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SRM UNIVERSITY

DEPARTMENT OF MATHEMATICS

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) 1st b) 2nd c) 3rd d) >1 — Ans (a)

O

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) $z=ax+(1-\sqrt{a})^2y+c$ b) $z=px+(1-\sqrt{a})^2y+c$
   c) 0 d) None — Ans (a)

6. The complete integral of $z=px+qy+p^2q^2$ is
   a) $z=ax+by+a^2b^2$ 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)

O

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 $\left(D^2+4DD'^2\right)z=e^x$ is

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

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

a) $\varphi_1(y-x)+x\varphi_2(y-x)$ b) $(A+Bx)e^{-x}$

c) $\varphi_1(y-2x)+x\varphi_2(y-x)$ d) none Ans (a)

15. The P.I of $\left(D^2-3DD'+2D'^2\right)Z=\sin(x-2y)$ 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 $\left(D^3-3D^2D'+2DD'^2\right)z=0$ 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 $\left(D^3+DD'^2-D^2D'-D'^3\right)z=0$ is

a) $z=\varphi(y+x)+f(y+ix)+F(y-ix)$ b) $z=f_1(y+ix)+f_2(y-ix)+f_3(y)$

c) $z=\varphi(y-x)+f(y+ix)+F(y+ix)$ 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 $\left(D^2-2DD'+D'^2\right)z=\cos(x-3y)$ 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 2π?

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) 2π b) 4π c) π 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) π b) 2π c) $\frac{\pi^2}{3}$ d) $\frac{2\pi^2}{3}$ Ans (c)

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) π 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

b) Odd b) even c) neither even nor odd d) None Ans (a)

C

15. The constant term of the function $f(x) = x - x^3$ in $(-\pi,\pi)$ is ....

a) 0 b) π 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) π 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)

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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 $u_t=c^2u_{xx}$ where c^2 refers
a) Thermal constant b) thermal conductivity
c) thermal diffusivity d) none Ans (c)

16. In $C^2=\frac{K}{\sigma\rho}$, ρ represents
a) Density of material b) specific heat capacity
b) constant d) none Ans (a)

17. In $C^2=\frac{K}{\sigma\rho}$, σ 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) $F(s)$ & $F^{-1}[F(s)]$ (b) $F(s)$ & $F[F(s)]$
(c) $f(x)$ & $F^{-1}[f(x)]$ (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) $e^{s^2/2}$ (d) $\frac{1}{a}f(\frac{s}{a})$ 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) $\frac{1}{a}f(\frac{s}{a})$ 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) $e^{-s^2/2}$ (b) $e^{s^2/2}$ (c) $e^{s/2}$ (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^nf(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) $(-i) \frac{d^n}{ds^n} F(s)$ 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) $\sqrt{\frac{2}{\pi}} \int_0^\infty F_s(s) \sin x \, dx$ (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) $\sqrt{\frac{2}{\pi}} \int_{-\infty}^\infty F_s(s) \sin x \, ds$ Ans (b)

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

(a) $\sqrt{\frac{2}{\pi}} \int_0^\infty F_c(s) \cos x \, dx$ (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^nu(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) δ(n) (b) f(n) (c) k(n) (d) δ(k) Ans (a)

3. Z transform of e^{at} is

(a) $z/ \; z-e^a$ (b) $z/ \; z-e^{-a}$ (c) $z/ \; z-e2^a$ (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) $\sum_{n\to-\infty}^{\infty} x(n+1)z^{-n}$ (b) $\sum_{n\to\infty}^{\infty} x(n)z^{-n}$ (c) $\sum_{n\to-\infty}^{\infty} x(n)z^{n}$ (d) $\sum_{n\to-\infty}^{\infty} x(n)z^{-n}$ 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) $\sum_{n\to-\infty}^{\infty} x(n)z^{-n}$ Ans (b)

8. The series of one sided Z transform is
(a) divergent (b) convergent (c) obsolutely convergent (d) continous Ans (b)

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

(a) $\underset{n\to\infty}{Lt} \left| \frac{x(n+1)}{x(n)} \right|$ (b) x(n+1) (c) x(n) (d) limit $n \to 0$ Ans (a)

10. Z-transform plays an important role in analysis of
(a) Continous time signals (b) discrete time signals (c) invariant time signals

(d) random time signals Ans (b)

11. By intial value theorem $Z[f(t)] = F(z)$ then f(0) is
(a) $f(0) = \underset{z\to\infty}{Lt} F(z)$ (b) $f(0) = \underset{z\to\infty}{Lt} Z(z)$ (c) 1 (d) 0 Ans (a)

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

(a) F(z) (b)(z-1) (c) $\underset{z\to\infty}{Lt}$ (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)

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

(a) m^{am} (b)n^{an} (c) ^{a2} (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)
