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

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 58]

[ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 32

Total No. of Questions : 58]

[Total No. of Printed Pages : 32

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

ವಿಷಯ : ಗಣಿತ

Code No. : **81-E**

Subject : MATHEMATICS

(ಇಂಗ್ಲೀಷ್ ಭಾಷಾಂತರ / English Version)

ದಿನಾಂಕ : 18. 06. 2012]

[Date : 18. 06. 2012

ಸಮಯ : ಬೆಳಿಗ್ಗೆ 09-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12-45 ರವರೆಗೆ]

[Time : 09-30 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) **Space for Rough Work** has been printed and provided at the bottom of each page.
 - viii) Candidates have extra 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 alphabet in the space provided against each question.* $20 \times 1 = 20$
1. If A and B are two disjoint sets, then the relation between them is
 - (A) $n(A \cup B) = n(A) + n(B)$
 - (B) $n(A) + n(B) = n(A \cup B) + n(A \cap B)$
 - (C) $n(A \cup B) = n(A \cap B)$
 - (D) $n(A \cap B) = n(A) + n(B)$.

Ans. : _____

(SPACE FOR ROUGH WORK)

2. If $U = \{0, 1, 2, 3, 4\}$, $A = \{0, 2, 4\}$ and $B = \{1, 2, 3\}$ then $U - B =$

(A) $\{0, 4\}$

(B) $\{1, 3\}$

(C) $\{0, 3\}$

(D) $\{3, 4\}$.

Ans. : _____

3. Among 9 passengers, 5 can speak Kannada. 2 can speak both Kannada and English. The number of passengers who can speak only English is

(A) 6

(B) 5

(C) 4

(D) 3.

Ans. : _____

4. In a geometric progression, $S_{2n} \div S_n =$

(A) $\frac{r^n + 1}{r^n - 1}$

(B) $r^n + 1$

(C) r^{n+1}

(D) $r^n - 1$.

Ans. : _____

5. If 16, x and 25 are in G.P. then the value of x is

(A) 20

(B) 10

(C) 5

(D) 4.

Ans. : _____

(SPACE FOR ROUGH WORK)

81-E

4

6. The H.C.F. of $x^3 + y^3$ and $x^2 - xy + y^2$ is

(A) $x + y$

(B) $x^2 - xy + y^2$

(C) $x^3 + y^3$

(D) $(x + y)^3$.

Ans. : _____

7. If $A \times B = H \times L$, then $L =$

(A) $\frac{A \times B}{H}$

(B) $\frac{H}{A \times B}$

(C) $\frac{A \times H}{B}$

(D) $\frac{B \times H}{A}$.

Ans. : _____

8. The value of $\sum_{p,q,r} p^2 - \sum_{p,q,r} q^2$ is

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

(B) 0

(C) $2p^2 + 2q^2 + 2r^2$

(D) $p + q + r$.

Ans. : _____

9. If one factor of $a^4 + a^2 b^2 + b^4$ is $a^2 + b^2 + ab$, then the other factor is

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

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

(C) $a^2 + b^2 + c^2$

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

Ans. : _____

(SPACE FOR ROUGH WORK)

10. The product of $\sqrt{a^2 b}$ and \sqrt{ab} is

- (A) $ab\sqrt{a}$ (B) $a\sqrt{ab}$
 (C) \sqrt{ab} (D) $b\sqrt{ab}$.

Ans. : _____

11. If $v^2 = u^2 + 2as$, then $u =$

- (A) $v^2 - 2as$ (B) $\pm\sqrt{2as - v^2}$
 (C) $\pm\sqrt{v^2 - 2as}$ (D) $\pm\sqrt{v^2 + 2as}$.

Ans. : _____

12. Sum of a number and its reciprocal is $5\frac{1}{5}$. Then the required equation is

- (A) $y^2 + \frac{1}{y} = \frac{26}{5}$ (B) $5y^2 - 26y + 5 = 0$
 (C) $y^2 + \frac{1}{y} + \frac{26}{5} = 0$ (D) $5y^2 + 26y + 5 = 0$.

Ans. : _____

13. The product of the roots of equation $2m^2 - 8m = 0$ is

- (A) 4 (B) 2
 (C) 0 (D) -8.

