



21100758

QP CODE: 21100758

Reg No :

Name :

B.Voc Degree Examination, MARCH 2021

First Semester

B.Voc Renewable Energy Technology and Management

RETTG102 - MATHEMATICS

2019 Admission Onwards

ADD31F32

Time: 3 Hours

Max. Marks : 80

Part A

Answer any ten questions.

Each question carries 2 marks.

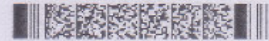
1. Determine whether the following relation on the set of all people is reflexive and transitive. "a and b have a common grandparent".
2. Draw the graph of the function $f(x)=x$
3. Define inverse of a function
4. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$ using elementary row transformation
5. Write the transpose of matrix $A = \begin{bmatrix} 6 & 3 & 5 \\ 2 & 4 & 2 \\ 3 & -6 & 1 \end{bmatrix}$
6. What are elementary transformation?
7. Calculate $\lim_{x \rightarrow c} (x^3 + x^2 - 3)$ using limit laws.
8. Differentiate $\sin(x^2+x)$ w.r.t x using chain rule.
9. State First derivative test
10. What do you mean by pictogram?
11. Find the range of marks of 10 students 91, 54, 44, 56, 71, 25, 9, 27, 22, 72, 62
12. What do you mean by histogram?

(10×2=20)

Part B

Answer any six questions.

Each question carries 5 marks.



13. Determine whether the function $f: \mathbb{R} \rightarrow \mathbb{R}$ is bijective if $f(x) = x^5 + 1$.
14. Define Partition. Find all partition of $S = \{1, 2, 3\}$
15. Compute $f(A)$ if $f(x) = x^2 - x - 1$ and $A = \begin{bmatrix} 2 & 1 & 1 \\ 3 & 1 & 2 \\ 1 & -1 & 0 \end{bmatrix}$
16. Compute the inverse of the matrix $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$
17. Check the continuity of the function $f(x) = \frac{1}{x-1}$ at $x = 1$
18. Express $\partial\omega/\partial r$ and $\partial\omega/\partial s$ in terms of r and s if $\omega = x + 2y + z^2$, $x = r/s$, $y = r^2 + \log s$, $z = 2r$.

Find the mean deviation about Arithmetic mean of the following data

19.

X	2	4	6	8	10
F	1	4	6	4	1

20. Find the geometric mean of 10, 20, 30, 40, 50
21. Find a double root of the equation $f(x) = x^3 - x^2 - x + 1 = 0$

(6×5=30)

Part C

Answer any two questions.

Each question carries 15 marks.

22. a) Suppose $f: A \rightarrow B$ and $g: B \rightarrow C$. Show that $g \circ f$ is a constant function if either f or g is a constant function.
- b) Let the functions f and g be defined by $f(x) = x^2 + 3x + 1$ and $g(x) = 2x - 3$. Find the formula defining the composition functions $f \circ g$ and $g \circ f$.

23. a) What are elementary row transformations?

$$A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -1 \end{bmatrix}$$

- b) Find the rank of the matrix $A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -1 \end{bmatrix}$ by elementary row transformation.

24. a) Find the extreme values of the function $y = \frac{x + 1}{x^2 + 2x + 2}$
- b) Find the critical points of $f(x) = x^3 - 12x - 5$ and identify the intervals on which f is increasing and decreasing
25. Find the positive root of $x^3 - x - 1 = 0$ correct to four decimal places by bisection method.

(2×15=30)

