Paper Code - 3354

B.SC B.Ed SEM - I(New Course)
July-Sep-2021
MATHEMATICS: CC-MAT-111

કુલ સમય :– ૬૦ મીનીટ કુલ પ્રશ્નો : ૫૦ વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૩૫

નોંધ : વિદ્યાર્થીએ માત્ર ૩૫ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૩૫ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.

1) *For Cauchy Mean Value theorem, functions* $f(x) = \sin x\ , g(x) = \cos x\ ; x \in \left[0, \frac{\pi}{2}\right]$ *then* $c =$ _____.

$(a)\ \pi$ $(b)\ \frac{\pi}{4}$ $(c)\ 2\pi$ $(d) 0$

2) *Real function* $f(x)$*and* $g(x)$*are differentiable on* _____.

$(a)[a,b]$ $(b)(a,b)$ $(c)\ [a,b)$ $(d)(a,b]$

3) $-x^2 - \frac{x^4}{2} - \frac{x^6}{3} -$ ……. = _____.

$(a)\log(1-x^2)$ $(b)\log x$ $(c)\sin x$ $(d)\cos x$

4) $1 - \frac{\left(x-\frac{\pi}{2}\right)^2}{2!} + \frac{\left(x-\frac{\pi}{4}\right)^4}{4!} -$ …… = _____.

$(a)\log(1-x^2)$ $(b)\log x$ $(c)\sin x$ $(d)\cos x$

5) $-\frac{1}{n}\sin^{n-1} x \cos x + \frac{n-1}{n}\int sin^{n-2} x\ dx =$ _____.

$(a)\int sin^n x\ dx$ $(b)\int sin^2 x\ dx$ $(c)\int cos^n x\ dx$ $(d)\int cos^2 x\ dx$

6) $\int_0^{\pi/2} sin^8 x\ dx =$ _____.

$(a)\frac{32}{105}$ $(b)\ 0$ $(c)\frac{256\pi}{35}$ $(d)\frac{35\pi}{256}$

7) $\int_0^{\frac{\pi}{2}} sin^{10} x\, cos^4 x\ dx =$ _____.

$(a)\frac{9}{4096}$ $(b)\frac{9\pi}{4096}$ $(c)\frac{4096}{9}$ $(d)10$

8) $\int_0^2 x^3(4-x^2)^{5/2}\ dx =$ _____.

$(a)\frac{63}{1024}$ $(b)\ 0$ $(c)\frac{1024}{63}$ $(d)\ \pi$

9) $\frac{n}{n^2+1^2} + \frac{n}{n^2+2^2} + \frac{n}{n^2+3^2} +$ …… $+ \frac{1}{n^2+n^2} +$ …… = _____.

$(a)\frac{\pi}{4}$ $(b)\frac{\pi}{2}$ $(c)\ 1$ $(d)\ 0$

10) *Find the length of arc of asteroid* $x^{2/3} + y^{2/3} = a^{2/3}$.

$(a)\ 6a$ $(b)\ 4a$ $(c)\ 2a$ $(d)a$

11) *Find the volume of the paraboloid generated by revolving the area bounded by parabola* $y^2 = 4ax$ *and straight line* $x = 4a$ *about* $X - axis$.

$(a)\ 5\pi^2$ $(b)\ 32\pi a^3$ $(c)\frac{5\pi}{3}$ $(d)2\ \pi$

12) *If* $\bar{x} = (1,2,-1)$ *and* $\bar{y} = (1,2,2)$ *then* $\bar{x} \cdot \bar{y} =$ _____.

$(a)\ 1$ $(b)\ 2$ $(c)\ 3$ $(d)4$

13) *If* $\bar{x} = (2020,2021,2022)$ *then* $\bar{x} \times \bar{x} =$ _____.

$(a)\bar{0}$ $(b)\bar{1}$ $(c)\bar{6}$ $(d)\bar{5}$

14) $[\bar{z}\bar{x}\bar{y}] =$_____.