Ans. : _____

(SPACE FOR ROUGH WORK)

81-E

6

14. The set of residues of modulo Z_4 is

(A) $\{0, 1, 2, 3, 4\}$

(B) $\{1, 2, 3, 4\}$

(C) $\{0, 1, 2\}$

(D) $\{0, 1, 2, 3\}$.

Ans. : _____

15. If $x + 2 \equiv 4 \pmod{5}$, then the value of x is

(A) 7

(B) 5

(C) 4

(D) 3.

Ans. : _____

16. If $a : b = c : d$, then the correct relationship is

(A) $\frac{a}{d} = \frac{b}{c}$

(B) $\frac{d}{a} = \frac{b}{c}$

(C) $\frac{a}{b} = \frac{b}{a}$

(D) $\frac{d}{b} = \frac{c}{a}$.

Ans. : _____

17. The surface area of a solid hemisphere is

(A) πr^2

(B) $4\pi r^2$

(C) $\frac{4}{3}\pi r^2$

(D) $3\pi r^2$.

Ans. : _____

(SPACE FOR ROUGH WORK)

18. The height of a hollow cylinder is 7 cm and its radius is 3.5 cm. Then the surface area is

- (A) 231 cm^2 (B) 154 cm^2
 (C) 308 cm^2 (D) 115.5 cm^2 .

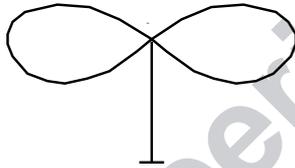
Ans. : _____

19. Euler's formula for polyhedral solids is

- (A) $N + R = A + 2$ (B) $N + A = R + 2$
 (C) $F + V = E + 2$ (D) $F + E = V + 2$.

Ans. : _____

20. The number of regions in the figure is



- (A) 4 (B) 3
 (C) 2 (D) 1.

Ans. : _____

(SPACE FOR ROUGH WORK)

81-E

8

II. Complete the following statements by filling the blanks : 10 × 1 = 10

21. The formula for n^{th} term of a geometric progression is

Ans. : _____

22. The value of ${}^n C_r - {}^n C_{n-r} =$

Ans. : _____

23. The formula for coefficient of variation (C.V.) is given by

Ans. : _____

24. If the last remainder is a constant and not zero, then the H.C.F. of two expressions is

Ans. : _____

25. The standard form of an adfected quadratic equation is

Ans. : _____

26. In a quadratic equation $ax^2 + bx + c = 0$, the product of the roots of the equation is

Ans. : _____

27. Circles having the same centre but different radii are called

Ans. : _____

28. If two circles of radii 5 cm and 3 cm touch each other internally, then the distance between their centres is equal to

Ans. : _____

29. The formula for the total surface area of a cone is

Ans. : _____

30. The maximum number of odd nodes in a traversable network is

Ans. : _____

(SPACE FOR ROUGH WORK)

- III. 31. If $X = \{ 1, 2, 3, 5, 7, 11 \}$
 $Y = \{ 2, 4, 6, 8, 10 \}$
 $Z = \{ 1, 3, 5, 7, 9, 11 \}$

Then show that union of sets is distributive over intersection of sets. 2

32. The sixth and tenth terms of a Geometric Progression are 63 and 5103 respectively. Find the first term and common ratio. 2

(SPACE FOR ROUGH WORK)

81-E

10

33. If a, H, b are in Harmonic Progression and H is called the harmonic mean between a and b , then prove that, $H = \frac{2ab}{a+b}$. 2

34. If $A = \begin{bmatrix} 2 & 5 \\ -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ -2 & 4 \end{bmatrix}$,

find the matrix P when $2A + P = B$.

