**Department of Mathematics**

M.Sc. (I Year/I Sem) Question Bank

**Paper – V** (105), Subject: **Mathematical Methods**

**Unit – I**

1. The degree of differential Eqn. is [ ]

A) 1

B) 2

C) 3

D)

E)

2. The order of the differential Eqn. [ ]

A)

B) 0

C) 1

D) 2

E) Not defined

3. The order and degree of the differential

are respectively [ ]

A) 2, 3

B) 3, 2

C) 2, 1

D) 2, 2

E) 3, 3

4. The general form of an ordinary differential equation is [ ]

A) F(x, y) = 0

B) F(x, y, y1, y2……. yn) = 0

C) F(x, x1, x2, …… xn) = 0

D) F(y, x, x1, ….. xn) = 0

E) None of these

5. A differential equation involving only a single independent variable is

called [ ]

A) Linear D.E.

B) Partial D.E.

C) Ordinary D.E.

D) None Linear D.E.

E) None of these

6. The order & degree of the - 2+xy = 0 respectively are [ ] A) 3, 4

B) 4, 3

C) 3, 5

D) 2, 3

E) 3, 2

7. A diff. equation. involving two (or) more independent variables is called [ ]

A) Ordinary

B) Linear

C) Non – Linear

D) Partial

E) None of these

8. If the given equation has only P, Q & Z present [ ]

A) Standard form -I

B) Standard form-III

C) Standard form-IV

D) Standard form-II

E) Standard form –I & IV

9. A Non-linear P.D.E. can be divided into [ ]

A) Three standard forms

B) Two standard forms

C) Four standard forms

D) Five standard forms

E) only one standard form

10. Notation of s is [ ]

A)

B)

C)

D)

E)

11. A differential equation is =0 is [ ]

A) Linear D.E.

B) Ordinary D.E.

C) Non-Linear D.E.

D) Partial D.E.

E) Linear D.E. & Ordinary D.E.

12. A differential Eqn. is [ ]

A) Linear D.E.

B) Non Linear D.E.

C) Ordinary D.E.

D) Partial D.E.

E) Linear D.E. & Ordinary D.E.

13. The General Eqn. of Non-Linear P.D.E. is [ ]

A)

B)

C)

D)

E) All

14. Each Eigen value as a \_\_\_\_ Eigen form [ ]

A) Single L.I.

B) Single L.D.

C) Single L.I. & Single L.D.

D) All of these

E) None of these

15. The Eigen values are [ ]

A) Imaginary

B) Real

C) Finite

D) Real & Finite

E) Imaginary & Real

16. Solution of P.D.E. by eliminating a & b from the Equation z=(x+a)(y+b) is [ ]

A)

B)

C)

D)

E)

17. A differential equation + where u, x, y are [ ]

A) u is Dependent, x, y are Independent

B) x, y are Dependent, u is Independent

C) u, x, y are Dependent

D) u, x, y are Independent

E) None of these

18. A differential Eqn. then order & degree [ ]

A) (3, 2)

B) (2, 3)

C) (2, 2)

D) (3, 3)

E) (1,2)

19. A differential equation which is not linear is called \_\_\_\_ [ ]

A) Differential Equation

B) Linear Differential Equation

C) Non-Linear D.E.

D) sesque linear differential equation

E) None of these

20. A differential Equation is \_\_\_\_ D.E. [ ]

A) Differential Equation .

B) Ordinary Differential Equation .

C) Linear Differential Equation .

D) Ordinary Linear Differential Equation E) All of these

21. The notation of p is \_\_\_\_\_ [ ]

A)

B)

C)

D)

E)

22. The notation of q is \_\_\_\_\_ [ ]

A)

B)

C)

D)

E)

23. In standard form -I only \_\_\_\_\_\_ are present [ ]

A) Only p,q

B) Only p

C) Only q

D) p,q, z

E) None of these

24. The Lagrange’s auxiliary Equations are [ ]

A)

B) = =

C) =

D)

E) None of these

25. Char pits auxiliary equation is \_\_\_\_\_\_\_ [ ]

A) = = =

B) =

C) = =

D) =

E) None of these

26. Z = a(x+y)+b, then eliminating a & b [ ]

A) =

B)

C)

D) E) &

27. The general solution of the linear partial differential equation is [ ]

A) P + Q = R

B) P.q + Q.p = R

C) P.p. + Q.q = R

D) P.p + Q.q = Rr

E) P.x + Q.y = Rz

28. If z = px + qy + pq then the complete Integral is [ ]

A) ax + by

B) ax+by+ab

C) ax+ab

D) by+ab

E) None of these

29. Each Eigen value as a single \_\_\_ Eigen function [ ]

A) L.I.

B) L.D.