$(a)\bar{0}$ $(b)[\bar{x}\bar{y}\bar{z}]$ $(c)\overline{xyz}$ $(d)\bar{1}$

15) *If* $\bar{x} = (10,20,30)$ *and* $\bar{y} = (2,4,6)$ *then* $\bar{x} \cdot (\bar{x} \times \bar{y}) =$ _____

$(a)\ 30$ $(b)\ 1$ $(c)\ 0$ $(d)20$

16) $\left[\bar{a}\bar{b}\bar{c}\right] = 0$ *if and only if* $\bar{a}\bar{b}\bar{c}$ *are* _____.

$(a)co-ordinates$ $(b)\ coplanar$ $(c)\ constant$ $(d)\pi$

17) *If* $\bar{a}\ ,\bar{b}\ ,\ \bar{c} \in R^3$ then $\bar{a} \times (\bar{b} \times \bar{c}) =$ _____.

$(a)\left[\bar{a}\bar{b}\bar{c}\right]$ $(b)0$ $(c)\ 2\left[\bar{a}\bar{b}\bar{c}\right]$ $(d)(\bar{a} \cdot \bar{c})\bar{b} - (\bar{a} \cdot \bar{b})\bar{c}$

18) $\bar{a} \times \left(\bar{b} \times \bar{c}\right) + \bar{b} \times (\bar{c} \times \bar{a}) + \bar{c} \times \left(\bar{a} \times \bar{b}\right) =$ _____.

$(a)\bar{0}$ $(b)\left[\bar{a}\bar{b}\bar{c}\right]$ $(c)\bar{a} \times \bar{b}$ $(d)\bar{c} \times \bar{a}$

19) *Find the polar co* $-$ *ordinates of the point having cartesian co* $-$ *ordinates* $\left(1, -\sqrt{3}\right)$ *in* R^2.

$(a)(2,\frac{\pi}{2})$ $(b)\ (\sqrt{2},\frac{\pi}{2})$ $(c)\ (2,-\frac{\pi}{3})$ $(d)(\sqrt{2},\frac{\pi}{4})$

20) $\left(\bar{a} - \bar{b}\right) \times \left(\bar{a} + \bar{b}\right) =$ _____.

$(a)\left|\bar{a} \times \bar{b}\right|^2$ $(b)\left(\bar{a}\ \cdot \bar{b}\right)^2$ $(c)2(\bar{a} \times \bar{b})$ $(d)0$

21) $(\frac{\partial\emptyset}{\partial x}, \frac{\partial\emptyset}{\partial y}, \frac{\partial\emptyset}{\partial z}) =$ _____ . *where* $\emptyset$ *is a scalar function*

$(a)\ 0$ $(b)\frac{\pi}{2}$ (c)curl $\emptyset$ $(d) grad\ \emptyset$

22) $Curl\ F =$ _____. *where F is a vector function.*

$(a)\nabla F$ $(b)\nabla \times F$ $(c)\nabla^2$ $(d)\ 0$

23) $(grad\ \emptyset)F + \emptyset(div\ F) =$ _____. *where* $\emptyset$ *is a scalar function & F is vector functions.*

$(a) grad\ (F \times G)$ $(b)\ Curl(F \times G)$ (c)div$(\emptyset F)$ $(d)\ 0$

24) $Curl\ (grad\ \emptyset) =$ _____. $where\ \emptyset\ is\ a\ scalar\ function$

$(a)\ 0 \qquad (b)1 \qquad (c)\nabla\emptyset \qquad (d)curl\emptyset$

25) $If\ \bar{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k} \& r = |\bar{r}|\ then\ f''(r) + \frac{2}{r}f'(r) =$ _____.

$(a)\bar{r} \qquad (b)\nabla^2 f(r) \qquad (c)\frac{\bar{r}}{r} \qquad (d)0$

26) $If\ \emptyset(x,y,z) = x^2yz^3 + xy^2z^2\ then\ find\ grad\ \emptyset\ at\ point\ (1,3,2).$

$(a)\ (84,32,72) \qquad (b)\ (82,32,72) \qquad (c)\ (7,3,-8) \qquad (d)(7,-3,8)$

27) $Find\ the\ radius\ of\ the\ circle\ x^2 + y^2 + z^2 - 2y + 2z - 23 = , x + 2y - 2z + 5 = 0.$

$(a)\ 0 \qquad (b)\ 1 \qquad (c)\ 3 \qquad (d)\ 5$

28) Ifthe angle of intersection of two sphere is _____ then the spheres are called orthogonal sphere.