2

(SPACE FOR ROUGH WORK)

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

2

36. What is fundamental counting principle ? What is the meaning of ${}^n P_r$? 2

(SPACE FOR ROUGH WORK)

81-E

12

37. Find the H.C.F. of $x^3 - 7x^2 + 14x - 8$ and $x^3 - 6x^2 + 11x - 6$ by division method. 2

38. The product of two expressions is $a^4 - 9a^2 + 4a + 12$ and their H.C.F. is $a - 2$. Find their L.C.M. 2

(SPACE FOR ROUGH WORK)

39. What are unlike surds ? Give one example.

2

40. Simplify : $8\sqrt{\frac{1}{2}} - \frac{1}{2}\sqrt{8}$.

2

(SPACE FOR ROUGH WORK)

81-E

14

41. Using the formula, find the value of x in $x^2 + 7x + 12 = 0$.

2

42. Form the quadratic equation, whose roots are $3 + \sqrt{2}$ and $3 - \sqrt{2}$.

2

(SPACE FOR ROUGH WORK)

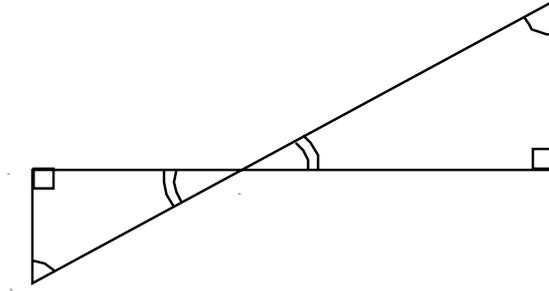
43. In a circle of radius 4 cm, draw two radii such that the angle between them is 120° . Draw two tangents at the ends of the radii. 2

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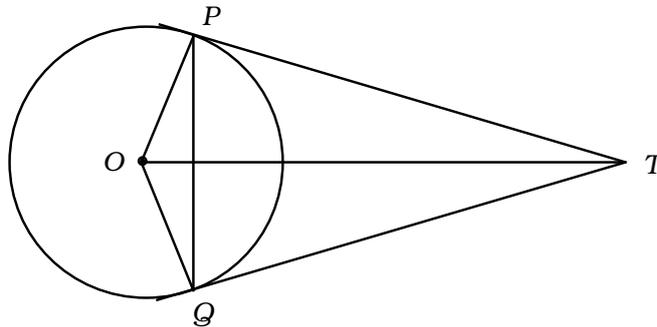
81-E

16

 44. In the given figure, $\angle ABD = \angle BDC$ and $CD = 4AB$. Show that $BD = 5BE$. 2


(SPACE FOR ROUGH WORK)

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



(SPACE FOR ROUGH WORK)

81-E

18

46. The height of a solid metal cylinder is 20 cm. Its radius is 1.5 cm. The cylinder is melted and cast into spheres of each of radius 1.5 cm. How many such spheres can be cast from the cylinder ? 2

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

[Scale : 20 m = 1 cm]

	Metres	
	to <i>D</i>	
	140	
	120	60 to <i>C</i>
To <i>E</i> 80	100	
	50	40 to <i>B</i>
	From <i>A</i>	

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81-E

20

48. Draw the graph for the following matrix :

2

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

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- IV. 49. There are 6 bowlers and 9 batsmen in a cricket club. In how many ways can a team of 11 be selected out of them, so that the team contains at least 4 bowlers ?

3

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81-E

22

50. Calculate the standard deviation for the given frequency distribution :

3

<i>C.I.</i>	<i>f</i>
1 - 5	1
6 - 10	2
11 - 15	3
16 - 20	4

N = 10

(SPACE FOR ROUGH WORK)

51. If $a = \frac{x}{y+z}$, $b = \frac{y}{z+x}$ and $c = \frac{z}{x+y}$, then prove that

$$\frac{a}{1+a} + \frac{b}{1+b} + \frac{c}{1+c} = 1.$$

3

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(SPACE FOR ROUGH WORK)

81-E

24

52. The perimeter of a right angled triangle is 30 cms and its hypotenuse is 13 cms.
Find the length of the other two sides. 3

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(SPACE FOR ROUGH WORK)

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

3

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(SPACE FOR ROUGH WORK)

81-E

26

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

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(SPACE FOR ROUGH WORK)

- V. 55. In an A.P. the sum of first 11 terms is 44 and that of the next 11 terms is 55.
Find the first term and the common difference. 4

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(SPACE FOR ROUGH WORK)

81-E

28

56. Two circles of radii 3 cm and 2 cm, have their centres 9 cm apart. Draw transverse common tangent and measure the length of the tangent and write the measurement.

