1.What is the nature of relation R, if R is defined as R = {(x,y) : 2x + y = 41, x, yÃ N} ?

A. reflexive
B. symmetric
C. transitive
D. None of these

2.cos 24° + cos 55° + cos 125° + cos 204° + cos 300° = ?

A. 1/2
B. 3/2
C. 3
D. 0

3. $\sec^{-1}\left[\frac{x^2+1}{x^2-1}\right] = ?$

A. $2\tan^{-1} x$
B. $2x^2$
C. $2\cot^{-1} x$
D. x^2

4.Find the foci of hyperbola $9x^2 - 16y^2 = 144$.

A. (0, ±5)
B. (±5, 0)
C. (±5, 1)
D. (5, ±1)

5.Find the nature of the triangle whose vertices are A(12, 8), B(-2, 6) & C(6, 0).

A. Isosceles Right angle triangle
B. Equilateral triangle
C. Scalene triangle

D. None of these

6.For every point $P(x, y, z)$ on the xy - plane,

A. $x = 0$
B. $y = 0$
C. $z = 0$
D. None of these

7.Find the conjugate of $(6 + 5i)^2$.

A. $60 + 11i$
B. $11 - 60i$
C. $11 + 60i$
D. $60 - 11i$

8.$C(n,r) + 2C(n,r-1) + C(n,r-2) = ?$.

A. $C(n + 1,r)$
B. $C(n + 2,r)$
C. $C(n + 2,r - 1)$
D. $C(n+1,r - 1)$

9.If n^{th} term of a G.P. is 2^n then find the sum of its first 6 terms.

A. 126
B. 124
C. 190
D. 154

10.Find the coefficient of x^2 in the expansion of $\left(3x - \frac{1}{x}\right)^6$.

A. 405
B. 7290
C. 2430
D. 1215

11. $\begin{vmatrix} 0 & c & b \\ c & 0 & a \\ b & a & 0 \end{vmatrix}^2$

A. $a^2 b^2 c^2$
B. $4\, a^2 b^2 c^2$
C. $1/4\, a^2 b^2 c^2$
D. $(a + b + c)^2$

12. If $A = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$, then $A^{-1} = ?$

A. A
B. $-A$
C. I
D. $-I$

13. If ω is the cube root of unity, then $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix} = ?$

A. 1
B. ω
C. ω^2
D. 0

14. $\lim_{x\to 0}\frac{\sin(2+x)-\sin(2-x)}{x}=?$

A. 1/2 cos2

B. 1

C. 2 cos 2

D. 0

15. $\frac{d}{dx}\left\{\tan^{-1}(\sec x+\tan x)\right\}=?$

A. – 1/2

B. 1

C. –1

D. 1/2

16.Find $\frac{d^2y}{dx^2}$, if $\sqrt{x+y}+\sqrt{y-x}=c$.

A. 2/c

B. $-2/c^2$

C. $2/c^2$

D. $4/c^2$

17.An edge of a cube is increasing at the rate of 3 cm/sec. Find the rate at which does the volume increase (in cm^3/sec) if the edge of the cube is 10 cm.

A. 900

B. 725

C. 700

D. 825

18.If $s = t^3 - 4t^2 + 5$ describes the motion of a particle, then its velocity (in unit/sec) when the acceleration vanishes, is

A. 16/9
B. – 32/3
C. 4/3
D. –16/3

19.Find the standard deviation of 8, 12, 13, 15, 22.

A. 3.54
B. 3.72
C. 4.21
D. 4.6

20.If a coin is tossed thrice, find the probability of getting one or two heads.

A. 4/5
B. 5/8
C. 3/4
D. 6/7

21.If the points $A(60\hat{i}+3\hat{j}), B(40\hat{i}-8\hat{j})$ and $C(a\hat{i}-52\hat{j})$ are collinear, then a is equal to

A. 40
B. – 40
C. 20
D. – 20

22. $\int_{\frac{\pi}{3}}^{\frac{\pi}{3}} \sin^2 x \, dx = ?$

A. 1
B. $\frac{\pi}{3}-\frac{\sqrt{3}}{4}$

C. $\frac{\pi}{2}-\frac{1}{4}$

D. 0

23. $\int \frac{\cos 2x}{\cos^2 x.\sin^2 x}$

A. $-\cot x - \tan x + c$

B. $\cot x - \tan x + c$

C. $\cot x + \tan x + c$

D. $\tan x - \cot x + c$

24.Find the solution of the differential equation $\frac{dy}{dx}=e^{x+y}+x^2e^y$.

A. $e^x - e^y + \frac{y^3}{3} = c$

B. $e^x + e^y + \frac{x^3}{3} = c$

C. $e^x + e^{-y} + \frac{x^3}{3} = c$

D. $e^x + e^{-y} + \frac{y^3}{3} = c$

25.Find the area of the region (in sq. units) bounded by the curve $y^2 = 2y - x$ & y – axis.

A. 8/3

B. 4/3

C. 5/3

D. 2/3