

First Year B.Sc (MRT) Degree Supplementary Examinations
March 2026
Mathematics

Time: 3 Hours

Total Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers • Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together • Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary.
- The use of a simple calculator is allowed, but using scientific calculator or sharing any calculator is strictly prohibited under any circumstance.

Essay

(2x20=40)

1. (a) Find the standard deviation from the following frequency distribution.

Class	120-124	125-129	130-134	135-139	140-144	145-149
f	12	25	28	15	12	8

(b) Using Simpson's rule evaluate $\int_0^2 \frac{1}{1+x} dx$.

2. (a) integrate the following

(i) $\int (3x+4)^{10} dx$ (ii) $\int \frac{1}{(x+3)} dx$

(b) Find Curl $\vec{F}$, where $\vec{F} = x^2y \hat{i} + yz \hat{j} + z^2 \hat{k}$ at (1,-1,2)**Short notes:**

(8x5=40)

3. Differentiate $\sin^{-1}(x^2)$ with respect to x
4. If two sides of a triangle are 8 units and 6 units and the included angle is 30° . Then find the area of the triangle.
5. Using Cramer's rule solve:

$$x + y + z = 3$$

$$2x + 4y - z = 5$$

$$2x - y + 2z = 3$$

6. Find the Laplace transform of
- $\sin 3t + t^2 + e^{4t}$

7. Find the values of
- $(-1)^{1/5}$
- .

8. Ten coins are tossed simultaneously. Find the probability of getting

(i) atleast 7 Heads

(ii) exactly 7 Heads

9. Using Trapezoidal rule evaluate
- $\int_1^2 \frac{1}{x} dx$

10. Find the sum of the series
- $-3 + 1 + 5 + 9 + \dots$
- , upto 20 terms.

Answer briefly:

(10x2=20)

11. Find the value of
- $\begin{vmatrix} 4 & 2 \\ 1 & 3 \end{vmatrix}$
- .

12. Find the value of
- ${}_8P_2$

13. Find
- $\text{div } \vec{F}$
- if
- $\vec{F} = xy \hat{i} + yz \hat{j} + xz \hat{k}$
- at (1,1,1)

14. If
- $x^2 + y^2 = 25$
- . Find
- $\frac{dy}{dx}$

15. Evaluate
- $\lim_{x \rightarrow 3} \frac{x-3}{x^2-9}$

16. Find the modulus of the complex number
- $\frac{1+i}{1-i}$

17. Find
- $\frac{\partial f}{\partial x}$
- , if
- $f = x^5y$

18. Find the order and degree of the differential equation
- $\left(\frac{dy}{dx}\right)^3 + \frac{d^2y}{dx^2} = 4$

19. If
- $\vec{r} = \sin t \hat{i} + \cos t \hat{j}$
- , find
- $\frac{d\vec{r}}{dt}$
- .

20. Find the arithmetic mean of the following set of observations:

13, 32, 24, 23, 34, 14, 23, 25, 28, 29.
