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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 : 17. 06. 2013]

[Date : 17 06. 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

FOR OFFICE USE ONLY

| 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. | | x | |
| 8. | | 21. | | 34. | | 47. | | x | |
| 9. | | 22. | | 35. | | 48. | | x | |
| 10. | | 23. | | 36. | | 49. | | x | |
| 11. | | 24. | | 37. | | 50. | | x | |
| 12. | | 25. | | 38. | | 51. | | x | |
| 13. | | 26. | | 39. | | 52. | | x | |
| 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 × 1 = 20

1. If the universal set $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ and $A = \{0, 1, 3, 5, 7\}$ then $U - A$ is equal to
- (A) $\{0, 2, 3, 4, 6, 8, 9\}$
 - (B) $\{0, 2, 4, 6, 8\}$
 - (C) $\{2, 4, 6, 8\}$
 - (D) $\{2, 4, 6, 8, 9\}$.

Ans. : _____

(SPACE FOR ROUGH WORK)

2. If 2, $1 + x$, 10 are in Harmonic Progression, then the value of x is

- (A) $\frac{1}{3}$ (B) $\frac{7}{3}$
 (C) $\frac{9}{3}$ (D) 10.

Ans. : _____

3. If $A = [1 \ 2 \ 3]$ and $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$ then the order of BA is

- (A) 1×1 (B) 3×3
 (C) 1×3 (D) 3×1 .

Ans. : _____

4. The number of combinations of the letters of the word CONFUSE is

- (A) 1 (B) 8
 (C) $8!$ (D) 336.

Ans. : _____

5. The L.C.M. of $(8x^3 - 1)$ and $(4x^2 + 2x + 1)$ is

- (A) $8x^3 + 1$ (B) $8x^3 - 1$
 (C) $4x^2 + 2x + 1$ (D) $2x - 1$.

Ans. : _____

6. The average of three numbers is 5. If the sum of the first two numbers is 6, then the third number is

- (A) 5 (B) 9
 (C) 15 (D) 21.

Ans. : _____

(SPACE FOR ROUGH WORK)

7. $\sum_{a,b,c} a^2 + \sum_{a,b,c} 2ab$ is equal to

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

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

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

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

Ans. : _____

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

(A) 0

(B) 1

(C) $-3abc$

(D) $3abc.$

Ans. : _____

9. If $a + b + c = 0$ then the value of $a - b - c$ is equal to

(A) $-2a$

(B) $2a$

(C) $2b$

(D) $2c.$

Ans. : _____

10. If $a\sqrt{b} = \sqrt{128}$ and $a = 8$ then b is equal to

(A) $\sqrt{2}$

(B) 2

(C) $\sqrt{64}$

(D) 128.

Ans. : _____

(SPACE FOR ROUGH WORK)

11. One pair of like surds from the following is

(A) $\sqrt{2}$, $\sqrt{8}$

(B) $\sqrt{2}$, $\sqrt{3}$

(C) $\sqrt[3]{2}$, $\sqrt{2}$

(D) $4\sqrt{3}$, $\sqrt[3]{4}$

Ans. : _____

12. The equation having the roots 1 and - 1 is

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

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

(C) $x^2 = 1$

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

Ans. : _____

13. The value of the discriminant of the equation $4x^2 - 4x + 1 = 0$ is

(A) - 8

(B) - 12

(C) 32

(D) 0.

Ans. : _____

14. The product of $5 \otimes_{11} 10$ is

(A) 6

(B) 50

(C) 55

(D) 110.

Ans. : _____

15. The sum of $(3 \oplus_7 6) \oplus_7 4$ is

(A) 16

(B) 13

(C) 7

(D) 6.

Ans. : _____

(SPACE FOR ROUGH WORK)

16. $\Delta ABC \parallel \Delta DEF$. If $\hat{A} = \hat{D}$ and $\hat{B} = \hat{E}$ then $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF}$ is equal to

(A) $\frac{AC^2}{DF^2}$

(B) $\frac{AB^2}{DF^2}$

(C) $\frac{AC^2}{EF^2}$

(D) $\frac{BC^2}{DE^2}$.

Ans. : _____

17. The diagonal of a square is d units. Then the area of the square is

(A) $\frac{d}{\sqrt{2}}$

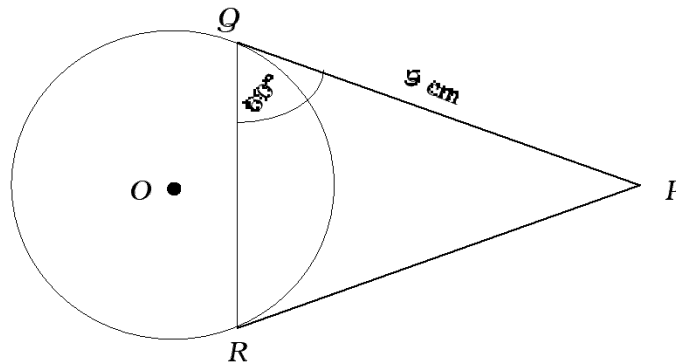
(B) $\frac{d^2}{\sqrt{2}}$

(C) $\frac{d^2}{2}$

(D) $\frac{2}{d^2}$.

