CET MOCK TEST 5

SUB:MATHEMATICS MARKS:60

TOTAL DURATION MARKS FOR ASWERING:70MINUTES

01.*If* a,b,c are p^{th}, q^{th} and r^{th} terms repectively of a G.P., then
(q-r)loga+(r-p)logb+(p-q)logc=
a)0 b) 1 c)-1 d)abc

02. Express the recurring decimal 0.1353535.... as a rational fraction.
a)68/495 b)66/433 c)67/495 d)68/496

03.The value of $\sqrt{6+\sqrt{6}+.....}$ is
a)3 b)2 c) 4 d)5

04. $\frac{(n+2)!}{(n-1)!}$ is divisible by
a)4 b)5 c)6 d)7

05. Total number of ways of giving at least one coin out of three 25 paise and two 50 paise coins to a beggar is
a)32 b) 12 c) 11 d)35

06. 12^{th} term of $\left(x+\frac{1}{x}\right)^{13}$ is
a)$78x^{9}$ b)$78x^{-6}$ c)$78x^{-9}$ d)$78x^{10}$

07. R is the set of real numbers f:R $\rightarrow$ R defined by f(x)=x^2, the f is

a) onto function b)one-one function c)into funcion d) not a function

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08. The negation of the proposition:" It is cloudy or it is raining"

a)It is cloudy and it is raining b)It is cloudy and it is not raining

c)It is not cloudy and it is not raining d) It is not cloudy and it is raining.

09. One end of a line segment is (5,3), the midpoint is (7,2). Find the other co-ordinates of the other end.

a)(9,-1) b)(9,0) c)(9,1) d)(9,2)

10. Find the equation to the locus of a point which moves at a constant distance of 5 units from a fixed point (2,-3)

a)$x^2 + y^2 - 4x + 6y - 12 = 0$ b)$x^2 + y^2 + 6x + 6y - 24 = 0$

c) $x^2 + y^2 - 4x - 6y + 12 = 0$ d) $x^2 - y^2 - 4x + 6y - 12 = 0$

11.Find the orthocentre of the triangle formed by the vertices A(5,-2),B(-1,2) and C(1,4)

a)$(-\frac{1}{5}, \frac{14}{5})$ b)$(-\frac{1}{5}, -\frac{14}{5})$ c) $(\frac{1}{5}, \frac{14}{5})$ d)$(-\frac{1}{5}, -\frac{14}{5})$

12. If slope of one of the lines $ax^2 + 2hxy + by^2 = 0$ is three times the other then it is

a) $3h^2 = 2ab$ b)$3h^2 = 4ab$ c)$2h^2 = 3ab$ d)$h^2 = ab$

13. The angles of a triangle are inA.P. The ratio of the number of $\frac{n!}{r!(n-r)!}$ degrees in the least to the number of radians in the greatest is $60:\pi$. Find the angles in degrees.

a)$30^0, 60^0, 90^0$ b)$45^0, 60^0, 90^0$ c)$60^0, 90^0, 120^0$ d)$30^0, 60^0, 180^0$

14.*If* $\sin\theta$=n.sin(θ+2α) then (1-n).tan(θ+α) =

a)n.tanα b)(1+n).tanα c)(1-n).tanα d)n.(1+tanα)