C) Real

D) Finite

E) None of these

30. Storm Liouville equation is \_\_\_\_\_ [ ]

A)

B)

C)

D)

E) None of these

31. Storm Liouville problem have \_\_\_\_\_ Eigen values [ ]

A) Finitely many

B) Two

C) Infinitely many

D) Finitely many &Two

E) None of these

32. Eigen functions corresponding to the different Eigen values w.r.t some [ ]

A) Orthogonal Function

B) Ortho-normal Function

C) Orthogonal Function & Ortho-normal Function

D) Weight Function

E) None of these

33. All Eigen values of storm Liouville problem are [ ]

A) Real

B) Imaginary

C) Finite

D) Infinite

E) None of these

34. {Fn(x)} is orthogonal set of functions on the interval a ≤ x ≤ b if \_\_\_\_\_ [ ]

A)

B) where m n

C) where m = n

D) All of these

E) None of these

35. Ortho-normal set of functions Smn = \_\_\_\_\_\_ [ ]

A)

B)

C) 0

D) 1

E) 0 &1

36. The boundary conditions of strum Liouville problem are [ ]

A) a1 y(a) + a2 y1(a) = 0

B) b1y(b) + b2y1(b)

C) a1 y(a) + a2 y1(a) = 0 & b1y(b) + b2y1(b)

D) a1 y(a) + a2 y1(a) = 0 or b1y(b) + b2y1(b)

E) All of these

37. If z = F (x,y) = x2 + y2 + 2gx + 2fy + c where g, f, c are [ ]

A) L.I.

B) L.D.

C) Parameters

D) L.I & Parameters

E) None of these

38. Equation of standard form -II is\_\_\_\_\_\_ [ ]

A)

B) f1 (x, p) = f2 (x, p)

C) f (p,q,z) = 0

D) z = px + qy + f (p,q)

E)

39. The Norm is defined by [ ]

A)

B)

C)

D) &

E) None of these

40. The solution of complete Integral of the Equation z = pq is [ ]

A)

B)

C)

D)

E)

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**UNIT-I ANSWERS**

|  |  |  |
| --- | --- | --- |
| 1 | B | 2 |
| 2 | C | 1 |
| 3 | D | (2, 2) |
| 4 | B | F(x, y, y1, y2……. yn) = 0 |
| 5 | C | Ordinary D.E. |
| 6 | A | 3, 4 |
| 7 | D | Partial |
| 8 | B | Standard form-III |
| 9 | C | Four standard forms |
| 10 | C |  |
| 11 | D | Partial D.E. |
| 12 | B | Non Linear D.E. |
| 13 | A |  |
| 14 | A | Single L.I. |
| 15 | B | Real |
| 16 | A |  |
| 17 | A | u is Dependent, x, y are Independent |
| 18 | B | (2, 3) |
| 19 | C | Non-Linear D.E. |
| 20 | C | Linear D.E. |
| 21 | A |  |
| 22 | C |  |
| 23 | A | Only p,q |
| 24 | B | = = |
| 25 | A | = = = |
| 26 | A | = |
| 27 | C | P.p. + Q.q = R |
| 28 | B | ax+by+ab |
| 29 | A | L.I. |
| 30 | A |  |
| 31 | C | Infinitely many |
| 32 | D | Weight Function |
| 33 | A | Real |
| 34 | B | where m n |
| 35 | A |  |
| 36 | C | 0 |
| 37 | C | Parameters |
| 38 | D | z = px + qy + f(p,q) |
| 39 | B |  |
| 40 | C |  |

**Unit – II**

1. If D is the factor of f (D,D1) then the part of C.F. is [ ]

A)

B)

C)

D)

E) &

2. If D1 is the factor of f (D,D1) then the part of C.F. is [ ]

A)

B)

C)

D)

E)

3. The solution of (D2+2DD1+) z = 0 [ ]

A)

B)

C)

D)

E)

4. Cos x = \_\_\_\_\_\_\_ [ ]

A) Cosx

B) - Cosx

C) Sin x

D) - Sinx

E) None of these

5. Particular integral of = \_\_\_\_\_ [ ]

A)

B)

C)

D)

E)

6. If u1, u2 ….. un are solutions of the homogeneous linear P.D.E. F(D, D1)z =\_\_ [ ]

A) 1

B)

C) 0

D) f (x,y)

E) f (y,x)

7. If n<m, 1/ should be expanded in powers of \_\_\_\_\_ [ ]

A)

B) D

C)

D)

E)

8. The solution of particular integral of particular integral of (D2-2DD1+D)z =

12xy is [ ]

A) (2y+x)

B) 2xy +

C)

D) (2y+x) &

E) None of these

9. The particular integral of )z = x is [ ]

A)

B)

C)

D)

E)

10. The C.F. of (D2-2DD1-)z = is \_\_\_\_ [ ]

A) )x)

B)

C)

D)

E) &

11. The general equation of heat is \_\_\_\_\_\_\_ [ ]

A)

B)

C)

D)

E) None of these

12. Notation of t is \_\_\_\_ [ ]

A)

B)

C)

