F.Y.B.Sc Sem II Maths Paper I

Sample Questions

1. $\sum_{n=2}^{\infty} \frac{2}{n^2-1} = \cdots$

a. 5

b. 4

c.3/2

d. none of these

2.$\sum_{n=1}^{\infty} \frac{\pi^n}{4^{n+1}} = \cdots$

a. 15

b. divergent

c.9

d. none of these

3. $\sum_{n=1}^{\infty} \frac{6}{5n^2+6n}$

a. Converges

b. diverges

c. cannot be convergent

d. none of these

4. The series $\sum_{n=1}^{\infty} cosn\pi$

a. Converges to zero

b. diverges

c. oscillates between -1 and 0

d. none of these

5. if f:[a ,b]→R is continuous and $f(x) \in R - Q$ then

a. f is constant function

b. f is non constant function which attain its bound

c. f is a function which does not attain its bound

d. none of these

6. 3. Let $f(x) = \sqrt{sinx}$ and let y^n denote the n^{th} derivative of f(x) at x = 0 then the value of the expression $12y^{(5)}\, y^{(1)} + 30\, y^{(4)}\, y^{(2)} + 20\, (y^{(3)})^2$ is given by

a) 0

b) 655

c) 999

d) 1729

7. 3. Let $f(x) = \sqrt{1 - x^2}$ and let $y^{(n)}$ denote the nth derivative of f(x) at x = 0 then the value of $6y^{(1)}\, y^{(2)} + 2y^{(3)}$ is

a) -998

b) 0

c) 998

d) -1

8. The function tanx is

a. differentiable on R

b. not differentiable on R

c. well defined on R

d. none of these

9. if $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ Then dy/dx=⋯

a. y/x

b. x/y

c. $-(y/x)^{1/3}$

d. none of these

10. If $y = \frac{3x^{13}+15x^{12}}{x-5}$ Then y_{12} is

a. $y_{12} = 3.(12!) + \frac{8(12!)}{(x-5)^{13}}$

b. $y_{12} = \frac{8(12!)}{(x-5)^{13}}$

c. $y_{12} = 12! \frac{1}{(x-5)^{13}}$

d. none of these

11. The function $f(x) = lnx$, $x \in R^+$ is

a. increasing

b. decreasing

c. non increasing

d. non decreasing

12.The point of inflection of$y = x^3 - 6x^2 + 8x + 5$ are

a. x=1

b. x= 2

c. x= -1

d. None of these

13.the maximum and minimum values of $f(x) = 2x^3 - 24x + 4$ is

a. max value= 17 , min value =-28

b. a. max value= 36 , min value =-28

c. max value= 36 , min value =-16

d. max value= 36 , min value =-15

14. if f:I→R has local extremum at a point c in I and f is differentiable at x=c then

a. f”(c) is zero

b. f’(c) is not zero

c. f’(c) is zero

d. none of these

15.The critical point of the function $f(x) = 10x^2 + 8x$ is

a.-2/5

b.-5/3

c.3/5

d. 5/2

16. 8. For second degree polynomial it is seen that the roots are equal. Then what is the relation between the Rolles point c and the root x?

a) c = x

b) $c = x^2$

c) They are independent

d) c = sin(x)

17. 4. Mean Value theorem is also known as

a) Rolle's Theorem

b) Lagrange's Theorem

c) Taylor Expansion

4) Leibnitz's Theorem

18. 7. What is the value of c which lies in [1, 2] for the function f(x)=4x and $g(x)=3x^2$?

a) 1.6

b) 1.5

c) 1

d) 2

19. 9. Find the value of 'a' if $f(x) = ax^2+32x+4$ is continuous over [-4, 0] and differentiable over (-4, 0) and satisfy the Rolle's theorem. Hence find the point in interval (-2,0) at which its slope of a tangent is zero

a) 2, -2

b) 2, -1

c) 8, -1

d) 8, -2

20. 9. If f(x) = sin(x) cos(x) and $g(x) = x^2$ than find value of $\lim_{x\to 0} \frac{f(x)}{g(x)}$

a) 2

b) 0

c) -1

d) Cannot be found

21. 8. Let Mclaurin series of some f(x) be given recursively, where an denotes the coefficient of x^n in the expansion. Also given $a_n = a_n\text{-}1 / n$ and $a_0 = 1$, which of the following functions could be f(x)?

a) e^x

b) e^{2x}

c) $c + e^x$

d) No closed form exists

22. The expansion of log(1+x) is

a. $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$

b. $x - \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} + \cdots$

c. $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots$

d. None of these

23. The approximate value of log(1.2) correct upto 4 decimal places

a. 0.0125

b. 0.1823

c. 0.0013

d. 0.1254

24. The expansion of $log\left(\frac{tanx}{x}\right)$ is

a. $1 + \frac{x^2}{3} + \frac{7x^4}{90} + \cdots$

b. $1 - \frac{x^2}{3} + \frac{7x^4}{90} - \cdots$

c. $\frac{x^2}{3} + \frac{7x^4}{90} + \cdots$

d. None of these

25. The expansion of $sin^{-1}x$ is

a. $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^6}{6!} + \cdots$

b. $x + (1)^2\ \frac{x^3}{3!} + (1)^2(3)^2\ \frac{x^5}{5!} + (1)^2\ (3)^2\ (5)^2 \frac{x^7}{7!} + \cdots$

c. $1 + (1)^2\ \frac{x^3}{3} + (1)^2(3)^2 \frac{x^5}{5} + (1)^2(3)^2(5)^2 \frac{x^7}{7!} + \cdots$

d. None of these