15.*Solve* the triangle given that b=2, c=$\sqrt{3}+1, A=30^0$

a)a=$\sqrt{2}, B=45^0, C=105^0$ b)a=2, $B=60^0, C=105^0$

b) a=$\sqrt{2}, B=45^0, C=60^0$ d) a=$\sqrt{2}, B=30^0, C=120^0$

16. A cycle graph consists

a)two cycle of vertices b) a single cycle of vertices

c)only vertices d)multiple cycle of vertices

17. $\lim_{\theta\to\frac{\pi}{2}} \frac{\pi/2-\theta}{\cot\theta} =$

a) 1 b)∞ c)0 d)-1

18. $\lim_{x\to\infty}\left(1-\frac{4}{x-1}\right)^{3x-1} =$

a)e^4 b)e^3 c)e^{12} d)e^{-12}

19. Find the last digit in 13^{130}

a)4 b)8 c)9 d)12

20.For any positive odd integer n, $n(n^2-1)$ is divisible by

a) 6 but not by12 b)12 but not by 24 c) 24 d) 12

21. If A=$\begin{pmatrix}5 & 2\\ 1 & 7\end{pmatrix}, B=\begin{pmatrix}1 & 2\\ -3 & 4\end{pmatrix} \& C=\begin{pmatrix}1 & 1\\ -1 & -1\end{pmatrix}$

find X such that 2A+B+X=3C

a)$\begin{pmatrix}-8 & -3\\ -2 & -21\end{pmatrix}$ b)$\begin{pmatrix}-8 & 3\\ -2 & -21\end{pmatrix}$ c)$\begin{pmatrix}8 & -3\\ -2 & -21\end{pmatrix}$ d)$\begin{pmatrix}-8 & -3\\ -2 & 21\end{pmatrix}$

22. $\begin{vmatrix}\cos\frac{\pi}{12} & \sin\frac{\pi}{12}\\ \cos\frac{\pi}{4} & \sin\frac{\pi}{4}\end{vmatrix}^2 x \begin{vmatrix}\cos\frac{\pi}{4} & \cos\frac{\pi}{12}\\ \sin\frac{\pi}{4} & \sin\frac{\pi}{12}\end{vmatrix}^2 =$

a)9/16 b)3/4 c)3/16 d)1/16

23. The determinant $\begin{vmatrix} \cos(\alpha+\beta) & -\sin(\alpha+\beta) & \cos 2\beta \\ \sin\alpha & \cos\alpha & \sin\beta \\ -\cos\alpha & \sin\alpha & \cos\beta \end{vmatrix}$ *is* independent of

a) α b)β c)α and β d)neither α nor β

24.*If* A=$\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$ then characterstic roots of A are:

a)-5,1,1, b)5,-1,1 c)5,-1,-1 d)5,1,1

25. In the multiplicative group whose elements are the cube roots of unity,namely $\{1, \omega, \omega^2\}$, the inverse of the element ω is

a)1 b)ω c)$1/\omega$ d)ω^2

26. In the group G=$\{0,1,2,3,4,5\}$ under addition modulo 6,$(3+5^{-1})^{-1}$ *is*

a) 0 b)1 c)2 d)3

27. The set G=$\{0,1,2,3,4,5\}$ with operation of addition modulo 6 is a group. Which of the following is a subgroup of G?

a)$\{0,3\}$ b)$\{2,4\}$ c)$\{1,3\}$ d) $\{2,3\}$

28. The projection of $\vec{a} = (1,-2,1)$ on $\vec{b} = (4,-4,7)$ is

a)19/2 b)19/81 c)19/9 d)19/7

29.If $\vec{a}$ and $\vec{b}$ are unit vectors and θ is the angle between them,$\sin\frac{\theta}{2}$ =

a)$\frac{1}{2}|\vec{a}-\vec{b}|$ b)$\frac{1}{2}|\vec{a}+\vec{b}|$ c)$\frac{|\vec{a}x\vec{b}|}{|\vec{a}||\vec{b}|}$ d)$\frac{\vec{a}.\vec{b}}{|\vec{a}||\vec{b}|}$

31. If $a_1, a_2, a_3 ....., a_n$ *is* an A.P. with common difference d then

$\tan^{-1}\left[\tan^{-1}\frac{d}{1+a_1a_2}+\tan^{-1}\frac{d}{1+a_2a_3}+.....\tan^{-1}\frac{d}{1+a_{n-1}a_n}\right]$ *is* equal to

a)$\frac{(n-1)d}{a_1+a_2}$ b)$\tan^{-1}\frac{d}{1+a_1a_n}$ c)$\tan^{-1}\frac{nd}{1+a_1a_n}$ d)$\tan^{-1}\frac{a_n-a_1}{a_n+a_1}$

