

## M.Sc. (IT) Entrance Test Paper (Sample)

Name:

Total Time :- 1 Hours

Questions: 50 MCQs

Roll Number:

Total Marks :- 100

### SECTION-A MATHEMATICS QUESTIONS

- The first and second derivatives of a quadratic Polynomial at  $x = 1$  are 1 and 2 respectively. Then the value of  $f(1) - f(0)$  is given by?  
a. 3/2                      b. 1/2                      c. 1                      d. 0
- $n$ th derivative of  $\sinh(x)$  is  
a.  $0.5(e^x - e^{-x})$                       b.  $0.5(e^{-x} - e^x)$                       c.  $0.5(e^x - (-1)^n e^{-x})$                       d.  $0.5((-1)^n e^{-x} - e^x)$
- Let  $f(x) = \sin(x)/1+x^2$ . Let  $y^{(n)}$  denote the  $n$ th derivative of  $f(x)$  at  $x = 0$  then the value of  $y^{(100)} + 9900y^{(98)}$  is  
a. 0                      b. -1                      c. 100                      d. 1729
- Let  $f(x) = e^x \sin(x^2)/x$  Then the value of the fifth derivative at  $x = 0$  is given by  
a. 25                      b. 21                      c. 0                      d. 5
- Leibniz rule gives the  
a.  $n$ th derivative of addition of two function  
b.  $n$ th derivative of division of two functions  
c.  $n$ th derivative of multiplication of two functions  
d.  $n$ th derivative of subtraction of two function
- For the function  $f(x) = \frac{\sin(x)}{x^2}$ , How many points exist in the interval  $[0, 7\pi]$  such that  $f'(c) = 0$ .  
a. 8                      b. 0                      c. 7                      d. 6
- Rolle's Theorem is a special case of  
a. Leibniz Theorem  
b. Mean Value Theorem  
c. Taylor Series of a function  
d. Leibniz's Theorem
- For the function  $f(x) = x^2 - 2x + 1$ . We have Rolle's point at  $x = 1$ . The coordinate axes are then rotated by 45 degrees in anticlockwise sense. What is the position of new Rolle's point with respect to the transformed coordinate axes?  
a. 3/2                      b. 1/2                      c. 5/2                      d. 1
- Mean Value Theorem tells about the

- a. Existence of point c in a curve where slope of a tangent to curve is equal to the slope of line joining two points in which curve is continuous and differentiable
- b. Existence of point c in a curve where slope of a tangent to curve is equal to zero
- c. Existence of point c in a curve where curve meets y axis
- d. Existence of point c in a curve where curve meets x axis

10. The Mclaurin Series expansion of  $\sin(e^x)$  is?

a.  $\sin(1) + \frac{x \cos(1)}{1!} + \sum_{n=2}^{\infty} \sum_{a=0}^{\infty} \frac{x^n \cdot (-1)^a}{n!} \times \frac{(2a+1)^n}{(2a+1)!}$

b.  $\frac{e^x}{1!} + \frac{e^{3x}}{3!} + \frac{e^{5x}}{5!} \dots \infty$

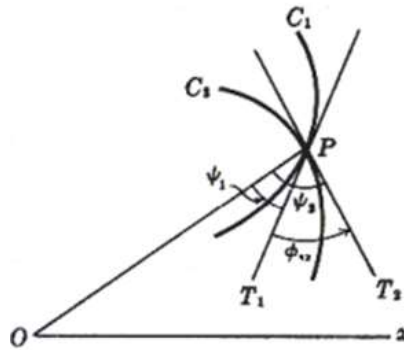
c.  $-\frac{e^x}{1!} + \frac{e^{3x}}{3!} - \frac{e^{5x}}{5!} \dots \infty$

d.  $\sum_{n=2}^{\infty} \sum_{a=0}^{\infty} \frac{x^n \cdot (-1)^a}{n!} \times \frac{(2a+1)^n}{(2a+1)!}$

11. Find  $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x^2 + 2x + 1}\right)^{x^2 + 3x + 1}$

- a. e
- b. 1
- c. e<sup>2</sup>
- d. 1/e

12. Angle of intersection of two polar curves is equal to the angle between the tangents drawn at the point of intersection of the two curves then What is the condition for the two curves intersecting orthogonally for the below mentioned figure?



