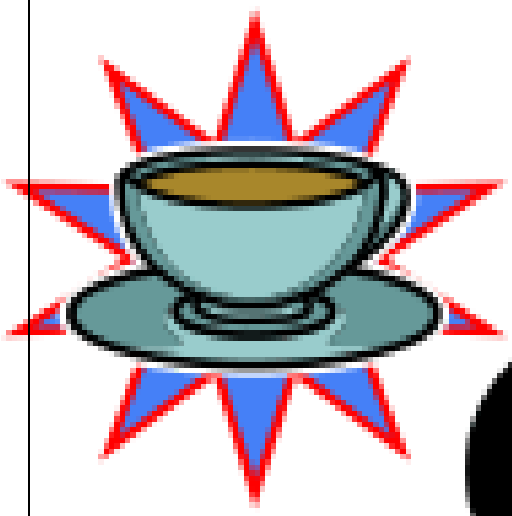

Math café

+1-QUESTION BANK

REVISION TEST-1

PREPARED BY: E.PALAVESAM.M.Sc.,B.Ed.,

Math Café

Mathematics Time: 3.00Hrs.

STD: **XI** **REVISION TEST-1** Marks: **90**

PART-A

I. Choose the best Answers **20 x 1 = 20**

1. The number of relations on a set containing 3 elements is
   (1) 9 (2) 81 (3) 512 (4) 1024
2. If 3 is the logarithm of 343 , then the base is
   (1) 5 (2) 7 (3) 6 (4) 9
3. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \cdots + \cos 179^\circ =$
   (1) 0 (2) 1 (3) -1 (4) 89
4. The number of rectangles that a chessboard has ⋯
   (1) 81 (2) 9^9 (3) 1296 (4) 6561
5. The remainder when 38^{15} is divided by 13 is
   (1) 12 (2) 1 (3) 11 (4) 5.
6. $\sin 150^0 =$ _____
   (1) $\frac{1}{2}$ (2) $-\frac{1}{2}$ (3) $\frac{\sqrt{3}}{2}$ (4) $-\frac{\sqrt{3}}{2}$
7. The area of the triangle formed by the lines $x^2 - 4y^2 = 0$ and $x = a$ is
   (1) $2a^2$ (2) $\frac{\sqrt{3}}{2}a^2$ (3) $\frac{1}{2}a^2$ (4) $\frac{2}{\sqrt{3}}a^2$
8. The points (x, -2), (5, 2), (8, 8) are collinear then x is equal to
   (1) – 3 (2) $\frac{1}{3}$ (3) 1 (4) 3
9. If $|\vec{a}| = 13, |\vec{b}| = 5$ and $\vec{a} \cdot \vec{b} = 60^\circ$ then $|\vec{a} \times \vec{b}|$ is
   (1) 15 (2) 35 (3) 45 (4) 25
10. $\lim_{x\to 0} \frac{a^x - b^x}{x} =$
    (1) $\log ab$ (2) $\log\left(\frac{a}{b}\right)$ (3) $\log\left(\frac{b}{a}\right)$ (4) $\frac{a}{b}$
11. If $y = \frac{1}{a-z}$, then $\frac{dz}{dy}$ is
    (1) $(a-z)^2$ (2) $-(z-a)^2$ (3) $(z+a)^2$ (4) $-(z+a)^2$
12. If A is a square matrix and $|A| = 2$, find the value of $|AA^T|$
    (1) 0 (2) 1 (3) 2 (4) 4

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13. $\int e^{\sqrt{x}}dx$ is

(1) $2\sqrt{x}\left(1-e^{\sqrt{x}}\right)+c$ (2) $2\sqrt{x}\left(e^{\sqrt{x}}-1\right)+c$ (3) $2e^{\sqrt{x}}(1-\sqrt{x})+c$ (4) $2e^{\sqrt{x}}(\sqrt{x}-1)+c$

14. If two events A and B are independent such that $P(A)=0.35$ and $P(A\cup B)=0.6$, then $P(B)$ is

(1) $\frac{5}{13}$ (2) $\frac{1}{13}$ (3) $\frac{4}{13}$ (4) $\frac{7}{13}$

15. $|x-9|<2$ *then*

(1) $7<x<11$ (2) $x=11$ (3) $7>x>11$ (4) $x\neq 7$

16. The x – intercept for the equation $\sqrt{3}x-y+4=0$ is

(1) $2/\sqrt{3}$ (2) $\sqrt{3}/4$ (3) $1/4$ (4) $-4/\sqrt{3}$

17. The sum of the squares of the direction cosines of $\bar{r}$ is

(1) 0 (2) 1 (3) -1 (4) none of these

18. Ten coins are tossed. The probability of getting at least 8 heads is

(1) $7/64$ (2) $7/32$ (3) $7/16$ (4) $7/128$

19. $\int \frac{\sqrt{\tan x}}{\sin 2x}dx$ is

(1) $\sqrt{\tan x}+c$ (2) $2\sqrt{\tan x}+c$ (3) $\frac{1}{2}\sqrt{\tan x}+c$ (4) $\frac{1}{4}\sqrt{\tan x}+c$