32.$\cos\left(\frac{1}{4}\sin^{-1}x\right)=\frac{\sqrt{3}+1}{2\sqrt{2}}$, *then* x is

a)$\frac{\sqrt{3}-1}{2\sqrt{2}}$ b)$\sqrt{6}-\sqrt{2}$ c)1/2 d)$\sqrt{3}/2$

33. If $e^{(\sin^2 x+\sin^4 x+\sin^6 x.....+\infty)\log_e 2}$ satisfies the equation $x^2-9x+8=0$, *then* the value of $\frac{\cos x}{\cos x+\sin x}, 0 \prec x \prec \frac{\pi}{2}$ is.....

a) $\frac{1}{2}(\sqrt{3}+1)$ b) $\frac{1}{2}(\sqrt{3}-1)$ c) $\frac{1}{2}(\sqrt{3})$ d) $\frac{1}{2}(\sqrt{5}+1)$

34. *If* $(\cos\theta+i\sin\theta)(\cos2\theta+i\sin2\theta).....(\cos n\theta+i\sin n\theta)=1$, then the value of θ is

a) $4m\pi, m \in z$ b) $\frac{2m\pi}{n(n+1)}, m \in z$ c) $\frac{4m\pi}{n(n+1)}, m \in z$ d) $\frac{m\pi}{n(n+1)}, m \in z$)

35. If $\omega(\neq 1)$ is a cube root of unity,then

$$\begin{vmatrix} 1 & 1+i+\omega^2 & \omega^2 \\ 1-i & -1 & \omega^2-1 \\ -i & -i+\omega-1 & -1 \end{vmatrix}$$ equals

a)0 b)1 c)i d)ω

36. The circles whose equations are $x^2+y^2+c^2=2ax$ and $x^2+y^2+c^2-2by=0$ will touch one another externally if

a) $\frac{1}{b^2}+\frac{1}{c^2}=\frac{1}{a^2}$ b) $\frac{1}{c^2}+\frac{1}{a^2}=\frac{1}{b^2}$ c) $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{c^2}$ d) $-\frac{1}{b^2}-\frac{1}{c^2}=\frac{1}{a^2}$

37. If the circles $x^2+y^2+2x+2ky+6=0, x^2+y^2+2ky+k=0$ intersect orthogonally, then k is

a)2 or -3/2 b)-2 or -3/2 c)2 or 3/2 d)-2 or 3/2

38. The focus of the parabola $y^2-x-2y+2=0$ is

a)(1/4,0) b)(1,2) c)(3/4,1) d)(5/4,1)

39. The ecentricity of an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ whose latus rectum is half of its major axis is

a) $\frac{1}{\sqrt{2}}$ b) $\sqrt{\frac{2}{3}}$ c) $\frac{\sqrt{3}}{2}$ d) $\sqrt{\frac{3}{2}}$

40. The equation of the chord of the hyperbola $25x^2-16y^2=400$ which is bisected at the point (6,2) is

a)16x-75y=418 b)75x-16y=418 c)25x-4y=400 d)67x+5y=396

41. *If* $f(x)=\frac{\tan x+\sec x-1}{\tan x-\sec x+1}$, *then* f '(x) is

a)secx(tanx-secx) b)secx(secx-tanx) c)secx(secx+tanx) d)tanx(tanx-secx)

42. If y=cos3x.cos4x, then y_n is

a) $\frac{1}{2}\left(7\cos\left(\frac{n\pi}{2}+7x\right)+\cos\left(\frac{n\pi}{2}+x\right)\right)$ b) $\frac{1}{2}\left(7^n\cos\left(\frac{n\pi}{2}+7x\right)+\sin\left(\frac{n\pi}{2}+x\right)\right)$

c) $\frac{1}{2}\left(7\cos\left(\frac{n\pi}{2}+7x\right)+\cos\left(\frac{n\pi}{2}+x\right)\right)$ c) $\frac{1}{2}\left(7\sin\left(\frac{n\pi}{2}+7x\right)+\cos\left(\frac{n\pi}{2}+x\right)\right)$

