

Roll No.									
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Serial No. of
G. 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 : 08.04.2013]

[Date : 08.04.2013

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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G. No.	Marks	G. No.	Marks	G. No.	Marks	G. No.	Marks	G. 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	

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.* $20 \times 1 = 20$

1. If A , B and C are non-empty sets then the 'Intersection of sets is distributive over union of sets' is represented as
- (A) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
(B) $A \cap (B \cap C) = (A \cap B) \cap (A \cap C)$
(C) $(A \cup B) \cup C = (A \cap C) \cup (B \cup C)$
(D) $(A \cap B) \cup C = (A \cup C) \cap (B \cup C)$

Ans. : _____

(SPACE FOR ROUGH WORK)

2. If 5 and 2 are the Arithmetic Mean and Harmonic Mean of two distinct numbers, then their Geometric Mean is

- (A) 3 (B) 7
(C) $\sqrt{10}$ (D) 10.

Ans. : _____

3. If $A + B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ and $A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ then matrix B is

- (A) $\begin{bmatrix} 1 & 1 \\ 4 & 2 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 4 \\ 1 & 2 \end{bmatrix}$
(C) $\begin{bmatrix} 2 & 4 \\ 1 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 4 & 2 \\ 1 & 1 \end{bmatrix}$

Ans. : _____

4. If ${}^n C_8 = {}^n C_5$, then the value of n is

- (A) 2 (B) 3
(C) 1 (D) 13.

Ans. : _____

5. The H.C.F. of $5x^2y^3$ and $10x^3y^2$ is

- (A) $10x^3y^3$ (B) $5x^2y^2$
(C) $5xy$ (D) $5x^3y^3$.

Ans. : _____

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81-E

4

6. The expansion of $\sum_{p,q,r} p^2$ is

(A) $p^2 q^2 r^2$

(B) pqr

(C) p^2

(D) $p^2 + q^2 + r^2$.

Ans. : _____

7. The value of $\sum_{a,b,c} a(b-c)$ is

(A) $2(ab + bc + ca)$

(B) $ab + bc + ca$

(C) 0

(D) $a + b + c$.

Ans. : _____

8. If one factor of $a^3 + b^3$ is $(a + b)$, then the other factor is

(A) $a^3 + b^3 + ab$

(B) $a - b + ab$

(C) $a^2 + b^2 - ab$

(D) $a^2 + b^2 + ab$

Ans. : _____

9. If $x\sqrt{y} = \sqrt{80}$, then the value of y is

(A) 5

(B) 16

(C) 4

(D) 20.

Ans. : _____

(SPACE FOR ROUGH WORK)

10. The simplified form of $10\sqrt[3]{x} - 8\sqrt[3]{x}$ is

- (A) $18\sqrt[3]{x}$ (B) $2\sqrt{x}$
 (C) $2\sqrt[3]{x}$ (D) $18\sqrt{x}$

Ans. : _____

11. If $4x = \frac{81}{x}$, then the value of x is

- (A) -4.5 (B) ± 4.5
 (C) 4.5 (D) ± 0.45 .

Ans. : _____

12. The quadratic equation having the roots $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$ is

- (A) $x^2 - 4x + 1 = 0$ (B) $x^2 + 4x - 1 = 0$
 (C) $x^2 - 4x - 1 = 0$ (D) $x^2 + 4x + 1 = 0$

Ans. : _____

13. If $3 \oplus y \equiv 2 \pmod{6}$, then the value of y is

- (A) 2 (B) 4
 (C) 5 (D) 6.

Ans. : _____

14. Out of the following sets, Z_4 is

- (A) $\{0, 1, 2\}$ (B) $\{0, 1, 2, 3\}$
 (C) $\{0, 1, 2, 3, 4\}$ (D) $\{1, 2, 3, 4\}$

Ans. : _____

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81-E

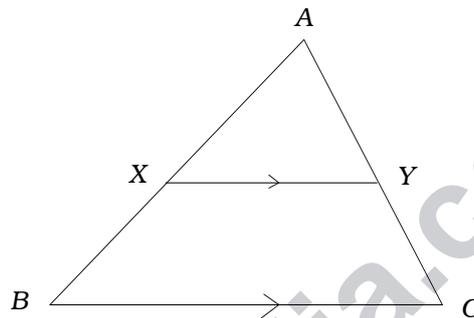
6

15. In ΔABC , D and E are the mid-points of AB and AC respectively, then the area of ΔADE is

- (A) $4 \Delta ABC$ (B) $\frac{1}{4} \Delta ABC$
 (C) $2 \Delta ABC$ (D) $\frac{1}{2} \Delta ABC$.

Ans. : _____

16. In the given figure, $XY \parallel BC$, then $\frac{AX}{BX} =$



- (A) $\frac{AY}{AC}$ (B) $\frac{YC}{AY}$
 (C) $\frac{AX}{AB}$ (D) $\frac{AY}{CY}$.

