



## MULTIPLE CHOICE QUESTIONS

Subject Code: MA1003

Subject Name: TRANSFORMS AND BOUNDARY VALUE PROBLEMS

### UNIT - I PARTIAL DIFFERENTIAL EQUATIONS

1. The order and degree of a PDE  $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$  is  
a) 2,1    (b) 1,2    c) 2,2    d) 1,1    Ans (a)
2. The order degree of a PDE  $\left(\frac{\partial z}{\partial x}\right)^3 + \frac{\partial^2 z}{\partial y^2} = \cos(x+y)$  is  
a) 1,2    b) 2,1    c) 1,3    d) 3,1    Ans (b)
3. While forming the PDE, if the number of arbitrary constants to be eliminated is equal to the number of independent variables, the resulting PDE will be of \_\_\_\_\_ order.  
a) 1<sup>st</sup>    b) 2<sup>nd</sup>    c) 3<sup>rd</sup>    d) >1    Ans (a)
4. The complete integral of  $F(p,q)=0$  is  
a) 0    b)  $px + qy + c$     c)  $Z = ax + by + c$     d) none    Ans (c)
5. The complete integral of  $\sqrt{p} + \sqrt{q} = 1$  is  
a)  $z = ax + (1 - \sqrt{a})^2 y + c$     b)  $z = px + (1 - \sqrt{a})^2 y + c$   
c) 0    d) None    Ans (a)
6. The complete integral of  $z = px + qy + p^2 q^2$  is  
a)  $z = ax + by + a^2 b^2$     b)  $z = px + qy$     c)  $z = ax + by$     d) none    Ans (a)
7. The solution of  $(D^2 - 3DD' + 2D'^2)Z = 0$  is  
a)  $z = \varphi_1(y+x) + \varphi_2(y+2x)$     b)  $z = Ae^x + Be^{2x}$   
c)  $z = \varphi_1(y+2x) + \varphi_2(y-x)$     d) None.    Ans (a)
8. The solution of  $r - 4s + t = 0$  is  
a)  $z = (A + Bx)e^{2x}$     b)  $z = \varphi_1(y+2x) + x\varphi_2(y+2x)$   
c)  $z = \varphi_1(y+x) + \varphi_2(y+2x)$     d) none.    Ans (b)
9. The P.I of  $(D^2 - 2DD' + D'^2)Z = 8e^{x+2y}$  is  
a)  $e^{x+2y}$     b)  $8e^{x+2y}$     c) 8    d) 0    Ans (b)
10. The P.I of  $(D^2 - 3DD' + 2D'^2)Z = 2 \cosh(3x+4y)$  is  
a)  $\frac{2}{5} \cosh(3x+4y)$     b)  $-\frac{2}{5} \cosh(3x+4y)$     c)  $\frac{3}{5} \cosh(3x+4y)$     d) none    Ans (a)

11. The P.I of  $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = \cos(3x + 2y)$  is

- a)  $\frac{1}{9} \cos(3x + 2y)$  b)  $-\frac{1}{9} \cos(3x + 2y)$  c) 0 d) none.

Ans (a)

12. The P.I of  $(D^3 - 2D^2D')z = 4 \sin(x + y)$  is

- a)  $4 \sin(x + y)$  b)  $-4 \cos(x + y)$  c)  $4 \cos(x + y)$  d) 0

Ans (b)

13. The P.I of  $(D^2 + 4DD'^2)z = e^x$  is

- a)  $e^x$  b)  $e^{-x}$  c)  $e^{2x}$  d) 0

Ans (a)

14. The complementary function of  $(D^2 + 2DD' + D'^2)Z = xy$  is

- a)  $\phi_1(y - x) + x\phi_2(y - x)$  b)  $(A + Bx)e^{-x}$   
c)  $\phi_1(y - 2x) + x\phi_2(y - x)$  d) none

Ans (a)

15. The P.I of  $(D^2 - 3DD' + 2D'^2)Z = \sin(x - 2y)$  is

- a)  $-\frac{1}{15} \sin(x - 2y)$  b)  $\frac{1}{15} \sin(x - 2y)$  c) 0 d) none