- a.  $\tan \phi_1 \cdot \tan \phi_2 = 1$
- b.  $\tan \phi_1 \cdot \tan \phi_2 = -1$
- c.  $\tan(\phi_1 + \phi_2) = \frac{1}{\sqrt{2}}$
- d.  $\tan(\phi_1 - \phi_2) = \frac{1}{\sqrt{2}}$

13. For the curve  $y = a \log \sec\left(\frac{x}{a}\right)$  what is the value of  $\frac{ds}{dx}$ ? (where  $\phi$  is the angle made by tangent to the curve with x-axis)?

- a.  $\cos \phi$
- b.  $\sec \phi$
- c.  $\tan \phi$
- d.  $\cot \phi$

14. The curvature of a function  $f(x)$  is zero. Which of the following functions could be  $f(x)$ ?  
 a.  $ax + b$                       b.  $ax^2 + bx + c$                       c.  $\sin(x)$                       d.  $\cos(x)$

15. Envelope of a family of curves can be defined as \_\_\_\_\_  
 a. A curve which touches 50% of the family of curves  
 b. A curve which is a straight line  
 c. A curve which touches each member of the family of curves  
 d. A curve which surrounds the family of curves

16. Find the value of  $A^3$  where  $A = \begin{pmatrix} -1 & -1 & 2 \\ 0 & 1 & -1 \\ 2 & 2 & 1 \end{pmatrix}$

a.  $\begin{pmatrix} 3 & 5 & -1 \\ -2 & -9 & 2 \\ -2 & -4 & -5 \end{pmatrix}$       b.  $\begin{pmatrix} 3 & 5 & -1 \\ 1 & -9 & 1 \\ -2 & -4 & -5 \end{pmatrix}$       c.  $\begin{pmatrix} 3 & 5 & -1 \\ -2 & -9 & 1 \\ -2 & -4 & -5 \end{pmatrix}$       d.  $\begin{pmatrix} 3 & 5 & -1 \\ -1 & -9 & 1 \\ -2 & -4 & -5 \end{pmatrix}$

17. Three companies A, B and C supply 25%, 35% and 40% of the notebooks to a school. Past experience shows that 5%, 4% and 2% of the notebooks produced by these companies are defective. If a notebook was found to be defective, what is the probability that the notebook was supplied by A?  
 a.  $44/69$                       b.  $25/69$                       c.  $13/24$                       d.  $11/24$

18. Find the derivative of:  $f(x) = \sqrt{x}$   
 a.  $-\frac{1}{2\sqrt{x}}$                       b.  $\frac{1}{\sqrt{x}}$                       c.  $\frac{1}{2\sqrt{x}}$                       d.  $\sqrt{x}$

19. The  $p^{\text{th}}$  derivative of a  $q^{\text{th}}$  degree monic polynomial, where  $p, q$  are positive integers and  $2p^4 + 3pq^{32} = 3q^{32} + 2qp^3$  is given by?  
 a. Cannot be generally determined      b.  $(q-1)!$       c.  $(q)!$       d.  $(q-1)! * p^q$

20. Find the differentiation of  $x^3 + y^3 - 3xy + y^2 = 0$ ?  
 a)  $(x^2-y)/(x-y^2-2y)$   
 b)  $(3x^2-3y)/(3x-3y^2-2y)$   
 c)  $(3x^3-3y)/(3x-3y^2-2y)$   
 d)  $(3x^2-y)/(3x-3y^2-y)$

21.  $f(x, y) = x^2 + xyz + z$  Find  $f_x$  at  $(1,1,1)$   
 a. 0                      b. 1                      c. 3                      d. -1

22. Differentiation of function  $f(x,y,z) = \sin(x)\sin(y)\sin(z) - \cos(x)\cos(y)\cos(z)$  w.r.t 'y' is?  
 a.  $f'(x,y,z) = \cos(x)\cos(y)\sin(z) + \sin(x)\sin(y)\cos(z)$   
 b.  $f'(x,y,z) = \sin(x)\cos(y)\sin(z) + \cos(x)\sin(y)\cos(z)$   
 c.  $f'(x,y,z) = \cos(x)\cos(y)\cos(z) + \sin(x)\sin(y)\sin(z)$   
 d.  $f'(x,y,z) = \sin(x)\sin(y)\sin(z) + \cos(x)\cos(y)\cos(z)$

23.  $f(x, y) = \frac{x^3 + y^3}{x^{99} + y^{98}x + y^{99}}$  find the value of  $f_y$  at  $(x, y) = (0, 1)$ .

