

Consortium of Medical Engineering and Dental Colleges of Karnataka (COMEDK-2007)

MATHEMATICS

- 7^{2Log_7^5} is equal to
 - 1) 5
 - 2) $\text{Log}_7 35$
 - 3) $\text{Log}_7 25$
 - 4) 25
- In the group $(G \otimes_{15})$, where $G = \{3, 6, 9, 12\}$, \otimes_{15} is multiplication modulo 15, the identity element is
 - 1) 6
 - 2) 3
 - 3) 9
 - 4) 12
- A group $(G *)$ has 10 elements. The minimum number of elements of G , which are their own inverses is
 - 1) 1
 - 2) 2
 - 3) 0
 - 4) 9
- If \vec{a} and \vec{b} are vectors such that $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$, then the angle between \vec{a} and \vec{b} is
 - 1) 60°
 - 2) 120°
 - 3) 30°
 - 4) 90°
- $\frac{3x^2 + 1}{x^2 - 6x + 8}$ is equal to
 - 1) $\frac{49}{2(x-4)} + \frac{13}{2(x-2)}$
 - 2) $3 + \frac{49}{2(x-4)} + \frac{13}{2(x-2)}$
 - 3) $\frac{49}{2(x-4)} + \frac{13}{2(x-2)}$
 - 4) $\frac{-49}{2(x-4)} + \frac{13}{2(x-2)}$

26. A graph G has ' m ' vertices of odd degree and ' n ' vertices of even degree. Then which of the following statements is necessarily true ?

- 1) $m + n$ is an even number 2) $m + n$ is an odd number
3) $m + 1$ is an odd number 4) $n + 1$ is an even number

27. If p is any point on the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$, and S and S' are the foci, then $PS + PS' =$

- 1) 8 2) 4
3) 12 4) 10

28. The value of $\text{Sin} \left[2\text{Cos}^{-1} \frac{\sqrt{5}}{3} \right]$ is

- 1) $\frac{2\sqrt{5}}{3}$ 2) $\frac{\sqrt{5}}{3}$
3) $\frac{2\sqrt{5}}{9}$ 4) $\frac{4\sqrt{5}}{9}$

29. If $\frac{x^2}{36} - \frac{y^2}{k^2} = 1$ is a hyperbola, then which of the following statements can be true ?

- 1) (3, 1) lies on the hyperbola 2) (-3, 1) lies on the hyperbola
3) (5, 2) lies on the hyperbola 4) (10, 4) lies on the hyperbola

30. The focus of the parabola is

- 1) $\left(\frac{1}{3}, \frac{-3}{2} \right)$ 2) $\left(\frac{-1}{3}, \frac{3}{2} \right)$
3) $\left(\frac{1}{3}, \frac{-1}{2} \right)$ 4) $\left(\frac{1}{3}, \frac{3}{2} \right)$

31. The solution of $\tan^{-1}x + 2\cot^{-1}x = \frac{2\pi}{3}$ is

1) $\frac{1}{\sqrt{3}}$

2) $-\frac{1}{\sqrt{3}}$

3) $\sqrt{3}$

4) $-\sqrt{3}$

32. $\sin^2 17.5^\circ + \sin^2 72.5^\circ$ is equal to

1) $\tan^2 45^\circ$

2) $\cos^2 90^\circ$

3) $\sin^2 45^\circ$

4) $\cos^2 30^\circ$

33. The conjugate of the complex number $\frac{(1+i)^2}{1-i}$ is

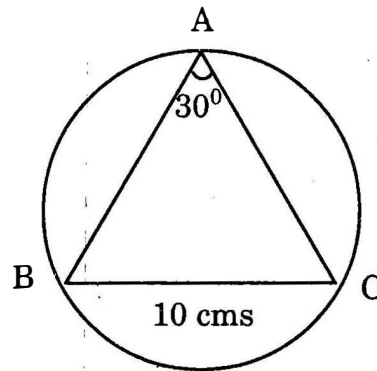
1) $1+i$

2) $1-i$

3) $-1-i$

4) $-1+i$

34. ABC is a triangle with $\angle A = 30^\circ$ $BC = 10$ cms
The area of the circum-circle of the triangle is



1) 5 sq. cms.

