C.F. and L.C.M. of two expressions are ($x - 3$) and

$(x^3 - 5x^2 - 2x + 24)$ respectively. If one of the expressions is

$(x^2 - 7x + 12)$, find the other. 　　　　　　　2

(**SPACE FOR ROUGH WORK**)

38. What is meant by rationalisation of a surd ? Write the rationalising factor of

$a \sqrt{x + y}$.   2

(SPACE FOR ROUGH WORK)

39. Simplify : $\sqrt{18} + 5\sqrt{2} - \sqrt{128}$.   2

(SPACE FOR ROUGH WORK)

40. Solve the equation by using the formula : 2

$m^2 - 2m = 2$.

(SPACE FOR ROUGH WORK)

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41. The length of a rectangular field is 3 times its breadth. If the area of the field is 147 m^2 , find its length.   2

42. What is the nature of the roots of the quadratic equation $ax^2 + bx + c = 0$ if

  (i) $b^2 - 4ac = 0$

  (ii) $b^2 - 4ac < 0$ 2

(**SPACE FOR ROUGH WORK**)

43. Construct a chord of length 5 cm in a circle of radius 3 cm. Construct tangents
    at the ends of the chord.   2

(**SPACE FOR ROUGH WORK**)

427210   [Turn over

44. The surface area of a sphere is 616 cm^2. Find the diameter of the sphere. 2

(SPACE FOR ROUGH WORK)

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45. The total surface area of a cylinder is 462 cm ^{2} and its curved surface area is $\frac{1}{3}$ of its total surface area. Find the radius of the cylinder.   2

(**SPACE FOR ROUGH WORK**)

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[Turn over

46. Draw the plan of a field using the following measurements of a field book :   2

[Scale :   50 m   =   1 cm]

	To D (in mts)	
	300	
	200	150 to C
To E 100	150	
	50	100 to B
	From A	

(SPACE FOR ROUGH WORK)

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47. Draw a network for the following route matrix : 2

$$\begin{bmatrix} 0 & 2 & 2 \\ 2 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix}.$$

(SPACE FOR ROUGH WORK)

48. Verify Euler's formula for Dodecahedron. 2

(SPACE FOR ROUGH WORK)

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IV.   49.   There are 60 students in a class. Every student learns at least one of the subjects Kannada or English. 45 students offer Kannada and 30 English. How many students offer both the subjects ? Draw Venn diagram.   3

(SPACE FOR ROUGH WORK)

50. In a Geometric Progression (G.P.) the product of first five terms is 1 and the sum of first three terms is $\dfrac{7}{4}$. Find its common ratio. 3

(SPACE FOR ROUGH WORK)

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(**SPACE FOR ROUGH WORK**)

51. Find the L.C.M. of $m^4 + 3m^3 - m - 3$ and $m^3 + m^2 - 5m + 3$. 3

(SPACE FOR ROUGH WORK)

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(SPACE FOR ROUGH WORK)

52. If $a + b + c = 0$, show that

$$a^2 - bc = \left(\frac{a^2 + b^2 + c^2}{2} \right).$$ 3

(**SPACE FOR ROUGH WORK**)

53. Prove that the areas of similar triangles have the same ratio as the squares of corresponding altitudes.   3

(SPACE FOR ROUGH WORK)

54. If two circles touch each other externally, prove that their point of contact and their centres are collinear. 3

(SPACE FOR ROUGH WORK)

V.   55.   Calculate the Standard Deviation and coefficient of variation for the given
           frequency table :   4

Class-interval	Frequency
1 – 5	1
6 – 10	2
11 – 15	3
16 – 20	4

(SPACE FOR ROUGH WORK)

56. Construct a transverse common tangent to two circles of radii 3 cm and 2 cm whose centres are 9 cm apart. Measure its length and write.   4

(**SPACE FOR ROUGH WORK**)

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57. Prove that in a right-angled triangle, square on the hypotenuse is equal to the sum of the squares on the other two sides. 4

(SPACE FOR ROUGH WORK)

