

22101288

QP CODE: 22101288

Reg No :

Name :

B.VOC DEGREE (REGULAR / REAPPEARANCE) EXAMINATIONS, MARCH 2022

First Semester

B.VOC RENEWABLE ENERGY TECHNOLOGY AND MANAGEMENT

RETTG102 - MATHEMATICS

2019 Admission Onwards

04BC1B47

Time: 3 Hours

Max. Marks : 80

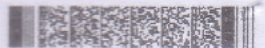
Part A

Answer any ten questions.

Each question carries 2 marks.

1. Define Equivalence relation.
2. Determine whether $f: Z \times Z \rightarrow Z$ is onto if $f(m,n)=m+n$
3. Let $F:R \rightarrow R$ defined by $f(x)=x^2$, Find $F^{-1} (\{x:0 < x < 1\})$
4. Define rank of a matrix.
5. Give an example of a diagonal matrix which is not scalar.
6. Check whether the matrix is invertible $\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$
7. Evaluate $\lim_{z \rightarrow 0} (2z - 8)^{\frac{1}{3}}$
8. Find the derivative of $y = \frac{f^2 - 1}{f^2 + 1}$
9. Find F_x and F_y if $f(x,y,z)=1+xy-2z$.
10. What do you mean by geometric mean ?
11. Find two iterations for the equation $x e^x = 1$





12. Write the generalised form of Newton –Raphson formula.

(10×2=20)

Part B

Answer any **six** questions.

Each question carries 5 marks.

13. Define the following terms

1. Function
2. Domain of a function
3. Target set
4. Range
5. Preimage

14. Find fog and gof where $f(x)=x^2+2$ and $g(x)=x+2$ are functions from R to R

15. Find the inverse of Matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ by using elementary row transformation

16. For the three matrices A, B, C

$$A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix} \quad B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$$

Verify that $AB = -BA = -C$

17. For what value of a is $f(x) = \begin{cases} x^2 - 1, & x < 3 \\ 2ax, & x \geq 3 \end{cases}$ continuous at every x.

18. Explain mean value theorem.

19. What is piedigram? Illustrate with an example.

20. Find the median and mode for the following data:

X_i	3	8	13	18	23
F_i	7	10	15	10	6

21. Write a note on different types of data.

(6×5=30)

Part C

Answer any **two** questions.





Each question carries 15 marks.

22. Sketch the graph of

a) $f(x) = x^2 + x - 6$

b) $g(x) = x^3 - 3x^2 - x + 3$

23. a) Write a note on transpose of a matrix.

b) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ is a matrix satisfying $AA^T = 9I_3$, then find the values of a and b

c) Find the values of x, y, z, if the matrix $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ Satisfy the equation $A^T A = I_3$

24. a) What do you mean by absolute maximum and absolute minimum values of a function.

b) Find the absolute minimum and absolute maximum values of the function

$f(x) = 4 - x^2, -3 \leq x \leq 1$

25. What are the graphical representations of a data?

(2 × 15 = 30)