Ans (a)

16. The solution of  $(D^3 - 3D^2D' + 2DD'^2)z = 0$  is

- a)  $z = f_1(y) + f_2(y + x) + f_3(y + 2x)$  b)  $z = f_1(y) + f_2(y - x) + f_3(y + 2x)$   
c)  $z = f_1(y) + f_2(y + x) + f_3(y - 2x)$  d) none

Ans (a)

17. The solution of  $(D^3 + DD'^2 - D^2D' - D'^3)z = 0$  is

- a)  $z = \phi(y + x) + f(y + ix) + F(y - ix)$  b)  $z = f_1(y + ix) + f_2(y - ix) + f_3(y)$   
c)  $z = \phi(y - x) + f(y + ix) + F(y + ix)$  d) none

Ans (a)

18. The P.I of  $\frac{\partial^3 z}{\partial z^3} - 2 \frac{\partial^3 z}{\partial x^2 \partial y} = e^{x+2y}$  is

- a)  $\frac{1}{3} e^{x+2y}$  b)  $-\frac{1}{3} e^{x+2y}$  c)  $-e^{x+2y}$  d) none

Ans (b)

19. The P.I of  $(D^2 - 2DD')z = e^{2x}$  is

- a)  $e^{2x}$  b)  $\frac{1}{4} e^{-2x}$  c)  $\frac{1}{4} e^{2x}$  d) 0

Ans (c)

20. The P.I of  $(D^2 - 2DD' + D'^2)z = \cos(x - 3y)$  is

- a)  $-\frac{1}{16} \cos(x - 3y)$  b)  $\frac{1}{16} \cos(x - 3y)$  c)  $\cos(x - 3y)$  d) 0

Ans (a)

21. If  $B^2 - 4AC < 0$ , then linear PDE is called

- a) Elliptic b) parabolic c) hyperbolic d) none

Ans (a)



22. If  $B^2 - 4AC = 0$ , then linear PDE is called

- a) Elliptic b) parabolic c) hyperbolic d) none

Ans (b)

23. If  $B^2 - 4AC > 0$ , then linear PDE is called

- a) Elliptic b) parabolic c) hyperbolic d) none

Ans (c)

24. The PDE  $xu_{xx} + u_{yy} = 0, x > 0$  is

- a) Elliptic b) parabolic c) hyperbolic d) none

Ans (a)

25. The PDE  $xu_{xx} + u_{yy} = 0, x < 0$  is

- a) Elliptic b) parabolic c) hyperbolic d) none

Ans (c)

26. The Laplace equation in two dimensions  $u_{xx} + u_{yy} = 0$  is classified as

- a) Elliptic type b) parabolic type c) hyperbolic type d) none

Ans (a)

27. The one dimensional heat equation  $\frac{\partial^2 u}{\partial x^2} = \frac{1}{a^2} \frac{\partial u}{\partial t}$  is classified as

- a) Elliptic type b) parabolic type c) hyperbolic type d) none

Ans (b)

28. The one dimensional wave equation  $\frac{\partial^2 u}{\partial x^2} = \frac{1}{a^2} \frac{\partial^2 u}{\partial t^2}$  is classified as

- a) Elliptic type b) parabolic type c) hyperbolic type d) none

Ans (c)

29. Which one of the following is classified as Elliptic?

- a) Poisson's equation b) 1-D heat equation c) 1-D Wave equation d) none

Ans (a)

30. The equation  $u_{xx} + 2u_{xy} + u_{yy} = 0$  is parabolic

- a) At all points b) only at  $x > 0$  c) only at  $x < 0$  d) none

Ans (a)

31. The equation  $x^2 f_{xx} + (1 - y^2) f_{yy} = 0, x \neq 0, -1 < y < 1$  is

- a) Elliptic type b) parabolic type c) hyperbolic type d) none

Ans (a)

#### UNIT - II FOURIER SERIES

1. Which of the following function is periodic in the interval  $(0, \pi)$ ?

- a)  $\sin x$  b)  $\cos x$  c)  $\tan x$  d)  $\sec x$

Ans (c)