Ans. : _____

18. Tangents PQ and PR are drawn to a circle from an external point P . If $PQ = 9$ cm and $\hat{PQR} = 60^\circ$, then the length of the chord QR is.



(A) 4.5 cm

(B) 6 cm

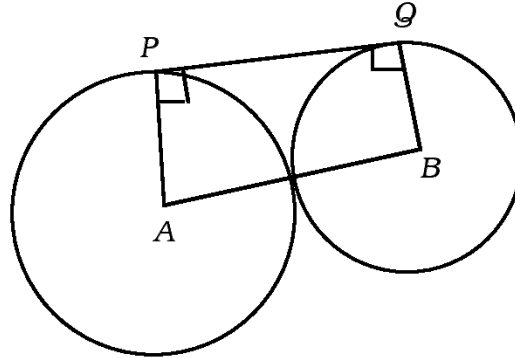
(C) 9 cm

(D) 18 cm.

Ans. : _____

(SPACE FOR ROUGH WORK)

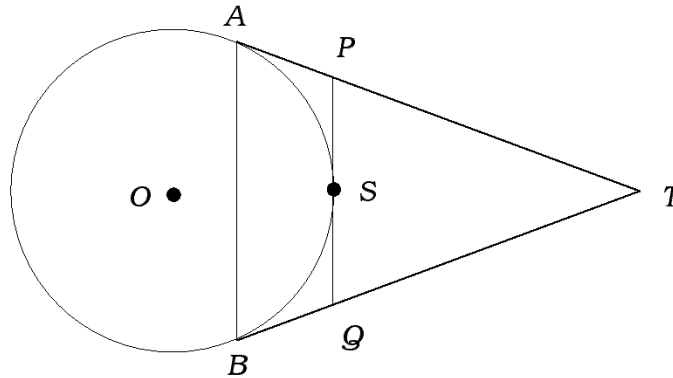
19. Two circles of radii 8 cm and 5 cm with their centres A and B touch each other externally as shown in the figure below. The length of direct common tangent PQ is



- (A) $16\sqrt{10}$ cm (B) $4\sqrt{10}$ cm
 (C) $10\sqrt{16}$ cm (D) $2\sqrt{10}$ cm.

Ans. : _____

20. In the given figure, TA and TB are tangents drawn from an external point T . PQ is another tangent at S . If the perimeter of ΔPTQ is 20 cm, then the length of AT is



- (A) 8 cm (B) 10 cm
 (C) 16 cm (D) 20 cm.

Ans. : _____

(SPACE FOR ROUGH WORK)

II. Fill in the blanks with suitable answers :

$10 \infty 1 = 10$

21. If A and B are non-empty sets such that $A - B = A$ then $A \cap B = \dots\dots\dots$

Ans. : _____

22. If $(AB)'$ = $\begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix}$ then $B' A'$ = $\dots\dots\dots$.

Ans. : _____

23. The value of ${}^5 C_0$ is $\dots\dots\dots$.

Ans. : _____

24. Conjugate of $a\sqrt{b} + c$ is $\dots\dots\dots$.

Ans. : _____

25. The sum of the roots of the equation $x^2 + 5x - 9 = 0$ is $\dots\dots\dots$.

Ans. : _____

(SPACE FOR ROUGH WORK)

26. The standard form of the quadratic equation $x^2 = 3x + 5$ is

Ans. : _____

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

Ans. : _____

28. A straight line drawn parallel to a side of a triangle, divides the other two sides

Ans. : _____

29. The formula to calculate surface area of a sphere is,

Ans. : _____

30. The shape of each face of an octahedron is

Ans. : _____

(SPACE FOR ROUGH WORK)

81-E

10

III. 31. There are 5 terms in a Geometric progression. If the third term is 4, find the product of its terms. 2

(SPACE FOR ROUGH WORK)

226151

32. In a geometric progression the first term is 3, common ratio is 2. Find the sum of the first six terms using suitable formula. 2

(SPACE FOR ROUGH WORK)

81-E

12

33. The Arithmetic Mean and Harmonic Mean of two numbers are 8 and 5 respectively. Find their Geometric Mean. 2

(SPACE FOR ROUGH WORK)

34. If $A = \begin{bmatrix} 2 & 5 \\ -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 \\ -2 & 4 \end{bmatrix}$, find X in the equation $A + \frac{1}{2} X = B$. 2

(SPACE FOR ROUGH WORK)

81-E

14

35. (a) State Fundamental Counting Principle.
(b) Write the meaning of ${}^n P_r$.

