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Examination October 2020

B.Sc. F.Y (Sem-I)

2161 Mathematics MAT - 101 Differential Calculus

Time: One Hour **Max. Marks: 50**

Instructions

- Solve any 25 questions from Q1 to Q30
- Solve any 25 questions from Q31 to Q60

1 Let f be a function from set A into set B then range of F is ----------.

(A)Set A (B)Set B (C)Set of all function values (D)Domain

2 Let a be any given number then function f(x) = a $\forall x \in R$ is called----------.

(A)One-one function (B)Constant function (C)Identity function (D)None of these

3 Let two functions

f(x)=x^2,g(x)=sinx

domain of F is R and domain of g is $[0,\infty]$ then (g o f)(x)=..... $x \in R$

(A)Sin x^2 (B)$(\sin x)^2$ (C)x^2+ sin x (D)x^2 sin x

4 $\lim_{x \to 1} \frac{(x^2-1)}{x-1} =$ _____

(A)1 (B)2 (C) ∞ (D) $-\infty$

5 F is said to have a removale discontinuity if----------.

(A) $\lim_{x \to c} f(x) \neq f(c)$ (B) $\lim_{x \to c+0} f(x) \neq \lim_{x \to c-0} f(x)$ (C)Neither of $\lim_{x \to c-0} f(x)$ and $\lim_{x \to c+0} f(x)$ (D)None of these

6 If f(x)= then $f(x) = \sqrt{x},$ then f(x) = ---------- x > 0

(A) $\sqrt{x}$ (B) $2\sqrt{x}$ (C) $\frac{1}{\sqrt{x}}$ (D) $\frac{1}{2\sqrt{x}}$

7 Which of the following statement is correct.

(A)If F is finitely derivable at C ,then F is also continuous at C. (B)If F is continuous at C ,then F is also finitely derivable. (C)Both A and B is correct. (D)None of these

8 The function

$f(x) = |x-2| + |x| + |x+2|$ is derivable at

(A)-2 (B)0 (C)2 (D)None of these

9 Sin hx=....., $x \in R$

(A) $\frac{e^x - e^{-x}}{2}$ (B) $\frac{e^x + e^{-x}}{2}$ (C) $\frac{2}{e^x + e^{-x}}$ (D) $\frac{2}{e^x - e^{-x}}$

10 $\frac{d}{dx}$ tan hx =....., $x \in R$

(A)Tan hx sechx (B)Sec hx (C)Sec h^2x (D)Cot hx

11 If $y=(ax+b)^m$ the $\frac{d^n y}{dx^n} =$ ----------.

(A) $\frac{m!}{(m-n)!} a^n (ax+b)^{m-n}$ (B) $\frac{m!}{(m+n)!} a^n (ax+b)^{m-n}$ (C) $\frac{m!}{(m-n)!} a^n (ax+b)^{m+n}$ (D) $\frac{m!}{(m+n)!} a^n (ax+b) m+n$

12 If y=sin(ax+b),then $\frac{d^n}{dx^n} \sin(ax+b) =$ ---------- -.

(A) $\sin(ax+b+\frac{n\pi}{2})$ (B) $\cos(ax+b+\frac{n\pi}{2})$ (C) $a^n \sin(ax+b+\frac{n\pi}{2})$ (D) $a^n \cos(ax+b+\frac{n\pi}{2})$

13 Leibnitz's theorm is the n th derivative of the ---------- of two function.

(A)Sum (B)Subtraction (C)Product (D)None of these

14 A function f is(i) continuous in closed interval [a,b](ii) derivative in the open interval]a,b[and (iii)f(a)=f(b) then there exist---------- value of c in]a,b[such that f'(c)=0.

(A)At the most value (B)At least value (C)No point (D)Every point

15 If we verify rolle's theorm for the function $f(x)=x(x+3)^{-x/2}$ in [-3,0] then the satisfying point in]-3,0[is --------.

(A)-2 (B)2 (C)3 (D)-3

16 If $f(x,y)=(x^y+y^x)$ then domain for this function is --------.

(A){(x,y):0 < x,0 < y} (B){(x,y):x < 0,y < 0} (C){(x,y):0 < x,y < 0} (D){(x,y):x < 0,0 < y}

17 If f is continuous at a point if and only if----------

(A)The limit of the function > value of the function (B)The limit of the function < value of the function (C)The limit of the function ≠ value of the function (D)The limit of the function = value of the function

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18 $f_y(x,y)$=---------.

(A) (B) $\lim_{h\to 0}\frac{f(x,y+h)-f(x,y)}{h}$ (C) $\lim_{h\to 0}\frac{f(x+h,y+h)-f(x,y)}{h}$ (D) $\lim_{h\to 0}\frac{f(x-h,y)}{h}$

19 If $z = \tan^{-1}(x+y)$ then $\frac{\partial z}{\partial x}$ = ---------.

(A) $\frac{1}{(x+y)}$ (B) $\frac{1}{(x+y)^2}$ (C) $\frac{1}{1+(x+y)^2}$ (D) $\frac{1}{x^2+y^2}$

20 If $z=e^{x-y}$ then $\frac{\partial^2 z}{\partial x\,\partial y}$=.....

(A)e^{x+y} (B)-e^{x-y} (C)-e^{x+y} (D)e^{x-y}

21 Neighbourhood of a point (a,b) in a plane is --------.

(A)Interval (B)Reactangle (C)Circle (D)Sphere

22 The scalar product of any two vectors is knows as --------.

(A)Cross product (B)Dot product (C)Direct product (D)Vector product

23 Scalar product of two non zero vector is zero if θ is ---------- angle.

(A)Acute (B)Right (C)Obtuse (D)None of these

24 If the a, b be two non zero vector and they satisfy the property a.b=b.a then this property is known as ----------.

(A)Commutativity (B)Distributivity (C)Associvibity (D)Reflexivity

25 If the a,b and c be the three non zero vector and they satisfy the property.

a .(b + c) = a.b + a.c

(A)Commutativity (B)Distributivity (C)Associvibity (D)Reflexivity

26 If i,j,k are three mutually perpendicular unit vector then which product s not correct.

(A) $i\times j=-k$ (B) $j\times i=-k$ (C) $j\times k=i$ (D) $k\times j=-i$

27 If the a,b and c be the three non zero vectors taken in this order then the scalar triple product is given by------.

(A) $a\times b\times c$ (B) $a\times b.c$ (C)a.b.c (D)None of these

28 Volume of the parallelpiped whose coterminous edges are 2i-3j+k,i-j+2k and 2i+j-k is-------.

(A)11 units (B)12 units (C)14 units (D)15 units

29 The vector valued point function ,then the range set of contain only--------.

(A)Scalar points (B)Vector points (C)Both A and B (D)None of these

30 div (ϕf)=----------.

(A) ϕ Div + ϕ + f grad f (B) ϕ Div f + f. grad ϕ (C)f div ϕ + ϕ grad f (D)None of this