

The Millennium Stars School and College
Rangpur Cantonment

Subject:- Higher Mathematics (1st paper)

Time: 25 minutes

Marks:25

- The polar coordinates of $(\sqrt{3}, -1)$ is –
a. $(2, 120^\circ)$ b. $(2, 150^\circ)$
c. $(2, 300^\circ)$ d. $(2, 330^\circ)$
 - If the points $(x, 0), (5, 4)$ and $(-3, -4)$ are collinear, then the value of x is-
a. -1 b. 0
c. 1 d. 5
 - The slope of the perpendicular line of $5x+2y-8=0$ is-
a. $-\frac{5}{2}$ b. $-\frac{2}{5}$ c. $\frac{2}{5}$ d. $\frac{5}{2}$
 - If the circle touches the x-axis whose centre is $(2, -5)$, then the radius is-
a. 2 units b. 3 units c. 5 units d. 11 units
 - The length of tangent from the point $(2, 3)$ on the circle $x^2+y^2=1$ is
a. $\sqrt{3}$ unit b. $2\sqrt{3}$ units c. 3 units d. $4\sqrt{3}$ units
- Observe the following stem and answer the questions no.6 and 7:-
A polygon consists of 10 sides.
- How many triangles can be formed by joining the angular points ?
a. 120 b. 14 c. 160 d. 180
 - How many diagonal can be formed by joining the angular points ?
a. 30 b. 35 c. 45 d. 50
 - What is the angle between the hour and minutes hand when the time is 7:15 o'clock?
a. 127° b. $127^\circ 15'$ c. $127^\circ 30'$ d. $127^\circ 45'$
 - The Period of $\sec(5x+3)$ is-
a. $\frac{2\pi}{5}$ b. $\frac{2\pi}{3}$ c. π d. 2π
 - What is the value of $\cos A + \cos(120^\circ - A) + \cos(120^\circ + A)$?
a. $-\frac{1}{2}$ b. 0 c. $\frac{1}{2}$ d. 1
 - If $\sin\theta = \frac{4}{5}$ and $\frac{\pi}{2} < \theta < \pi$, then what is the value of $\frac{\tan\theta + \sec(-\theta)}{\cot\theta + \operatorname{cosec}(-\theta)}$?
a. -6 b. -3 c. $\frac{3}{2}$ d. $\frac{5}{2}$
 - What is the value of $\lim_{x \rightarrow 2} \frac{x^2-2}{x^2-5x+6}$?
a. 4 b. -2 c. 0 d. 4
 - If $y = \tan^{-1} \sqrt{\frac{1-\cos x}{1+\cos x}}$ then which one is equal to $\frac{dy}{dx}$?
a. $\frac{1}{4}$ b. $\frac{1}{2}$ c. $\frac{3}{4}$ d. 1
 - If $y = \sin e^x$, then -
i. $\frac{dy}{dx} = \cos e^x$ ii. $\frac{d}{dx}(\sin^{-1} y) = e^x$ iii. $\frac{d}{dx}(\tan^{-1} y) = \frac{e^x \operatorname{cosec} x}{1+\sin^2 e^x}$
Which one is correct?
a. i & ii b. ii & iii c. i & iii d. i, ii & iii
 - Which one is equal to $\int \frac{e^x - e^{-x}}{e^x + e^{-x}} dx$?
a. $\ln(e^x - e^{-x}) + c$ b. $(e^x + e^{-x}) + c$

- c. $(e^x - e^{-x}) + c$ d. $\ln(e^x + e^{-x}) + c$
16. Which one is equal to $\int \frac{x^2}{x^2-4} dx$?
- a. $\ln \left| \frac{x-2}{x+2} \right| dx + c$ b. $\ln \left| \frac{x^2-2}{x^2+2} \right| dx + c$ c. $x + \ln \left| \frac{x^2-2}{x^2+2} \right| dx + c$ d. $2x + \ln \left| \frac{x-2}{x+2} \right| dx + c$
17. What is the value of $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$.
- a. $\frac{\pi}{16}$ b. $-\frac{\pi}{16}$ c. $\frac{\pi^2}{32}$ d. $\frac{\pi^2}{16}$
18. What is the value of $\int_0^{\frac{\pi}{4}} \frac{dx}{1+\cos 2x}$?
- a. 0 b. $\frac{1}{2}$ c. 1 d. $\frac{3}{2}$
19. For what value of m the matrix $\begin{bmatrix} m-2 & 6 \\ 2 & m-3 \end{bmatrix}$ will be singular?
- a. (-1,-6) b. (1,-6) c. (6,-1) d. (1,5)
20. If $A = \begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$, which one is equal to A^{-1} ?
- a. $\begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$ b. $\begin{bmatrix} 2 & -5 \\ -3 & 7 \end{bmatrix}$ c. $\begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$ d. $\begin{bmatrix} -2 & 5 \\ 3 & -2 \end{bmatrix}$
21. If the vector $a\hat{i} + \frac{1}{2}\hat{j} + \frac{1}{4}\hat{k}$ is unit vector then the value of a is -
- a. $\pm \frac{5}{6}$ b. $\pm \frac{4}{6}$ c. $\pm \frac{\sqrt{11}}{4}$ d. $\pm \frac{\sqrt{23}}{6}$
22. For what value of x the vectors $3\hat{i} - 2\hat{j} + 4\hat{k}$ and $3\hat{i} - x\hat{j} - \hat{k}$ are perpendicular?
- a. $-\frac{13}{2}$ b. $-\frac{5}{2}$ c. 0 d. 2
23. For what value of the straight lines $3x+2y-5=0$, $ax+4y-9=0$ and $x+2y-7=0$ will concurrent?
- a. -7 b. 3 c. 5 d. 7
- Observe the following stem and answer the question no.24 and no.25
The vertices of triangle ABC are A(1,5), B(-4,1) and C(2,1) respectively.
24. What is the value of AB?
- a. 5 units b. 9 units c. 16 units d. 25 units
25. The perpendicular length from C to AB is-
- a. $\frac{5}{24}$ units b. $\frac{24}{5}$ units c. 5 units d. 24 units

ANSWER OF THE QUESTION

1	d	2	c	3	a	4	c	5	b	6	a	7	b	8	c	9	a	10	b	11	c	12	a	13	b
14	c	15	c	16	c	17	c	18	b	19	c	20	d	21	c	22	b	23	d	24	a	25	b		