- a. 101                      b. -96                      c. 210                      d. 0

24. In euler theorem  $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = nz$ , here 'n' indicates?

- a. order of z                      b. degree of z                      c. neither order nor degree                      d. constant of z

25. The jacobian of p,q,r w.r.t x,y,z given  $p = x+y+z$ ,  $q = y+z$ ,  $r = z$  is \_\_\_\_\_

- a. 0                      b. 1                      c. 2                      d. -1

26. When solved by the method of Differentiation for the given integral i.e  $\int_0^{\infty} \frac{x^2 - 1}{\log x} dx$  the result

- obtained is given by \_\_\_\_\_  
a.  $\log 4$                       b.  $\log 3$                       c.  $2\log 3$                       d.  $\log 8$

27. The point (0,0) in the domain of  $f(x, y) = \sin(xy)$  is a point of \_\_\_\_\_

- a. Saddle                      b. Minima                      c. Maxima                      d. Constant

28. Which among the following correctly defines Leibnitz rule of a function given by  $f(\alpha) = \int_a^b f(x, \alpha) dx$

where a & b are constants?

a.  $f'(\alpha) = \frac{\partial}{\partial \alpha} \int_a^b f(x, \alpha) dx$

b.  $f'(\alpha) = \frac{d}{d\alpha} \int_a^b f(\alpha) dx$

c.  $f'(\alpha) = \int_a^b \frac{\partial}{\partial \alpha} f(x, \alpha) dx$

d.  $f'(\alpha) = \int_a^b \frac{d}{d\alpha} f(x, \alpha) dx$

29. Which among the following correctly defines Leibnitz rule of a function given by

$f(\alpha) = \int_a^b f(x, \alpha) dx$  where a & b are functions of  $\alpha$ ?

a.  $f'(\alpha) = \int_a^b \frac{\partial}{\partial \alpha} f(x, \alpha) dx$

b.  $f'(\alpha) = \frac{d}{d\alpha} \int_a^b f(x, \alpha) dx$

c.  $f'(\alpha) = \int_a^b \frac{\partial}{\partial \alpha} f(x, \alpha) dx + f(b, \alpha) \frac{da}{d\alpha} - f(a, \alpha) \frac{db}{d\alpha}$

d.  $f'(\alpha) = \int_a^b \frac{\partial}{\partial \alpha} f(x, \alpha) dx + f(b, \alpha) \frac{db}{d\alpha} - f(a, \alpha) \frac{da}{d\alpha}$

30. Find  $\int_0^{\frac{\pi}{2}} \sin^6(x) dx$ .

a. 0

b.  $\pi/8$

c.  $\pi/4$

d.  $15\pi/96$

**SECTION-B**  
**APTITUDE QUESTIONS**

31. In 6 hours the distance covered by Chulbul is 6 km more than the distance covered by Bulbul in 7 hours. In 7 hours the distance covered by Chulbul is 3 km less than the distance covered by Bulbul in 9 hours. In a race of 180 km, by what distance will Chulbul beat Bulbul?  
a. 48 km                      b. 24 km                      c. 30 km                      d. 36 km E. None of these
32. A mobile phone was sold at a profit of 20% on the cost price. If the mobile phone was sold at 10% lower than this price, then the profit would have been Rs. 600 less. At what price should the mobile phone be sold if one wants to gain 25% of the cost price?  
a. Rs. 7500                      b. Rs. 5000                      c. Rs. 6250                      d. Rs. 7250
33. Three friends A, B, C started working together on a piece of work. Once half of the work was completed B left the work and then A and C complete the remaining work together in 10 days. If B had worked with A and C together only for 6 days, then in how many days B alone can complete the piece of work?  
a. 25 days                      b. 40 days                      c. 30 days                      d. 20 days
34. The ratio of length to breadth of a rectangle is 1 : 2. If the length of the rectangle is increased by 20% and again it is decreased by 30% then the area of the rectangle is decreased by 32 sq. cm. What is the perimeter of the original rectangle?  
a. 60 cm                      b. 90 cm                      c. 120 cm                      d. 30 cm
35. 8 years ago, the ratio of A's age to B's age was 4 : 5. At present the ratio of B's age to C's age is 4 : 5. At present, the difference between A's age and C's age is 20 years, then what is the sum of the ages of A, B and C?  
a. 138 years                      b. 148 years                      c. 164 years                      d. 152 years
36. A sum of money becomes 4 times of itself at the end of 9 years. Find the ratio between the simple interest obtained at the end of 12 years to that at the end of 15 years if the rate of annum and the sum of money remains constant?  
a. 3 : 2                      b. 4 : 5                      c. 6 : 7                      d. 2.5 : 2
37. In a school, the average age of boys is 45 years. If 5 new boys whose average age is 30 years, join the school then the average age of boys becomes 42 years. Before the joining of 5 new boys, the number of girls was 20 more than that the number of boys and the average age of all the students of the school was 40 years, then find the average (in years) of the age of all the girls?  
a. 40                      b. 42.5                      c. 37.5                      d. 35
38. The perimeter of a square field is equal to the perimeter of a rectangular field. If the breadth of the rectangular field is equal to circumradius of the square field and the area of the square field is 441 sq. m then what is the area (in sq. meters) of the rectangular field?  
a. 441                      b. 330.75                      c. 360.5                      d. 325.25
39. A starts a business with a capital of Rs. 4000. At the end of 4 months, B joins him with a sum of Rs. 10,000 and C joins them only for 3 months. If at the end of the year C receives Rs. 6300 which is 1.5 times of the difference between A's share and B's share, then with how much amount does C join them?  
a. Rs. 21000                      b. Rs. 42000                      c. Rs. 16000                      d. Rs. 20000