4

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(SPACE FOR ROUGH WORK)

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

4

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(SPACE FOR ROUGH WORK)

81-E

30

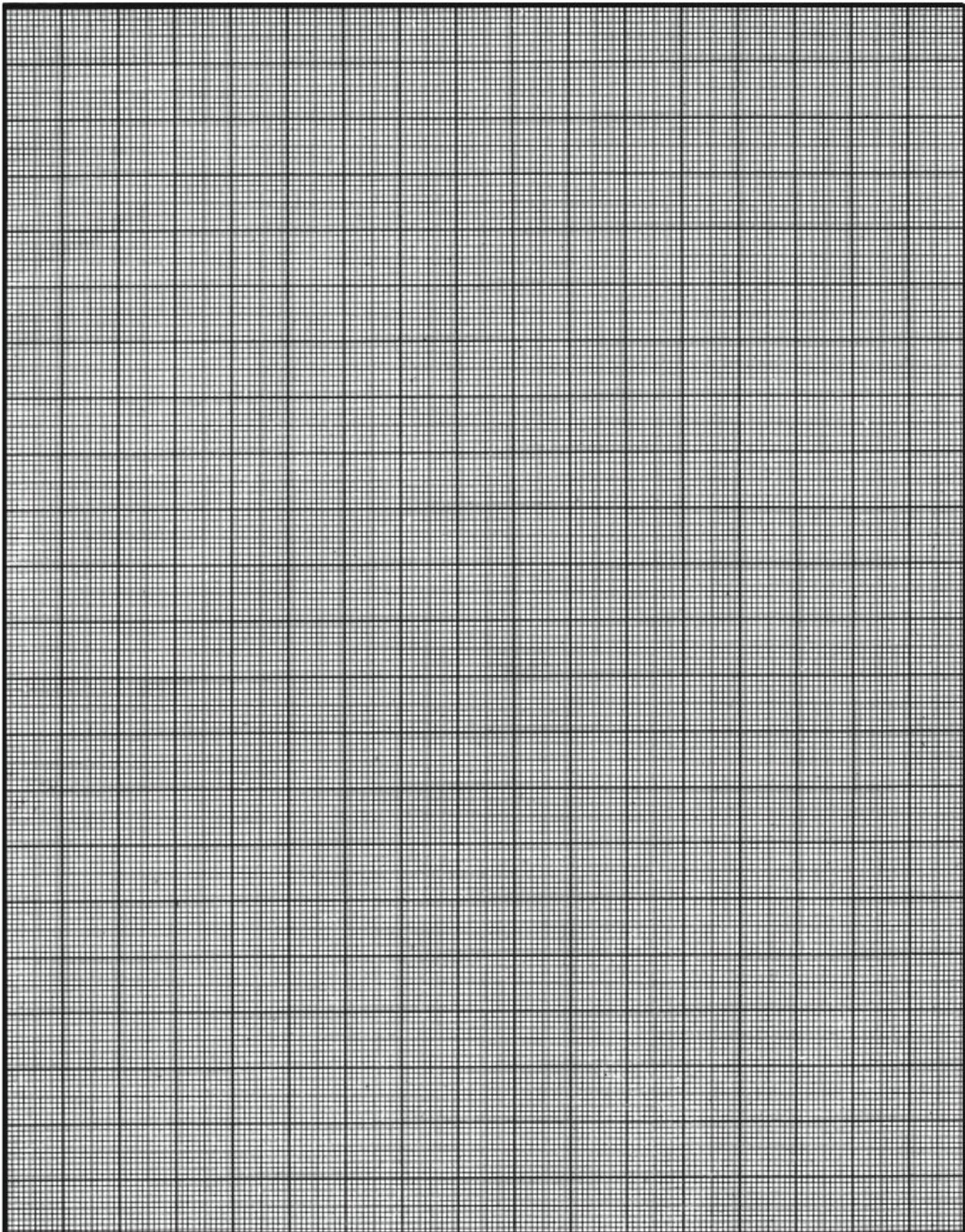
58. Draw the graphs of $y = x^2$ and $y = 2 + x$. Solve the equation

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

4

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