2) 100π sq. cms.

3) $\frac{100\pi}{3}$ sq. cms.

4) 25 sq. cms.

35. If $\sin 3\theta = \sin \theta$, how many solutions exist such that $-2\pi < \theta < 2\pi$?

1) 9

2) 8

3) 7

4) 5

41. If $\text{Sec}^{-1}\left(\frac{1+x}{1-y}\right) = a$, then $\frac{dy}{dx}$ is

1) $\frac{y+1}{x-1}$

2) $\frac{y-1}{x+1}$

3) $\frac{x-1}{y+1}$

4) $\frac{x-1}{y-1}$

42. If $y = \text{Cos}^2 \frac{3x}{2} - \text{Sin}^2 \frac{3x}{2}$, then $\frac{d^2y}{dx^2}$ is

1) $9y$

2) $-3\sqrt{1-y^2}$

3) $3\sqrt{1-y^2}$

4) $-9y$

43. If the function $f(x) = \begin{cases} \frac{1-\text{Cos } x}{x^2} & \text{for } x \neq 0 \\ k & \text{for } x = 0 \end{cases}$ is continuous at $x=0$, then the value of k is

1) 0

2) 1

3) -1

4) $\frac{1}{2}$

44. If $1, w, w^2$ are the cube roots of unity then $(1+w)(1+w^2)(1+w^4)(1+w^8)$ is equal to

1) 0

2) 1

3) w

4) w^2

45. If $x^x = y^y$ then $\frac{dy}{dx}$ is

1) $\frac{x}{y}$

2) $-\frac{y}{x}$

3) $\frac{1+\text{Log } x}{1+\text{Log } y}$

4) $1+\text{Log}\left(\frac{x}{y}\right)$

46. The point on the curve $y^2 = x$, the tangent at which makes an angle 45° with X-axis is

1) $(\frac{1}{2}, \frac{1}{4})$

2) $(\frac{1}{4}, \frac{1}{2})$

3) $(\frac{1}{2}, \frac{1}{2})$

4) $(\frac{1}{2}, -\frac{1}{2})$

47. The length of the subtangent to the curve $x^2y^2 = a^4$ at $(-a, a)$ is

1) $2a$

2) $\frac{a}{2}$

3) $\frac{a}{3}$

4) a

48. The number of positive divisors of 252 is

1) 5

2) 9

3) 10

4) 18

49. The remainder obtained when 5^{124} is divided by 124 is

1) 0

2) 5

3) 1

4) 2

50. Which of the following is not a group with respect to the given operation ?

1) The set of odd integers under addition.

2) The set of even integers under addition.

3) $\{1, -1\}$ under multiplication.

4) $\{0\}$ under addition.

56. The value of $\int e^x (x^5 + 5x^4 + 1) \cdot dx$ is

1) $e^x \cdot x^5 + e^x + C$

2) $e^x \cdot x^5$

3) $5x^4 \cdot e^x$

4) $e^{x+1} \cdot x^5 + C$

57. The value of $\int \frac{x^2+1}{x^2-1} dx$ is

1) $\text{Log}\left(\frac{x+1}{x-1}\right) + C$

2) $\text{Log}\left(\frac{x-1}{x+1}\right) + C$

3) $\text{Log}(x^2 - 1) + C$

4) $x + \text{Log}\left(\frac{x-1}{x+1}\right) + C$

58. The area bounded by the curve $x = 4 - y^2$ and the Y-axis is

1) 32 sq. units

2) 16 sq. units

3) $\frac{16}{3}$ sq. units

4) $\frac{32}{3}$ sq. units

59. The differential equation of the family of straight lines whose slope is equal to y-intercept is

1) $(x+1)\frac{dy}{dx} + y = 0$

2) $(x+1)\frac{dy}{dx} - y = 0$

3) $\frac{dy}{dx} = \frac{x+1}{y+1}$

4) $\frac{dy}{dx} = \frac{x-1}{y-1}$

60. The order and degree of the differential equation $\left[1 + \left(\frac{dy}{dx}\right)^5\right]^{\frac{1}{3}} = \frac{d^2y}{dx^2}$ are respectively

1) 2, 1

2) 1, 5

3) 2, 3

4) 2, 5