Ans. : _____

17. In ΔABC , $\angle ABC = 90^\circ$. If $AC = (x + y)$ and $BC = (x - y)$, then the length of AB is

- (A) $x^2 - y^2$ (B) $2xy$
 (C) $2\sqrt{xy}$ (D) $x^2 + y^2$

Ans. : _____

(SPACE FOR ROUGH WORK)

81-E

8

II. Fill in the blanks with suitable answers :

 $10 \times 1 = 10$ 21. If A and B are the subsets of the universal set U then

$$(A \cup B)' = \dots\dots\dots$$

Ans. : _____

22. If A is a matrix of order $(m \times n)$ and B is a matrix of order $(n \times p)$ then order of AB is

Ans. : _____

23. The value of ${}^n P_0$ is

Ans. : _____

24. Rationalising factor of $(\sqrt{x+y})$ is

Ans. : _____

25. The standard form of the quadratic equation is

Ans. : _____

(SPACE FOR ROUGH WORK)

26. If the value of the discriminant of the quadratic equation $ax^2 + bx + c = 0$ is less than 0 then the nature of the roots is

Ans. : _____

27. If R and r are the radii of two circles having their centres d cm apart, then the length of the transverse common tangent t is

Ans. : _____

28. If the square on one side of a triangle is equal to the sum of the squares on the other two sides, then those two sides contain

Ans. : _____

29. The formula to find volume of a right circular cylinder is

Ans. : _____

30. Shape of each face of Dodecahedron is

Ans. : _____

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10

III. 31. Which term of the Geometric Progression $2, 2\sqrt{2}, 4, \dots$ is 64 ?

2

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32. Find the sum of the series $1 + 2 + 4 + \dots$ up to 9 terms.

[using the formula]

2

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12

33. Three numbers are in harmonic progression. The harmonic mean between first and third numbers is 20. If the 1st number is twice the third number, find the three terms of the progression. 2

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34. What is meant by transposing of a matrix ? Give an example.

2

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14

35. (a) What is fundamental counting principle ?
(b) What is the meaning of ${}^n P_r$?

2

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36. There are 3 white and 5 red roses in a basket. In how many ways can 4 flowers be removed from the basket so that they contain 2 red flowers ? 2

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16

37. The H.C.F. and L.C.M. of two expressions are $(a - 7)$ and $(a^3 - 10a^2 + 11a + 70)$ respectively. If one of the expressions is $(a^2 - 12a + 35)$, find the other.

2

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38. Rationalise the denominator and simplify :

$$\frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}} .$$

2

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18

39. By selling an article for Rs. 18·75, a dealer loses as much per cent as its cost price. Find the cost price of the article. 2

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40. Solve the equation by using the fomula $x^2 - 8x + 1 = 0$.

2

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20

41. What is a pure quadratic equation ? Give an example.

2

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42. For what value of k the equation $kx^2 + 6x + 1 = 0$ has equal roots ?

2

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22

43. Construct two tangents to a circle of radius 3.5 cm from a point 4.5 cm away from the circle. 2

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44. $ABCD$ is a rhombus. Prove that

$$AC^2 + BD^2 = 4AB^2.$$

2

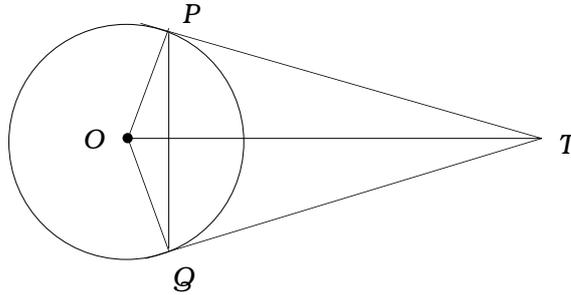
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24

45. In the given figure, TP and TQ are tangents drawn to a circle with centre O . Prove that $\angle PTQ = 2 \angle OPQ$. 2



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46. Draw a plan for the recordings from the Surveyor's field book given below : 2

[Scale : 20 m = 1 cm]

	Metres to D	
To E 80	160	60 to C
	120	
	100	40 to B
	60	
	From A	

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81-E

26

47. Draw a network for the following matrix :

2

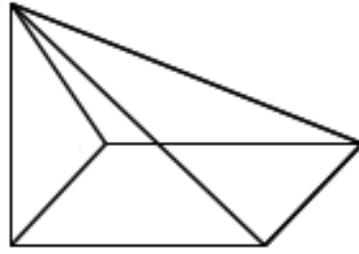
$$\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix} .$$

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48. Verify Euler's formula for the given solid.

2



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28

IV. 49. In an examination 82% of the candidates passed in Maths, 72% passed in Science and 55% passed in both. Find the percentage of students failed in both.