2. Which of the following function is periodic with period  $2\pi$ ?

- a)  $\sin x$  b)  $\tan x$  c)  $\cot x$  d) None

Ans (a)

3. The function  $f(x) = \cot x$  is periodic with period .....

- a)  $2\pi$  b)  $4\pi$  c)  $\pi$  d) None

Ans (c)

4. The smallest period of the following function is .....

- a)  $\sin x$  b)  $\sin 2x$  c)  $\cos 2x$  d)  $\tan x$

Ans (a)

5. The Fourier series expansion of an odd function contains.....only  
a) Sine terms b) cosine terms c) sine and cosine d) None Ans (b)
6. The Fourier series expansion of an even function contains.....only  
a) Sine terms b) cosine terms c) sine and cosine d) None Ans (a)
7. If  $f(x)$  is an odd function in  $(-\pi, \pi)$ , then the value of  $a_0$  is .....  
a) 1 b) 0 c) -1 d) None Ans (b)
8. If  $f(x)$  is an even function in  $(-\pi, \pi)$ , then the value of  $b_n$  is .....  
a) 1 b) 0 c) -1 d) None Ans (b)
9. If  $f(x) = x \sin x$  in  $(-\pi, \pi)$  then the value of  $b_n$  is .....  
a) 1 b) 0 c) -1 d) None Ans (b)
10. If  $f(x) = |x|$  in  $(-\pi, \pi)$  then the value for  $a_0$  is .....  
a)  $\pi$  b)  $2\pi$  c)  $\frac{\pi^2}{3}$  d)  $\frac{2\pi^2}{3}$  Ans (c)
11. If  $f(x) = x^2$  in  $(-\pi, \pi)$  then the value for  $b_n$  is .....  
a) 1 b) 0 c) -1 d) None Ans (b)
12. In the Fourier series expansion of  $f(x) = |\sin x|$  in  $(-\pi, \pi)$ . What is the value of  $b_n$ ?  
a) 1 b) 0 c)  $\pi$  d) None Ans (b)
13. The function  $f(x) = x \cos x$  in  $(-\pi, \pi)$  is ..... Function  
a) Odd b) even c) neither even nor odd d) None Ans (b)
14. The function  $f(x) = x^2 \sin x$  in  $(-\pi, \pi)$  is ..... Function  
a) Odd b) even c) neither even nor odd d) None Ans (a)
15. The constant term of the function  $f(x) = x - x^3$  in  $(-\pi, \pi)$  is .....  
a) 0 b)  $\pi$  c) -1 d) 1 Ans (a)
16. If the expansion of  $f(x) = \sinh x$  in  $(-\pi, \pi)$ , then  $a_n$  is.....  
a) 0 b)  $\pi$  c) 1 d) -1 Ans (a)
17. The Root mean square value of a function  $y = f(x)$  over a given interval  $(a, b)$  is .....  
a)  $\bar{y} = \sqrt{\frac{\int_a^b y^2 dx}{b-a}}$  b)  $\bar{y} = \sqrt{\frac{\int_a^b y dx}{a-b}}$  c)  $\bar{y}^2 = \sqrt{\frac{\int_a^b y^2 dy}{b-a}}$  d) None Ans (a)



18. The right and left hand limit for the function  $f(x) = (x-1)^2$  in the interval  $(0,1)$  is ....  
 a) 0,0      b) 1,1      c) 1,0      d) 0,1      **Ans (b)**
19. The right and left hand limit for the function  $f(x) = \frac{1}{1-x}$  in the interval  $(0,1)$  is ....  
 a) 0,0      b) 1,1      c) 1,0      d) 0,1      **Ans (c)**
20. If  $x = a$  is a point of discontinuity of  $f(x)$ , then the value of the Fourier series at  $x = a$  is ....  
 a)  $\frac{1}{2}[f(a+) + f(a-)]$       b)  $\frac{1}{2}[f(a+) - f(a-)]$   
 c)  $[f(a+) + f(a-)]$       d)  $2[f(a+) + f(a-)]$       **Ans (a)**
21. If  $f(x)$  has equally  $q$  spaced points then  $b_n$  is .....  
 a) 2(mean value of  $f(x)\sin nx$ )      b) (mean value of  $f(x)\sin nx$ )  
 c)  $q$  (mean value of  $f(x)\sin nx$ )      d)  $\frac{2}{q}$  (mean value of  $f(x)\sin nx$ )      **Ans (a)**
22. The process of finding the Fourier series for the function given by the numerical values is known as.....  
 a) Complex Analysis      b) Numerical Methods      c) Harmonic Analysis      d) None      **Ans (c)**