58. Draw the graph of $y = x^2$ and $y = x + 2$ and hence solve the equation

$x^2 - x - 2 = 0.$ 4

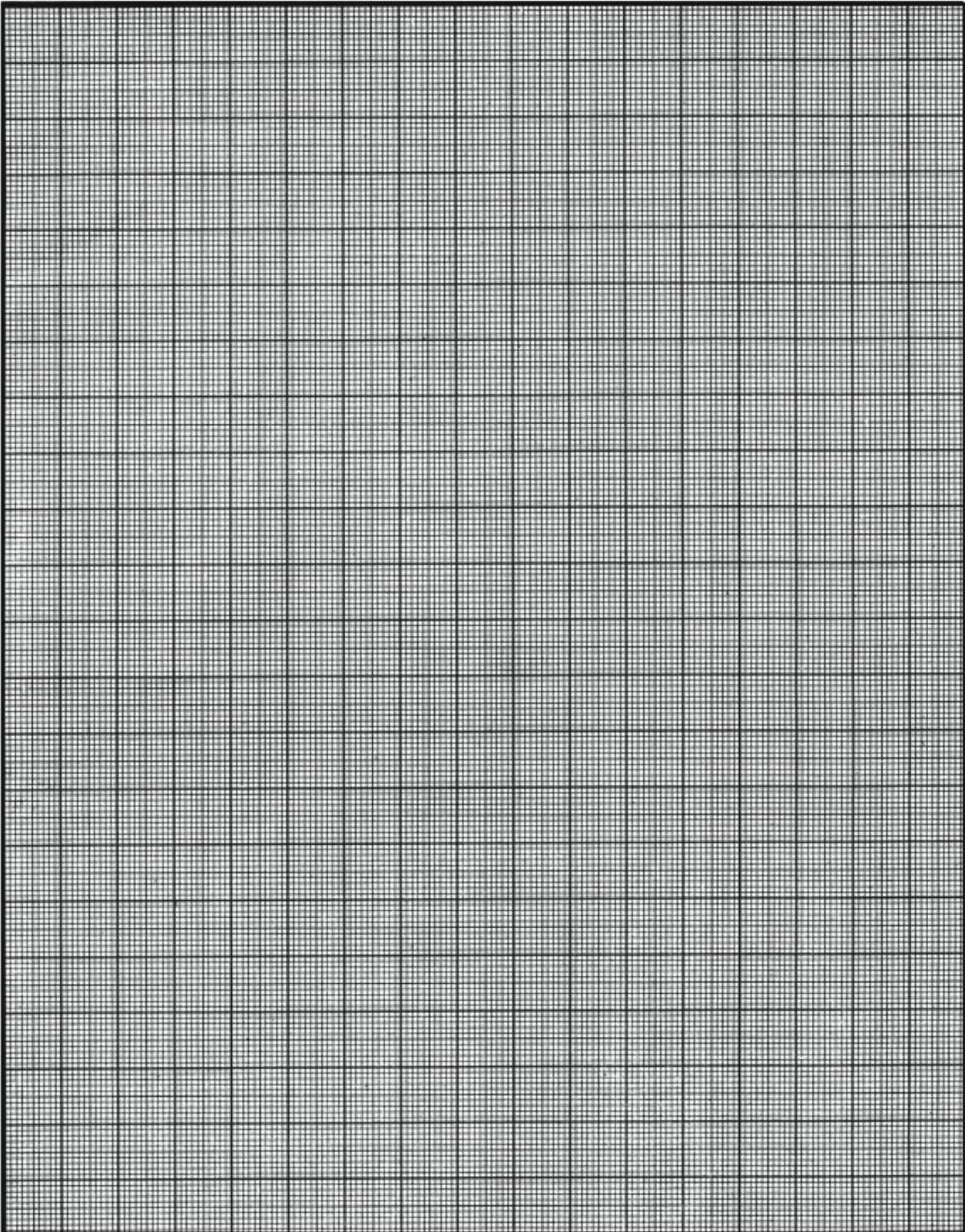
(SPACE FOR ROUGH WORK)