$(a)\ 0 \qquad (b)\ \pi \qquad (c)\frac{\pi}{2} \qquad (d)2\pi$

29) $The\ intersection\ of\ sphere\ and\ a\ plane\ is$ _____.

$(a)\ sphere \qquad (b)$circle $\qquad (c)curve \qquad (d)cylinder$

30) $If\ the\ plane\ kx - y - 2z = 4\ touches\ the\ sphere\ x^2 + y^2 + z^2 + 2x - 6y + 1 = 0\ then\ find\ the\ value\ of\ k.$

$(a) -\frac{1}{4} \qquad (b)\frac{1}{4} \qquad (c)\ 4 \qquad (d) -4$

31) $If\ y = \sin(ax + b)\ ; a \neq 0, b \in R\ then\ y_n =$ _____.

$(a)a^n \sin\left(ax + b + \frac{\pi}{2}\right) \qquad (b)a^n \sin\left(ax + b + \frac{n\pi}{2}\right) \qquad (c)a^n \sin\left(ax + b + \frac{\pi}{4}\right) \qquad (d)a^n \sin\left(ax + b + \frac{\pi}{2}\right)$

32) Write name of the following statement? $If\ u\ and\ v\ are\ functions\ of\ x\ \&\ there\ n^{th}\ derivatives\ exist\ then$

$(uv)_n = \binom{n}{0}u_n v + \binom{n}{1}u_{n-1}v_1 + \ \ldots\ldots\ldots\ldots + \binom{n}{r}u_{n-r}v_r + \ \ldots\ldots\ldots\ldots + \binom{n}{n}uv_n$

$(a)Maclaurin's\ theorem \quad (b)$Leibnitz's theorem $\quad (c)Euler\ theorem \quad (d)Taylor'stheorem$

33) Write name of the following statement? $For\ real\ function\ f(x)\ ,$

$(i)f^{(n-1)}(x)\ is\ continuous\ on\ [0,x] \& (ii)f^{(n-1)}(x)\ is\ differentiable\ on\ (0,x)\ then$

$f(x) = f(0) + xf'(0) + \frac{x^2}{2!}f''(0) + \ \ldots\ldots\ldots + \frac{x^{n-1}}{(n-1)!}f^{n-1}(0) + R_n$

$(a)Maclaurin's\ theorem \quad (b)$Leibnitz's theorem $\quad (c)Euler\ theorem \quad (d)Taylor'stheorem$

34) $If\ y = \sin(3x + 4)\ then\ y_5(0) =$ _____.

$(a)\ 0 \qquad (b) -3^5 \cos 4 \qquad (c)3^5 \cos 4 \qquad (d)\ None$

35) $\frac{1}{\sqrt{n^2}} + \frac{1}{\sqrt{n^2-1^2}} + \frac{1}{\sqrt{n^2-2^2}} + \ \ldots\ldots\ldots\ldots = $ _____

$(a)\ 3\pi \qquad (b)2\pi \qquad (c)\frac{\pi}{2} \qquad (d)\ 4\pi$

36) $n!\, x^n \sum_{r=0}^{r=n}\{\binom{n}{r}\}^2 =$ _____.

$(a)(x^{2n})_1 \qquad (b)(x^{2n})_n \qquad (c)(x^n)_1 \qquad (d)(x^{2n})_{2n}$

37) $If\ y = (2x + 1)^5\ then\ y_5 =$ _____.

$(a)5!\,2^2 \qquad (b)5!\,2^5 \qquad (c)5!\,2^{25} \qquad (d)\ 0$

38) $Find\ the\ length\ of\ arc\ of\ the\ circle\ 6y^2 = (2x + 8)^3.$

$(a)\frac{2}{9}[125 + 13\sqrt{13}] \qquad (b)125 - 13\sqrt{13} (c)\log(\sqrt{2} + 1)\ (d)\frac{2}{9}[125 - 13\sqrt{13}]$

39) $If\ the\ sets\ \{\overline{a_1}, \overline{a_2}, \overline{a_3}\}\ and\ \{\overline{b_1}, \overline{b_2}, \overline{b_3}\}\ are\ reciprocal\ sets\ of\ vector\ then\ \overline{a_1} \cdot \overline{b_2}$=_____and $\overline{a_3} \cdot \overline{b_3}$ =_____.