### UNIT – III ONE DIMENSIONAL WAVE AND HEAT EQUATION

1. A boundary value problem is a differential equation together with  
 a) Unknown variable      b) known variable  
 c) boundary condition      d) none      **Ans (c)**
2. The boundary conditions are the set of additional restraints along with  
 a) Partial differential equation      b) differential equation  
 c) Any equation      d) none      **Ans (b)**
3. The wave equation is a  
 a) Hyperbolic      b) elliptic      c) parabolic      d) none      **Ans (a)**
4. The heat equation is  
 a) Hyperbolic      b) elliptic      c) parabolic      d) none      **Ans (c)**
5. The Laplace's equation is  
 a) Hyperbolic      b) elliptic      c) parabolic      d) none      **Ans (b)**
6. The heat equation  $u_t = k\nabla^2 u$  where  $u$  refers  
 a) Temperature      b) wave      c) time      d) none      **Ans (a)**
7. In the wave equation  $u_{tt} - c^2\nabla^2 u = 0$ ,  $u$  is the  
 a) Temperature      b) displacement from rest      c) initial temperature      d) none      **Ans (b)**
8. In the Laplace's equation  $\nabla^2 u = 0$ ,  $u$  is the  
 a) Temperature      b) displacement  
 c) steady state temperature      d) none      **Ans (c)**

9. The suitable solution of a finite string with fixed ends executing transverse vibration is  
 a)  $y(x, t) = (A \cos \lambda x + B \sin \lambda x)(C \cos \lambda ct + D \sin \lambda ct)$  b)  $y(x, t) = (A \cos \lambda x + B \sin \lambda x)$   
 c)  $y(x, t) = (C \cos \lambda ct + D \sin \lambda ct)$  d) none  
 Ans (a)
10. The solution of wave equation is if the string is at rest  
 a)  $u(x, t) = \phi(x + ct) + \phi(x - ct)$  b)  $u(x, t) = \frac{1}{2}[\phi(x + ct) + \phi(x - ct)]$   
 c)  $u(x, t) = \phi(x + ct)$  d) none  
 Ans (b)
11. One of the initial conditions on vibrating strings due to initial displacement is  
 a)  $y(x, 0) = f(x) \neq 0$  b)  $y(x, t) = 0$  c)  $y(x, 0) = f(x) = 0$  d) none  
 Ans (b)
12. One of the initial conditions on vibrating strings due to initial displacement is  
 a)  $y(x, 0) = 0$  b)  $\frac{\partial y(x, 0)}{\partial t} = 0$  c)  $\frac{\partial y(x, 0)}{\partial t} \neq 0$  d) none  
 Ans (b)
13. One of the initial conditions on vibrating strings due to initial velocity is  
 a)  $y(x, 0) = 0, \frac{\partial y(x, 0)}{\partial t} = f(x)$  b)  $y(x, 0) = f(x), \frac{\partial y(x, 0)}{\partial t} = 0$   
 c)  $y(x, t) = 0$  d) none  
 Ans (b)
14. The one dimensional heat equation describes the flow of heat in a body of  
 a) String b) homogeneous material c) wave d) none  
 Ans (b)
15. In the heat equation  $u_t = c^2 u_{xx}$  where  $c^2$  refers  
 a) Thermal constant b) thermal conductivity  
 c) thermal diffusivity d) none  
 Ans (c)
16. In  $C^2 = \frac{K}{\sigma \rho}$ ,  $\rho$  represents  
 a) Density of material b) specific heat capacity  
 c) constant d) none  
 Ans (a)
17. In  $C^2 = \frac{K}{\sigma \rho}$ ,  $\sigma$  represents  
 a) Density b) specific heat capacity c) constant d) none  
 Ans (b)
18. The suitable solution of heat equation is  
 a)  $u(x, t) = e^{-c^2 \lambda^2 t} (A \cos \lambda x + B \sin \lambda x)$  b)  $u(x, t) = e^{c^2 \lambda^2 t} (A \cos \lambda x + B \sin \lambda x)$   
 c)  $u(x, t) = (A \cos \lambda x + B \sin \lambda x)$  d) none  
 Ans (a)
19. The initial condition on zero boundary condition is  
 a)  $u(x, 0) = 0$  b)  $u(x, t) = t$  c)  $u(x, 0) = f(x)$  d) none  
 Ans (c)
20. In steady state  
 a)  $\frac{\partial u}{\partial x} = 0$  b)  $\frac{\partial u}{\partial t} = 0$  c)  $\frac{\partial^2 u}{\partial t^2} = 0$  d) none  
 Ans (b)