(Draw Venn diagram to verify)

3

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50. Calculate the Mean and Standard Deviation for the following distribution : 3

Class-interval	Frequency
0 – 4	2
5 – 9	3
10 – 14	10
15 – 19	3
20 – 24	2

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30

51. Find the L.C.M. of $x^3 - 2x^2 - 13x - 10$ and $x^3 - x^2 - 10x - 8$.

3

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32

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

$$\frac{a(b^2c^2 - 1)}{bc + 1} + \frac{b(c^2a^2 - 1)}{ca + 1} + \frac{c(a^2b^2 - 1)}{ab + 1} = 2abc. \quad 3$$

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

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34

54. Find the total surface area of a sphere whose volume is equal to the volume of the cone having the radius 12 cm and height 6 cm. 3

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- V. 55. In an Arithmetic progression the first term is 2 and the sum of the first five terms is one fourth of the next five terms. Show that the 20th term is equal to -112 . 4

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36

56. Two circles of radii 4 cm and 2 cm, have their centres 10 cm apart. Draw two direct common tangents and measure their length and write. 4

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57. If two triangles are equiangular, prove that their corresponding sides are proportional.

4

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38

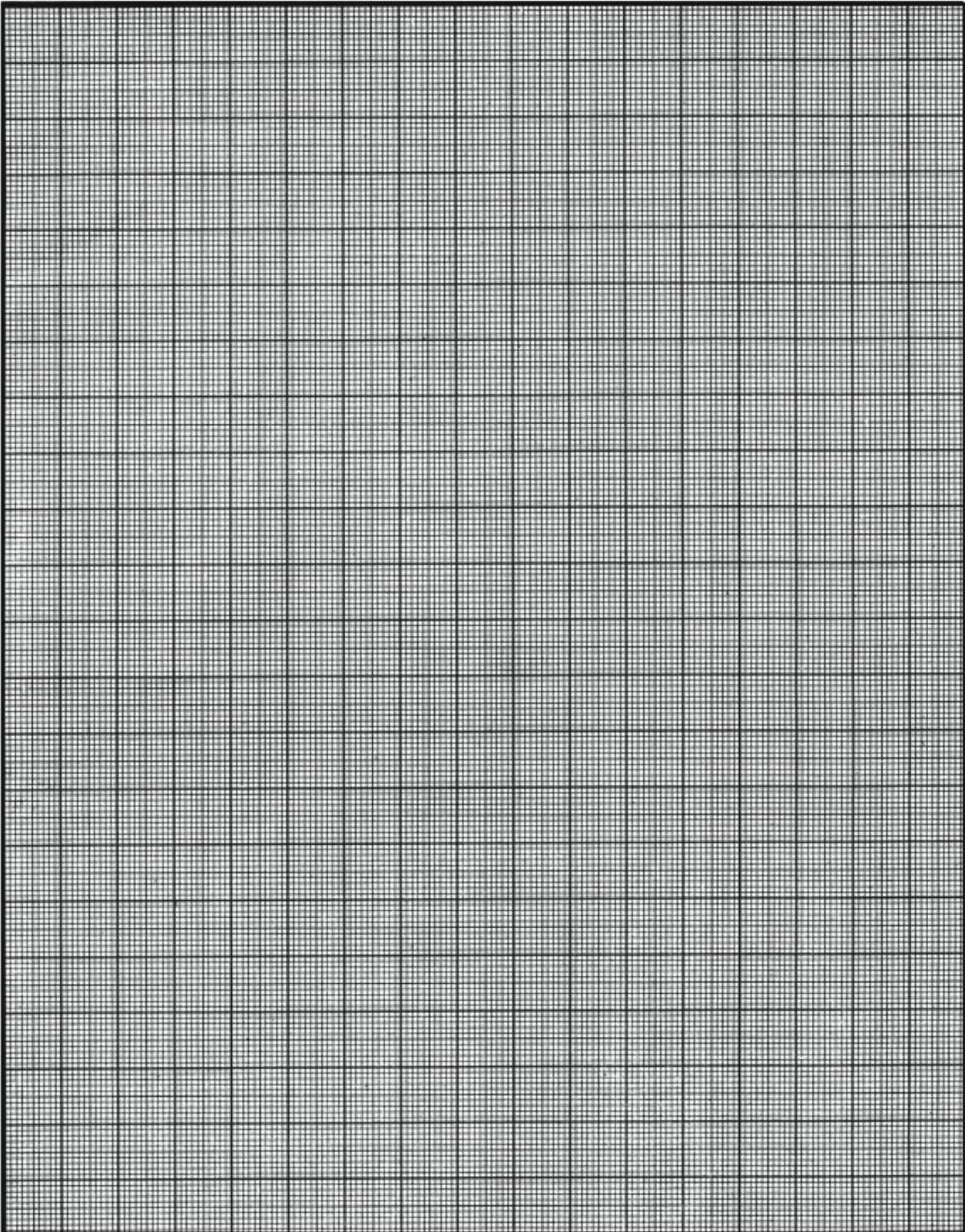
58. Draw the graph of $y = x^2$ and $y = 3 - 2x$ and hence solve the equation

$$x^2 + 2x - 3 = 0.$$

4

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