20. If $pv=81$, then $\frac{dp}{dv}$ at $v=9$ is

(1) 1 (2) -1 (3) 2 (4) -2

PART-B

II. Answer any 7 questions.(Q.no.30 is compulsory) **7 x 2 =14**

21. If $f:[-2,2]\to B$ is given by $f(x)=2x^3$, then find B so that f is onto.

22. Solve $\left|\frac{2}{x-4}\right|>1, x\neq 4$.

23. Express $\sin 40^\circ\cos 30^\circ$ as a sum.

24. If ${}^{n}C_{12}={}^{n}C_{9}$ find ${}^{21}C_{n}$.

25. Write the 6 terms of the sequence whose nth term a_n is given below.

$$a_n=\begin{cases} n & \text{if } n \text{ is } 1,2 \text{ or } 3 \\ a_{n-1}+a_{n-2}+a_{n-3} & \text{if } n>3 \end{cases}$$

26. Define Skew – Symmetric matrix.

27. Show that $\vec{a}\times(\vec{b}+\vec{c})+\vec{b}\times(\vec{c}+\vec{a})+\vec{c}\times(\vec{a}+\vec{b})=\vec{0}$.

28. Prove that $\lim_{x\to 0}\sin x=0$.

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29. Integrate e^{8-7x} w.r.t .x

30. Differentiate : $y = x \log x$ w.r.t. x

PART-C

III. Answer any 7 questions.(Q.no.40 is Compulsory) **7 x 3 =21**

31. Write the values of f at $-3,5,2,-1,0$ if

$$f(x) = \begin{cases} x^2 + x - 5 & \text{if } x \in (-\infty, 0) \\ x^2 + 3x - 2 & \text{if } x \in (3, \infty) \\ x^2 & \text{if } x \in (0,2) \\ x^2 - 3 & \text{otherwise} \end{cases}$$

32. Simplify by rationalising the denominator. $\frac{7+\sqrt{6}}{3-\sqrt{2}}$.

33. If $\frac{6!}{n!} = 6$, then find the value of n.

34. Find the last two digits of the number 7^{400}

35. Show the points $\left(0, -\frac{3}{2}\right)$, $(1, -1)$, $\left(2, -\frac{1}{2}\right)$ are collinear.

36. Find the value of the product; $\begin{vmatrix} \log_3 64 & \log_4 3 \\ \log_3 8 & \log_4 9 \end{vmatrix} \times \begin{vmatrix} \log_2 3 & \log_8 3 \\ \log_3 4 & \log_3 4 \end{vmatrix}$.

37. Find the positive integer n so that $\lim_{x\to 3} \frac{x^n - 3^n}{x-3} = 27$.

38. Integrate : $\frac{x \sin^{-1} x}{\sqrt{1-x^2}}$ w.r.t. x

39. Prove $\log \frac{75}{16} - 2\log \frac{5}{9} + \log \frac{32}{243} = \log 2$.

40. A die is rolled. If it shows an odd number, find the probability of getting 5.

PART-D

IV. Answer all the questions **7 x 5 = 35**

41. a) If $f: \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = 3x - 5$, prove that f is a bijection and find its inverse. **(OR)**

b) Prove that $32(\sqrt{3}) \sin \frac{\pi}{48} \cos \frac{\pi}{48} \cos \frac{\pi}{24} \cos \frac{\pi}{12} \cos \frac{\pi}{6} = 3$.

42. a) By the principle of mathematical induction, prove that, for all integers $n \geq 1$,

$1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$ **(OR)**

b) Show that $\lim_{x\to 0^+} x\left[\left\lfloor \frac{1}{x} \right\rfloor + \left\lfloor \frac{2}{x} \right\rfloor + \cdots + \left\lfloor \frac{15}{x} \right\rfloor\right] = 120$.

43. a) Prove that $\begin{vmatrix} 1 & x^2 & x^3 \\ 1 & y^2 & y^3 \\ 1 & z^2 & z^3 \end{vmatrix} = (x-y)(y-z)(z-x)(xy+yz+zx)$ **(OR)**

b) Evaluate : $\int \frac{3x+5}{x^2+4x+7} dx$

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44. a)Resolve into partial fractions : $\frac{x^2+x+1}{x^2-5x+6}$ **(OR)**

b) If the equation $\lambda x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$ represents a pair of straight lines, find

(i) the value of λ and the separate equations of the lines

(ii) point of intersection of the lines

(iii) angle between the lines

45. a) Prove that $\sqrt[3]{x^3+6} - \sqrt[3]{x^3+3}$ is approximately equal to $\frac{1}{x^2}$ when x is sufficiently large. **(OR)**

b) If $y = (\cos^{-1} x)^2$, prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - 2 = 0$. Hence find y_2 when $x = 0$

46. a) Find the equation of the line through the intersection of the lines $3x + 2y + 5 = 0$ and $3x - 4y + 6 = 0$ and the point (1,1). **(OR)**

b) The chances of A, B and C becoming manager of a certain company are 5: 3: 2. The probabilities that the office canteen will be improved if A, B, and C become managers are 0.4,0.5 and 0.3 respectively. If the office canteen has been improved, what is the probability that B was appointed as the manager?

47. a) Prove by vector method, the medians of a triangle are concurrent. **(OR)**

b) Prove that $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$.

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