# UNIT - IV FOURIER TRANSFORMS

1. Fourier transform pair is represented by

(a)  $F(s) \text{ \& } F^{-1}[F(s)]$

(b)  $F(s) \text{ \& } F[F(s)]$

(c)  $f(x) \text{ \& } F^{-1}[f(x)]$

(d) none

Ans (a)

2. If  $F(s)$  is the Fourier transform of  $f(x)$  then  $F[f(x) \cos ax]$  in terms of 'F' is

(a)  $F(s+a)+F(s-a)$

(b)  $\frac{1}{2} [F(s+a)+F(s-a)]$

(b) (c)  $\frac{1}{2} [F(s+a)-F(s-a)]$

(d)  $F(s+a)-F(s-a)$

Ans (b)

3. If  $F(s)$  is the Fourier transform of  $f(x)$  then Fourier transform of  $f(x-a)$  is

(a)  $e^{iax} f(x)$  (b)  $e^{ias} f(s)$  (c)  $e^{i\frac{x^2}{2}}$  (d)  $\frac{1}{a} f(\frac{x}{a})$

Ans (b)

4. If  $F(s) = F[f(x)]$  then  $F[e^{iax} f(x)] =$

(a)  $e^{iax} f(x)$  (b)  $e^{ias} f(s)$  (c)  $F(s+a)$  (d)  $\frac{1}{a} f(\frac{x}{a})$

Ans (c)

5. Parseval's identity for Fourier transform is

(a)  $\int_{-\infty}^{\infty} |F(s)|^2 ds = \int_{-\infty}^{\infty} |f(x)|^2 dx$

(b)  $\int_{-\infty}^{\infty} (F(s))^2 ds = \int_{-\infty}^{\infty} (f(x))^2 dx$

(c)  $\int_{-\infty}^{\infty} |F(s)|^2 ds = \int_{-\infty}^{\infty} |f(x)|^2 dx$

(d)  $\int_{-\infty}^{\infty} (F(s))^2 ds = \int_{-\infty}^{\infty} (f(x))^2 dx$

Ans (c)

6. The self reciprocal for  $F[e^{-x^2/2}]$  is given by

(a)  $e^{-x^2/2}$  (b)  $e^{x^2/2}$  (c)  $e^{i/2}$  (d) none

Ans (a)

7. Find the Fourier cosine transform of  $e^{-x}$

(a)  $\sqrt{\frac{2}{\pi}} (\frac{s}{1+s^2})$

(b)  $\sqrt{\frac{2}{\pi}} (\frac{1}{1+s^2})$

(c)  $\sqrt{\frac{2}{\pi}} (\frac{a}{a+s^2})$

(d)  $\sqrt{\frac{2}{\pi}} (\frac{a}{1+s^2})$

Ans (b)