$(a)\ 0,1 \qquad (b)1,1 \qquad (c)\ 1,0 \qquad (d)\ 0,0$

40) $If\ the\ sets\ \{\overline{a_1}, \overline{a_2}, \overline{a_3}\}\ and\ \{\overline{b_1}, \overline{b_2}, \overline{b_3}\}\ are\ reciprocal\ sets\ of\ vector\ then\ [\overline{a_1}\overline{a_2}\overline{a_3}][\overline{b_1}\overline{b_2}\overline{b_3}]$=_____

$(a)\ 0 \qquad (b)\ 1 \qquad (c)\ 3 \qquad (d)\ 5$

41) $If\ F(x,y,z) = x^2\hat{\imath} + y^2\hat{\jmath} + z^2\hat{k}\ then\ Curl\ F$=_____.

$(a)\ 0 \qquad (b)\ 1 \qquad (c)\ 2 \qquad (d)\ 3$

42) $The\ radius\ and\ centers\ of\ two\ spheres\ are\ r_1, r_2\ and\ c_1, c_2\ respectively.\ Give\ the\ condition\ that\ two\ sphere\ touches\ internally.$

$(a)c_1c_2 < r_1 - r_2 \qquad (b)c_1c_2 \neq |r_1 + r_2| \qquad (c)c_1c_2 \leq r_1 + r_2 \qquad (d)c_1c_2 = |r_1 - r_2|$

43) Polar co-ordinates are _____.

$(a)(x,y) \qquad (b)(r,\theta) \qquad (c)\frac{\pi}{2} \qquad (d)\ \pi$

44) The equation of cone having vertices at origin curve $x^2 + y^2 = 4\ , z = 2$ is _____.

$(a)x^2 + y^2 = z^2 \qquad (b)x^2 + y^2 = 8 \qquad (c)x^2 + z^2 = 0 \qquad (d)x^2 + y^2 = 1$

45) General equation of sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$, radius =_____.

$(a)\sqrt{u^2 + v^2 + w^2} \qquad (b)\sqrt{2u^2 + 2v^2 + 2w^2} \qquad (c)\sqrt{u^2 + v^2 + w^2 - d} \qquad (d)\ None$

46) Find the volume of sphere of radius 'a'.

$(a)\ 4\pi a^3 \qquad (b)\frac{4}{3}\pi a^3 \qquad (c)\frac{4\pi}{2} \qquad (d)\ \pi$

47) $If\ \bar{a}\ is\ constant\ vector\ then\ div\ (\bar{a} \times \bar{r})$=_____.

$(a)\ 0 \qquad (b)\bar{a} \qquad (c)\frac{\pi}{2} \qquad (d)\ None$

48) $(\bar{a} \times \bar{b}) \times (\bar{c} \times \bar{d})$=_____.

$(a)[\bar{a}\bar{b}\bar{d}]\bar{c} - [\bar{a}\bar{b}\bar{c}]\bar{d} \qquad (b)[\bar{a}\bar{b}\bar{d}]\bar{c} + [\bar{a}\bar{b}\bar{c}]\bar{d} \qquad (c)[\bar{a}\bar{b}\bar{c}] \qquad (d)\ None$

49) $If\ y = sin^3x\ then\ y_{100}(0)$=_____.

$(a)\cos x \qquad (b)\ 100 \qquad (c)\ 0 \qquad (d)\ None$

50) $\int sin^m x\, cos^n x\, dx =$ _____ $\sin^{m-1} x\, cos^{n+1} x + \frac{m-1}{m+n}\int sin^{m-2} x\, cos^n x\, dx$

$(a)\frac{1}{m+n} \qquad (b) -\frac{1}{m+n} \qquad (c)\frac{n}{m-n} \qquad (d)\ None$