43. Derivative of $\sec^{-1}\left\{\frac{1}{2x^2-1}\right\}$ *w.r.t.* $\sqrt{1-x^2}$ at x=1/2 is

a)2 b)4 c)1 d)-2

44. If siny=x.sin(a+y) and $\frac{dy}{dx}=\frac{\lambda}{1+x^2-2x\cos a}$ *.then* λ is

a) $\sin a$ b)cosa c) 0 d) -sina

45. If y=sin(msin^{-1}x), then $(1-x^2)y_2-xy_1+m^2y$ is

a) 1 b)-1 c)0 d)2

46. The point on the curve y=6x-x^2 where the tangent is parallel to x-axis is

a)(0,0) b)(2,8) c)(6,0) d)(3,9)

47.*If* the subnormal at any point on y=$a^{1-n}x^n$ is of constant length, then the value of n is

a)1/2 b)1 c)2 d)-2

48. The angle of intersection of the curves y=4-x^2 & $y=x^2$ is

a) $\pi/2$ b) $\tan^{-1}(4/3)$ c) $\tan^{-1}(4\sqrt{2}/7)$ d) π

49.The sides of an equilateral triangle are increasing at the. rate of 2cm/sec.The rate at which the area is increases when the side is 10cm.is

a) $\sqrt{3}$sq.units/sec *b*) $10\,sq.units/\sec$ *c*) $10\sqrt{3}\,sq.units/\sec$

d) $\frac{10}{\sqrt{3}}sq.units/\sec$

50.*The.Maximum value of* $\frac{\log x}{x}=$

a) $\frac{1}{2}\log 2$ *b*) 0 *c*) $1/e$ *d*) 1

51. $\int \cos\left[2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right] =$

$a)\frac{1}{2}x^2 + c$ b)$b)\frac{1}{2}\sin\left[2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right] + c$

$c)\frac{-1}{2}x^2 + c$ $d)\frac{-1}{2}x + c$

52. *If* $\int \sqrt{2}\sqrt{1+\sin x}\,dx = -4\cos(ax+b) + c$. *then the value of* a & b *is*

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

53. If $\int \frac{3\cos x + 2\sin x}{4\sin x + 5\cos x}dx = f(x) + \frac{2}{41}\log(4\sin x + 5\cos x) + c$, *then* f(x)=

a)$\frac{22}{41}x$ b)$\frac{23}{41}x$ c) $\frac{20}{41}x$ d)$\frac{24}{41}x$

54. $\int \frac{e^x(1+x\log x)}{x}dx =$

$a)\frac{e^x \log x}{x} + c$ $b)e^x(1+\log x) + c$ $c)e^x \log x + c$ $d)xe^x \log x + c$

55. $\int_{-1}^{1} |1-x|dx =$

a)-2 b)0 c)2 d)4

56. *If* $I_n = \int_0^{\pi/4} \tan^n \theta . d\theta$, *then* $I_8 + I_6 =$

a)1 / 4 b)1/5 c)1/6 d)1/7

57. *For* which of the following values of m, is the area of the region bounded by the curve $y=x-x^2$ and the line y=mx equals 9/2?

a)-4,0 b)-2,3 c)2,3 d)-2,4,

58. Area of the curve $x^2+y^2=2ax$ is

a) πa^2 b) $2\pi a^2$ c) $4\pi a^2$ d) $\frac{1}{2}\pi a^2$

59.Degree of the differential equation:

$$\left[1+2\left(\frac{dy}{dx}\right)^2\right]^{3/2} = 5\frac{d^2y}{dx^3} \text{ is}$$

a)1 b)2 c)3 d)4

60. The solution of $\frac{dy}{dx} = \cos(x-y)$ is

a) $y+\cot\frac{x-y}{2}+c$ b) $x+\cot\frac{x-y}{2}+c$ c) $x+\tan\frac{x-y}{2}+c$ d) $y-\cot\frac{x-y}{2}+c$