7. If  $F[f(x)] = F(s)$  then  $F[f(x) \cos ax] = \frac{1}{2} [F(s+a)+F(s-a)]$  is called .....

(a) Change of scale property

(b) shifting property

(c) Modulation property

(d) none

Ans (c)

8. Fourier Transform is also known as .....

(a) Inverse Fourier transforms

(b) Finite Fourier transforms

(c) Complex Fourier transforms

(d) Infinite Fourier transforms

Ans (c & d)



9. Find the Fourier sine transform of  $\frac{1}{x} =$

- (a)  $\sqrt{\pi/2}$  (b)  $\pi/2$  (c)  $\sqrt{\pi/3}$  (d) none

Ans (a)

11. If  $F(s) = F[f(x)]$  then  $F[x^n f(x)]$  is.....

- (a)  $(-i)^n \frac{d^n}{ds^n} F(s)$  (b)  $(i)^n \frac{d^n}{ds^n} F(s)$  (c)  $(i)^n \frac{d}{ds} F(s)$  (d)  $(-i)^n \frac{d^n}{ds^n} F(s)$

Ans (a)

12. The Convolution theorem for Fourier Transform is  $f * g =$  .....

- (a)  $\frac{1}{\sqrt{2\pi}} \int_0^\infty f(t)g(x-t)dt$  (b)  $\frac{1}{\sqrt{2\pi}} \int_0^\infty f(t)g(t)dt$   
(c)  $\frac{1}{2\pi} \int_{-\infty}^\infty f(t)g(x-t)dt$  (d)  $\frac{1}{\sqrt{2\pi}} \int_{-\infty}^\infty f(t)g(x-t)dt$

Ans (d)

13. Fourier Transform must satisfy.....

- (a) Dirichlet's condition (b) absolutely integrable  
(c) Continuity (d) All three.

Ans (d)

14. The Inverse Fourier sine transform  $f(x) =$  .....

- (a)  $\sqrt{\frac{2}{\pi}} \int_0^\infty F_s(s) \sin sx \, ds$  (b)  $\sqrt{\frac{2}{\pi}} \int_0^\infty F_s(s) \sin sx \, ds$   
(c)  $\sqrt{\frac{2}{\pi}} \int_0^\infty F(s) \sin sx \, ds$  (d)  $\sqrt{\frac{2}{\pi}} \int_{-\infty}^\infty F_s(s) \sin sx \, ds$

Ans (b)

15. The inverse Fourier cosine transforms  $f(x) =$

- (a)  $\sqrt{\frac{2}{\pi}} \int_0^\infty F_c(s) \cos sx \, ds$  (b)  $\sqrt{\frac{2}{\pi}} \int_0^\infty F(s) \cos sx \, ds$   
(c)  $\sqrt{\frac{2}{\pi}} \int_0^\infty F_c(s) \cos sx \, ds$  (d)  $\sqrt{\frac{2}{\pi}} \int_{-\infty}^\infty F_c(s) \cos sx \, ds$

Ans (c)

## UNIT - V Z - TRANSFORMS

1.  $Z[a^n u(n)]$  exists only if

- (a)  $|z| < |a|$  (b)  $|z| \leq |a|$  (c)  $|z| = |a|$  (d)  $|z| > |a|$

Ans (d)

2.  $u(n) - u(n-1)$  is

- (a)  $\delta(n)$  (b)  $f(n)$  (c)  $k(n)$  (d)  $\delta(k)$

Ans (a)

3. Z transform of  $e^{at}$  is

- (a)  $z / z - e^a$  (b)  $z / z - e^{-a}$  (c)  $z / z - e^{2a}$  (d)  $z / z - e^{-a}$

Ans(a)



4. Z transform of  $a^n$  is

(a)  $\frac{z}{z+a}$  (b)  $\frac{z}{z-a}$  (c)  $\frac{z}{z \pm a}$  (d)  $\frac{2z}{z+a}$

Ans (b)

5. By shifting theorem if  $Z[f(t)] = F(z)$ , then  $Z[e^{-at} f(t)]$  is

(a)  $F[ze^{aT}]$  (b)  $F[ze^{at}]$  (c)  $F[ze^{bT}]$  (d)  $F[ze^{-aT}]$

Ans (a)