D)

E)

13. The P.I. of is \_\_\_\_\_\_\_\_\_ [ ]

A)

B)

C)

D)

E)

14. If (bD-aD1+c) is factor of F(D,D1) then the part of C.F. is [ ]

A)

B)

C)

D)

E) None of these

15. If (bD+aD1) is a factor then the C.F. is \_\_\_\_\_ [ ]

A)

B)

C)

D)

E) None of these

16. If u is the C.F. & z1 a particular integral of a linear partial differential equation

F(D, D1)z= f (x, y) then u+z1 is a \_\_\_\_\_ [ ]

A) General Solution of a equation

B) Auxiliary Equation

C) Lagranges Equation

D) Auxiliary Equation & Lagranges Equation

E) All of these

17. If F(D,D1) be homogeneous function of D & D1 of degree n, then

[ ]

A)

B)

C)

D)

E)

18. [ ]

A)

B)

C)

D)

E) None of these

19. The P.I. of [ ]

A)

B)

C)

D)

E)

20. The C.F. of )z=0 is \_\_\_\_\_\_ [ ]

A)

B)

C)

D)

E)

21. [ ]

A)

B)

C)

D)

E)

22. The general equation of wave is \_\_\_\_ [ ]

A)

B)

C)

D)

E) None of these

23. A linear partial differential equation which is not homogenous is called a [ ]

A) Non-homogenous Linear

B) Homogenous Liner Equation

C) Non-Linear Equation

D) Linear Equation

E) None of these

24. The Laplace equation is \_\_\_\_\_ [ ]

A) +

B) =0

C)

D) = 0

E) None of these

25. If (bD-aD1-c) is a factor of F(D,D1) then the part of C.F. is [ ]

A)

B)

C)

D)

E) None of these

26. Expansion of [ ]

A) 1-x-x2-x3 ……  
 B) 1+x-x2+x3 …….

C) 1+x+x2+x3+……..

D) 1+x- E) None of these

27. If D1 is the factor of F (D,D1) then the part of C.F. is [ ]

A)

B)

C)

D)

E) None of these

28. If D is the factor of F (D, D1) repeats m times, then the fart of C.F. is [ ]

A)

B) +…

C) +….+

D) +….+

E) None of these

29. If m<n, should be expanded in powers of \_\_\_\_ [ ]

A)

B)

C)

D)

E)

30. The general solution of ( [ ]

A)

B) z =

C) z =

D) z =

E) None of these

31. Expansion of ….. [ ]

A)

B)

C)

D)

E)

32. The P.I. of ( is\_\_\_\_\_\_ [ ]

A)

B) xsinx – 2 cosx

C)

D)

E) None of these

33. The P.I. of (D2+2D+4)y = exsin 2x is [ ]

A) (8 cos 2x – 3sin 2x)

B) (8 cos 2x – 3sin 2x)

C) (8 cos 2x + 3sin 2x)

D) (8 cos 2x + 3sin 2x)

E) None of these

34. Particular integral of [ ]

A)

B)

C)

D)

E) None of these

35. The value of sinx is [ ]

A)

B)

C)

D)

E)

36. The particular integral of (D3-D2-D+1)Y = 1+x2 is [ ]

A) 5+2x+x2

B) 1+x+x2

C) 2x+x2

D) 5+2x

E) 2x2+x3

37. = \_\_\_\_ [ ]

A)

B)

C)

D)

E) None of these

38. [ ]

A) +

B) +

C) 2cos4x

D) E) None of these

39. = \_\_\_\_\_\_ [ ]

A)

B) 2x

C)

D)

E)

40. [ ]

A) Cosx

B)

C) - cosx

D) sinx

E) None of these

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**UNIT-II ANSWER KEY**

|  |  |  |
| --- | --- | --- |
| 1 | D |  |
| 2 | A |  |
| 3 | A |  |
| 4 | D | - Sinx |
| 5 | C |  |
| 6 | C | 0 |
| 7 | C |  |
| 8 | D | (2y+x) ; |
| 9 | C |  |
| 10 | A | )x) |
| 11 | C |  |
| 12 | C |  |
| 13 | B |  |
| 14 | C |  |
| 15 | C |  |
| 16 | A | General Solution of a equation |
| 17 | B |  |
| 18 | D |  |
| 19 | B |  |
| 20 | A |  |
| 21 | A |  |
| 22 | A |  |
| 23 | A | Non-homogenous Linear |
| 24 | B | =0 |
| 25 | A |  |
| 26 | E | None of these |
| 27 | E | None of these |
| 28 | C | +….+ |
| 29 | A |  |
| 30 | A |  |
| 31 | A |  |
| 32 | A |  |
| 33 | E | None of these |
| 34 | C |  |
| 35 | A |  |
| 36 | A | 5+2x+x2 |
| 37 | C |  |
| 38 | E | None of these |
| 39 | A |  |
| 40 | C | - cosx |