

9. The number of ways can a committee of 5 women and 6 men be chosen from 10 women and 8 men if Mr. A refuses to serve on the committee if Mrs. B is a member, is
a) 4410 b) 882 c) 3582 d) 3528
10. The value of $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\cot x}}$ is
a) $\frac{\pi}{6}$ b) $\frac{\pi}{3}$ c) $\frac{2\pi}{3}$ d) none of these
11. The range of the function $f(x) = \log_2 \frac{\sin x - \cos x + 3\sqrt{2}}{\sqrt{2}}$ is
a) (1,2) b) [1,2) c) (1,2] d) [1,2]
12. If the function $f(x) = \begin{cases} \frac{\ell \ln(1+ax) - \ln(1-bx)}{x} & , x \neq 0 \\ k & , x = 0 \end{cases}$ is continuous at $x = 0$, then the value of k is
a) $a - b$ b) $-a + b$ c) $a + b$ d) $-(a + b)$
13. If $f(x) = 2|x| + |x - 2|$, then $f'(1)$ is
a) -1 b) 1 c) 0 d) 2
14. If $\ell x + my = 1$ be a normal to the parabola $y^2 = 4ax$ then
a) $a\ell^3 + 2a\ell m^2 = m^2$ b) $a\ell^3 - 2a\ell m^2 = m^2$ c) $a\ell^3 - 2a\ell m^2 + m = 0$ d) $-a\ell^3 + 2a\ell m = m^2$
15. If the curves $ax^2 + by^2 = 1$ and $a'x^2 + b'y^2 = 1$ cut orthogonally, then
a) $\frac{1}{b} + \frac{1}{b'} = \frac{1}{a} + \frac{1}{a'}$ b) $\frac{1}{b} - \frac{1}{b'} = \frac{1}{a} - \frac{1}{a'}$ c) $\frac{1}{b'} - \frac{1}{b} = \frac{1}{a} - \frac{1}{a'}$ d) $\frac{1}{a} + \frac{1}{b} + \frac{1}{a'} + \frac{1}{b'} = 0$
16. If the lines $\ell x + my + n = 0$, $mx + ny + \ell = 0$ and $nx + \ell y + m = 0$ are concurrent, then
a) $\ell - m + n = 0$ b) $-\ell + m + n = 0$ c) $\ell + m + n = 0$ d) $\ell + m - n = 0$
17. The area bounded by the curves $y = |x - 1|$ and $y = 3 - |x|$ is
a) 1 sq. unit b) 3 sq. unit c) 2 sq. unit d) 4 sq. unit
18. The circumcentre of the triangle formed by the lines $x + y = 0$, $x - y = 0$ and $\ell x + my = 1$ is given by
a) $\left(\frac{\ell}{\ell^2 - m^2}, \frac{-m}{\ell^2 - m^2}\right)$ b) $\left(\frac{-\ell}{\ell^2 - m^2}, \frac{m}{\ell^2 - m^2}\right)$ c) $\left(\frac{\ell}{\ell^2 - m^2}, \frac{m}{\ell^2 - m^2}\right)$ d) $\left(\frac{-\ell}{\ell^2 - m^2}, \frac{-m}{\ell^2 - m^2}\right)$
19. If α, β be two different roots of the equation $a \cos \theta + b \sin \theta = c$, then the value of $\sin(\alpha + \beta)$ is
a) $\frac{2ab}{a^2 - b^2}$ b) $\frac{2ab}{a^2 + b^2}$ c) $\frac{-2ab}{a^2 - b^2}$ d) none of these
20. If n is an integer then the general solution of $\tan x - \cot x = \operatorname{cosec} x$ is
a) $(2n+1)\pi$ b) $2n\pi \pm \frac{\pi}{3}$ c) $(2n+1)\pi, 2n\pi \pm \frac{\pi}{3}$ d) none of these
21. Let $X = \{1, 2, 3, 4, 5\}$. The number of subsets of X containing more than one element is
a) 24 b) 25 c) 26 d) 27
22. The number of nonconstant maps from $\{1, 2, 3\}$ to $\{1, 2, 3, 4\}$ is
a) 54 b) 60 c) 64 d) 72
23. The number of reflexive relations on the set $\{1, 2, 3\}$ is
a) 32 b) 48 c) 64 d) 80

24. A problem is given to three students. The chances of solving the problem by them are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. The probability of the solving the problem by exactly one of the students is

a) $\frac{7}{24}$

b) $\frac{11}{24}$

c) $\frac{13}{24}$

d) $\frac{17}{24}$

25. If $A = \begin{pmatrix} 1 & 2 \\ 2 & 3 \end{pmatrix}$ then $A^2 - 3A + 5I_2$ is (I_2 is the identity matrix of order 2)

a) $\begin{pmatrix} 7 & 2 \\ 2 & 9 \end{pmatrix}$

b) $\begin{pmatrix} 2 & 7 \\ 2 & 9 \end{pmatrix}$

c) $\begin{pmatrix} 2 & 7 \\ 9 & 2 \end{pmatrix}$

d) $\begin{pmatrix} 7 & 2 \\ 9 & 2 \end{pmatrix}$

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FOR ROUGH WORK