6. Two sided Z transform is defined as

(a)  $\sum_{n=-\infty}^{\infty} x(n+1)z^{-n}$  (b)  $\sum_{n=-\infty}^{\infty} x(n)z^{-n}$  (c)  $\sum_{n=-\infty}^{\infty} x(n)z^n$  (d)  $\sum_{n=-\infty}^{\infty} x(n)z^{-n}$

Ans (d)

7. One side Z transform is defined as

(a)  $\sum_{n=0}^{\infty} x(n+1)z^{-n}$  (b)  $\sum_{n=0}^{\infty} x(n)z^{-n}$  (c)  $\sum_{n=0}^{\infty} x(n)z^n$  (d)  $\sum_{n=0}^{\infty} x(n)z^{-n}$

Ans (b)

8. The series of one sided Z transform is

(a) divergent (b) convergent (c) absolutely convergent (d) continuous

Ans (b)

9. Radius of convergence of  $\sum_{n=0}^{\infty} x(n)z^{-n}$  is

(a)  $\lim_{n \rightarrow \infty} \left| \frac{x(n+1)}{x(n)} \right|$  (b)  $x(n+1)$  (c)  $x(n)$  (d) limit  $n \rightarrow 0$

Ans (a)

10. Z-transform plays an important role in analysis of

(a) Continuous time signals (b) discrete time signals (c) invariant time signals  
(d) random time signals

Ans (b)

11. By initial value theorem  $Z[f(t)] = F(z)$  then  $f(0)$  is

(a)  $f(0) = \lim_{z \rightarrow \infty} z F(z)$  (b)  $f(0) = \lim_{z \rightarrow \infty} F(z)$  (c) 1 (d) 0

Ans (a)

12. By final value theorem  $Z[f(t)] = F(z)$  then  $\lim_{t \rightarrow \infty} f(t)$  is

(a)  $F(z)$  (b)  $(z-1)$  (c)  $\lim_{z \rightarrow \infty} (z-1)F(z)$  (d)  $f(0)$

Ans (c)

13. Convolution theorem states that if  $w(n)$  is the convolution of two sequences  $x(n)$  and  $y(n)$  then  $Z[w(n)]$  is

(a)  $Z[x(n)]$  (b)  $Z[y(n)]$  (c)  $W(z)$  (d)  $Z[x(n)] Z[y(n)]$

Ans (d)

14. Find  $Z\{(-1)^n\}$

(a)  $z/z-1$  if  $z < 1$  (b)  $z$  if  $z > 1$  (c)  $z/z+1$  if  $z > 1$  (d)  $z/z+1$  if  $z < 1$

Ans (c)

15. Inverse Z transform of  $\frac{z}{z-a}$  is

(a)  $a^n$  (b)  $b^n$  (c)  $a^m$  (d)  $a^{-n}$

Ans (a)

16. Inverse Z transform of  $\frac{az}{(z-a)^2}$  is

- (a)  $m^{2n}$  (b)  $n^{2n}$  (c)  $a^2$  (d)  $a^n$

Ans (b)

17. Inverse Z transform of  $z^{-k}$  is

- (a)  $\delta(k)$  (b)  $\delta(n)$  (c)  $\delta(n-k)$  (d)  $\delta(n+k)$

Ans (c)

18. Inverse Z transform of  $\frac{1}{z-a}$  is

- (a)  $a^{n-1}$  (b)  $a^{n+1}$  (c)  $a^n$  (d)

Ans (a)

19. Solve :  $y_{n+1} - 2y_n = 1$  given  $y_0 = 0$ .

- (a)  $2n$  (b)  $2^n$  (c)  $2^n - 1$  (d)  $2n + 1$

Ans (b)

20. Solve :  $y_{n+1} - 3y_n = 1$  given  $y_0 = 1$ .

- (a)  $3n$  (b)  $3^{n-1}$  (c)  $3^n$  (d)  $2n + 1$

Ans (c)