# Question Paper

1. Surfaces <b ‡,Ç•,z) = C • and <b "‡,Ç•,z) = C , are orthogonal if :
A. " <b â sÆ ,=0
B. " (<b Æ ,)=0
C. " <b , sÆ ,=0
D. " <b , sÆ ,=0

2. Gradient of a scalar function <b‡,Ç•,z) is :
A. " <`
B. " ²<`
C. " x" <`
D. None of the above.

3. Let F=xi+yj+zk and r=|r|, then :
A. " r = F
B. " r = F/r
C. " r = rF
D. " r = r/F

4. Divergence of vector field F=xi+2yj-zk is:
A. 5
B. 10
C. 0
D. 20

5. For the scalar function f, div[grad f] is equal to :
A. " ²f
B. " f
C. " xf
D. None of the above.

6. If F=xi+yj+zk, then " .F=
A. 0
B. 3
C. 1
D. 3

7. If F=(x+3)i+(y-2z)j+(x+nz)k is solenoidal, then the value of n is :
A. 2
B. 3

C. 0
D. -1

8. The curl of a vector function F=(y²z)i at a point (1,2,3) is:
A. 0
B. -3j
C. 3j
D. 0

9. If dy/dx = (x+y+1)/(x+y+1), then it is reduced to homogeneous by :
A. x+y=v+1
B. x+y=v
C. x-y=v
D. x+y+1=v

10. For dy/dx = x²/y, (A) linear in x (B) linear in y (C) non-linear in x (D) none of the above
A. linear in x
B. linear in y
C. non-linear in x
D. none of the above

11. If z • = 3+iy •, z , = 3+i, then real part of z •z , is
A. 9-y •
B. 9+y •
C. 9-y •
D. 9+y •

12. Arg(z) at z=0 is:
A. 0
B. not defined
C. <
D. < ó

13. If z=1-i, then conjugate of conjugate of z is :
A. 1+i
B. 1-i
C. 1+i
D. 1-i

14. If z=x+iy, then z+z0R —2 W V Â Fó
A. x

B. 2x
C. 2
D. 2x+i2y

15. If z=2.4+3i, then modulus of z is :
A. 13
B. 5
C. " 13
D. " 5

16. Imaginary part of z is, where z = x+iy
A. x
B. y
C. x
D. y

17. If x+y = 5, then:
A. x=1,y=2
B. x=2,y=3
C. x=3,y=2
D. x=3,y=2

18. The differential equation $d^2y/dx^2 + 3dy/dx + 2y=0$ is:
A. linear
B. non-linear
C. linear with constant coefficients
D. none of the above

19. A differential equation is ordinary if it has :
A. one dependent variable
B. one independent variable
C. both (A) and (B)
D. none of the above

20. Differential equation Mdx+Ndy=0 is exact iff':
A. " M/" y=" N/" x
B. " M/" x=" N/" y
C. " M/" x=-" N/" y
D. " M/" y=-" N/" x

21. (y-cosx)+(x+siny)dy/dx=0 is:
A. exact ODE

B. not exact ODE
C. linear in y
D. linear in x

22. General solution of $(d^2y/dx^2)-4y=0$ is:
A. y=c •e².2¶2 &R »"ã
B. y=c •e.2¶2 &R ²ã
C. y=c •e.0
D. y=c •e {.0

23. Integrating factor of dy/dx+Py=Q is:
A. e"+Pdx
B. e {"+Pdx
C. e"+Qdx
D. None of the above

24. Fourier series uses which domain representation of signals ?
A. Time domain
B. Frequency domain
C. Both (A) and (B)
D. None of the above

25. Solution of $d^2y/dx^2=1$ is:
A. y=x+c
B. y=x
C. $y=x^2+c$
D. y=e.0

26. The equation dy/dx = 1+y can be transformed to linear by rule :
A. dy/dx = 1+y
B. dy/dx = 1+y
C. dy/dx = 1+y
D. dy/dx = 1+y