40. A boat travels 30 km less distance in upstream than that in downstream in the same time 't' hours. If the speed of the stream is 3 km per hour and the boat can travel 40 km upstream in (t + 5) hours, then how many km in downstream can the boat travel in (t + 12) hours?
- a. 170 km                      b. 148 km                      c. 145 km                      d. 98 km
41. An alloy of copper and zinc is taken in the ratio 1 : 2, and another alloy of the same metal is taken in the ratio of 2 : 3. How many parts of the two alloys must be taken to obtain a new alloy consisting of copper and zinc that are in the ratio 3 : 5?
- a. 7 and 9                      b. 5 and 7                      c. 3 and 5                      d. 5 and 3
42. The price of a TV is Rs. 10,000. If successive discount of 15%, 10% and 5% allowed. Then at what price does a customer buy?
- a. Rs. 7267.50                      b. Rs. 7000                      c. Rs. 7200                      d. Cannot be determined
43. The average weight of A, B and C is 84 kgs. If D joins, the average weight now is 80 kgs. If another person E who is 3 kgs heavier than D replaces A then the average weight of B, C, D and E becomes 79 kgs. what is the weight of A?
- a. 70 kg                      b. 75 kg                      c. 65 kg                      d. 55 kg
44. Three pipes A, B and C can fill cistern in 6 hrs. After working together for 2 hours, C is closed and A and B fill the cistern in 8 hrs. Then find the time in which the cistern can be filled by pipe C?
- a. 6 hrs                      b. 12 hrs                      c. 14 hrs                      d. 20 hrs
45. One year ago the ratio of Ramu and Somu age was 6 : 7 respectively. Four years hence their ratio would become 7 : 8. How old is Somu?
- a. 24 years                      b. 30 years                      c. 32 years                      d. 36 years
46. What is the value of 68% of two fifth of 550?
- a. 149.6                      b. 150                      c. 154                      d. 158 e. None of these
47. A motorboat travelling at some speed, can cover 25 km upstream and 39 km downstream in 8 h. At the same speed, it can travel 35 km upstream and 52 km downstream in 11 h. The speed of the stream is:
- a. 2 km/h                      b. 3 km/h                      c. 4 km/h                      d. 5 km/h
48. If a square is inscribed in a circle, the ratio of the area of the circle and the square is:
- a. 2 : 1                      b.  $\pi$  : 2                      c.  $\pi$  : 1                      d. 11 : 7
49. What is the value of ? in the series 0, 4, 6, 3, 7, 9, 6, ?, 12
- a. 8                      b. 10                      c. 11                      d. 12
50. If 40% of the people from village R have cricket as favourite game and 20% of the people have Tennis as favourite game. Then how many people like other game in village R?
- a. 1440                      b. 1540                      c. 1640                      d. None of these

## Answer Key

- 1 d
- 2 c
- 3 a
- 4 b
- 5 c
- 6 d
- 7 b
- 8 a
- 9 a
- 10 a
- 11 a
- 12 b
- 13 b
- 14 a
- 15 c
- 16 c
- 17 b
- 18 a
- 19 c
- 20 b
- 21 c
- 22 b
- 23 b
- 24 a
- 25 a
- 26 c
- 27 b
- 28 c
- 29 d
- 30 d
- 31 d
- 32 c
- 33 c
- 34 a
- 35 b
- 36 b
- 37 c
- 38 b
- 39 c



- 40 a
- 41 c
- 42 a
- 43 b
- 44 b
- 45 d
- 46 a
- 47 c
- 48 b
- 49 b
- 50 d