2

(SPACE FOR ROUGH WORK)

36. Find n if ${}^{25}C_{n+5} = {}^{25}C_{2n-1}$.

2

(SPACE FOR ROUGH WORK)

81-E

16

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

2

(SPACE FOR ROUGH WORK)

38. Rationalise the denominator and simplify the following :

2

$$\frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}} .$$

(SPACE FOR ROUGH WORK)

81-E

18

39. If one root of the equation $x^2 + px + q = 0$ is 3 times the other, prove that

$$3p^2 = 16q.$$

2

(SPACE FOR ROUGH WORK)

40. What is a pure quadratic equation ? Give one example.

2

(SPACE FOR ROUGH WORK)

41. Solve the equation $p^2 + 1 = 8p$ using the formula.

2

(SPACE FOR ROUGH WORK)

42. If m and n are the roots of the equation $x^2 - 2x + 3 = 0$, find the value of

$$\frac{1}{m^2} + \frac{1}{n^2} .$$

2

(SPACE FOR ROUGH WORK)

81-E

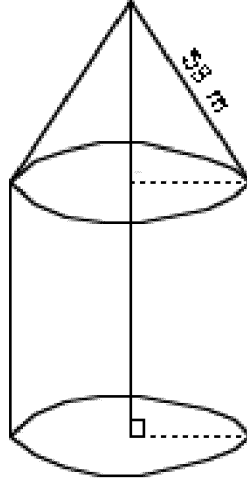
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43. Draw a circle of radius 3 cm. Construct two tangents to it such that angle between them is 50° .

2

(SPACE FOR ROUGH WORK)

44. A tent is in cylindrical shape to a height of 3 m and conical above it, as shown below. If its diameter is 105 m and slant height of the cone is 53 m, calculate the total surface area of the canvas required. 2



(SPACE FOR ROUGH WORK)

45. Find the volume of the cone having radius 7 cm and height 18 cm.

2

(SPACE FOR ROUGH WORK)

46. Draw a plan of the field from the records of surveyor's field book as given below :

2

[Scale : 25 m = 1 cm]

| | Metres to D | |
|---------|-------------|----------|
| | 300 | |
| | 200 | 100 to C |
| To E 75 | 150 | 75 to B |
| | From A | |

(SPACE FOR ROUGH WORK)

47. a) What is meant by traversibility of a network ?
- b) Mention the two conditions for the traversibility of a network. 2

(SPACE FOR ROUGH WORK)

48. Draw the network for the given matrix.

2

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

(SPACE FOR ROUGH WORK)

- 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 ? How many offer only English ? 3

(SPACE FOR ROUGH WORK)

50. The following frequency distribution shows the daily wages of 15 workers. Find their arithmetic mean and standard deviation. 3

| Wages (in Rs.) (CI) | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 | 70 – 80 |
|------------------------------------|---------|---------|---------|---------|---------|
| No. of workers (<i>f</i>) | 2 | 3 | 5 | 3 | 2 |

(SPACE FOR ROUGH WORK)

81-E

30

51. Find the L.C.M. of $m^3 - 3m^2 - 10m + 24$ and $m^3 - 2m^2 - 9m + 18$ by division method. 3

(SPACE FOR ROUGH WORK)

(SPACE FOR ROUGH WORK)

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

$$\frac{a^2}{a^2 - bc} + \frac{b^2}{b^2 - ca} + \frac{c^2}{c^2 - ab} = 2.$$

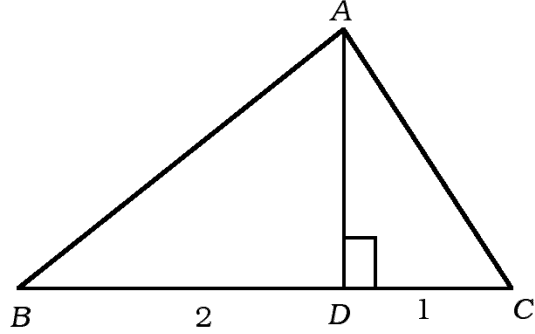
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(SPACE FOR ROUGH WORK)

53. In $\triangle ABC$, AD is the altitude drawn from A to BC and $DB : CD = 2 : 1$.

Prove that $BC^2 = 3(AB^2 - AC^2)$.

3



(SPACE FOR ROUGH WORK)

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

(SPACE FOR ROUGH WORK)

- V. 55. An arithmetic progression consists of three terms whose sum is 15 and sum of the squares of extremes is 58. Find the terms of progression. 4

(SPACE FOR ROUGH WORK)

56. Two circles of radii 5 cm and 2 cm have their centres 10 cm apart. Construct direct common tangents to them. Measure their length and mention the length of each direct common tangent. 4

(SPACE FOR ROUGH WORK)

57. Prove that the areas of similar triangles are proportional to the squares of their corresponding sides. 4

(SPACE FOR ROUGH WORK)

58. Solve graphically : $x^2 - x - 2 = 0$.

4

(SPACE FOR ROUGH WORK)