27. If dy/dx = 1+y/1-x, then its solution is:
A. tan {¹y = tan {¹x+c
B. tan {¹y = x+c
C. y = e.2¶0
D. 1+y = e.0

28. If $f(x,y)=x^2+y^2+2$, then f(x,y) is:
A. homogeneous

B. homogeneous of degree 0
C. non-homogeneous of degree 2
D. non-homogeneous

29. Lim n!'" [(1+1/n)^n] is linear if :
A. n=2
B. n=1
C. n=0
D. n=0

30. For equation $d^2y/dx^2+2dy/dx+y=x$, integrating factor is :
A. x+1
B. $(x+1)^2$
C. e.0
D. e {.0

31. A vector field is rotational if:
A. " xF=0
B. " .F=0
C. " F=0
D. None of the above

32. If F=yzi+zj+xyk and F=" <bÂ F†Vâ Æ is :
A. xyz+c
B. xyz+c
C. xyz+c
D. xyz+c

33. Conjugate of the complex number (6+5i) is:
A. 6-5i
B. 6-5i
C. 6+5i
D. 6+5i

34. Value of (i)^100 is equal to:
A. 1
B. i
C. -1
D. -i

35. Find the particular integral of $(D^2-4)y=1$:
A. -1/4

B. 1/4
C. 1
D. -1

36. Find the PI of $(D^2+4)y=\cos 2x$ :
A. $(x/4)\sin 2x$
B. cos2x
C. sin2x
D. xsin2x

37. Particular integral of $(D^2-1)y=x$ is:
A. -x
B. x
C. -x
D. x

38. Solution of $(D^2+1)y=0$ is :
A. c •cos x+c ,sin x
B. c •cos x+c ,sin x
C. c •cos x-c ,sin x
D. Both (B) and (C)

39. If f(x) is discontinuous at x=1 in [a,b] then lim x!'1 f(x) is:
A. lim x!'1 { f(x) + lim x!'1 z f(x)
B. lim x!'1 f(x)
C. lim x!'1 f(x)
D. None of the above

40. If $d^2y/dx^2 = x$, then general solution is:
A. $y=x^3/6+c$ •x+c ,
B. $y=x^3/6$
C. $y=x^3+c$
D. y=x+c

41. If y=ce.2Â F†Vâ 6÷'&W7 öæF–ær F–f`erential equation is :
A. dy/dx = y
B. dy/dx = y
C. dy/dx = y
D. dy/dx = y

42. Which of the following is ODE ?
A. y=dx

B. dy=dx
C. x=y
D. y=x

43. Order of differential equation " ²z/" x² + " ²z/" y² = 0 is:
A. 2
B. 1
C. not defined
D. None of the above

44. If z = 1+i and arg(z) = < óBÂ F†Vâ ¢ Ð
A. 2+2i
B. 2-2i
C. -2+2i
D. -2-2i

45. If f(x) is periodic in -< Çƒ ÃÀ, then Fourier coefficient a € is
A. (1/< '"² ³À^<  b‡,–G€
B. (1/< '"²  ãÀ f(x)dx
C. (1/< '"² ³À^<  b‡,–G€
D. None of the above

46. Operator form of d³y/dx³+dy/dx+y=0 is:
A. D³+D+1=0
B. (D³+D+1)y=0
C. D³+D+y=0
D. None of the above

47. If z=1+i, z •=1-i, then z z • is:
A. 2
B. 1
C. i
D. 2

48. Euler's formula for b ™ in Fourier series in [a,b] is:
A. (2/b-a)"+ • G f(x)cos(n< ,ö"Ö –G€
B. (2/b-a)"+ • G f(x)sin(n< ,ö"Ö –G€
C. (1/b-a)"+ • G f(x)sin(n< ,ö"Ö –G€
D. (1/b-a)"+ • G f(x)cos(n< ,ö"Ö –G€