Ambika VIDYALAYA

CET–2009–MODEL PAPER
Mathematics

Max. Marks – 60
No. of Questions: 60

By. Smt. Rajashree..S Nattoja M.Sc.

For every question four choices are given (a, b, c, d) of which one is the correct answer. Read and understand the question correctly. Select the correct answer.

1. If log (a + c), log (a – c), log (a – 2b + c) are in AP then
   a) a, b, c are in A. P b) a^2, b^2, c^2 are in A. P c) a, b, c are in G. P d) a, b, c are in H. P

2. If $\log_3 2 = a$ then $\log_{18} 24$ is
   a) $\frac{1+2a}{3+a}$ b) $\frac{1+a}{3+a}$ c) $\frac{1+3a}{2+a}$ d) $\frac{1+a}{3+2a}$

3. The sum of the coefficients in the expansion of $\left(\frac{1}{x}+2x\right)^n$ is 6561. Then n is
   a) 12 b) 11 c) 9 d) 8

4. Sum to infinity of the series $\frac{2}{3}+\frac{5}{9}+\frac{8}{27}+\ldots\ldots$ is
   a) $\frac{21}{4}$ b) $\frac{7}{4}$ c) $\frac{7}{2}$ d) $\frac{11}{4}$

5. Let $0 < x < \pi/4$ then sec 2x – tan 2x is
   a) tan (x - π/4) b) tan (π/4 – x) c) tan (x + π/4) d) $\tan^2(x + \pi/4)$

6. In a Δ ABC if a = 4, b = 8 & $\angle C = 60^0$ then
   a) $c = 4\sqrt{3}$ b) $\angle B = 90^0$ c) $\angle A = 30^0$ d) All correct

7. If the mid point of the section of a straight line intercepted between the axes is (1, 1) then the equation of the line is
   a) 2x + y = 3 b) 2x – y = 1 c) x = y d) x + y = 2

8. Which of the following is not a tree
   a) 

9. If $\cos\theta + \cos^2\theta + \cos^3\theta = 1$ and $a + b\sin^2\theta + c\sin^4\theta + d\sin^6\theta = 0$ then a + b + c + d is
   a) 0 b) 1 c) -2 d) 2

10. A line makes zero intercepts on x & y axes and it is ⊥r to the line 3x + 4y + 6 = 0 then its equation is
    a) 4x – 3y + 8 = 0 b) 4x – 3y + 6 = 0 c) y = x d) 4x – 3y = 0

11. If $A = \{(a, b) \mid 2a^2 + 3b^2 = 35, a, b \in Z\}$ then n(A) is
    a) 2 b) 4 c) 8 d) 12

12. If $f : R \to R$ is given by $f(x) = x^3 + 3$ then $f^{-1}(x)$ is
    a) $x^{1/3} - 3$ b) $x^{1/3} + 3$ c) $(x - 3)^{1/3}$ d) $x + 3^{1/3}$

13. In Δ ABC, Σ cos A = 3/2 then Δ ABC is
    a) Isosceles b) Right angled c) Equilateral d) Scalene

14. The inverse of the proposition $(p \wedge \sim q) \to r$ is
    a) $\sim r \to \sim p \vee q$ b) $\sim p \vee q \to \sim r$ c) $r \to p \wedge \sim r$ d) $\sim p \vee \sim q \to r$

15. The least non – negative integer to which 4^{101} is congruent to modulo 15
    a) 1 b) 4 c) 9 d) 14

16. Sum of the positive divisors of 8400 is
    a) 30750 b) 30752 c) 30700 d) 30725

17. If $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ & A - λI is singular matrix then

a) $\lambda^2 + 3\lambda + 4 = 0$ b) $\lambda^2 - 3\lambda + 4 = 0$ c) $\lambda^2 + 3\lambda - 4 = 0$ d) $\lambda^2 - 5\lambda - 2 = 0$

18. If f(x) = $\begin{vmatrix} 1 & x & x+1 \\ 2x & x(x-1) & x(x+1) \\ 3x(x-1) & x(x-1)(x-2) & x(x-1)(x+1) \end{vmatrix}$ then f(11) is

a)0 b) 11 c) -11 d) 1

19. If $\begin{vmatrix} a & b & a-b \\ b & c & b-c \\ 2 & 1 & 0 \end{vmatrix}$ = 0 if a, b, c are in

a) A.P b) A. G. P c) G. P d) H. P

20. If $[1 \times 1] \begin{bmatrix} 1 & 2 & 3 \\ 0 & 5 & 1 \\ 0 & 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ 1 \\ -2 \end{bmatrix}$ = 0 then x is

a) ¾ b) 1 c) 5/4 d) ¼

21. In the group G = {1, 3, 7, 9} under $\otimes_{10}$, $(3^{-1} \times 7)^{-1}$ is

a) 9 b) 5 c) 1 d) 3

22. Which of the following is not a binary operation ?

a) a * b = a/b ∀ a, b ∈ Q – {0} b) a * b = $a^2 + b^2$ ∀ a, b ∈ Z

c) a * b = a^{b^2} ∀ a, b ∈ Z d) a * b = a^b ∀ a, b ∈ Z

23. A unit vector in the plane of i + 2j + k and i + j + 2k and perpendicular to 2i + j + k is

a) j – k b) $\frac{i+j}{\sqrt{2}}$ c) $\frac{j-k}{\sqrt{2}}$ d) $\frac{j+k}{\sqrt{2}}$

24. The unit vector parallel to the resultant of the vectors 2i + 3j – k & 4i – 3j + 2k is

a) $\frac{1}{\sqrt{37}}$(6i + k) b) $\frac{1}{\sqrt{37}}$ (6i + j) c) $\frac{1}{\sqrt{37}}$ (6j + k) d) $\frac{1}{\sqrt{37}}$ (6i – k)

25. Let $\vec{a}$, $\vec{b}$, $\vec{c}$ be three vectors such that $\vec{a}.(\vec{b}+\vec{c}) + \vec{b}.(\vec{c}+\vec{a}) + \vec{c}.(\vec{a}+\vec{b}) = 0$ and $|\vec{a}| = 4$ $|\vec{b}| = 5$ & $|\vec{c}| = 7$ then $|\vec{a}+\vec{b}+\vec{c}|$ is

a) 16 b) 256 c) 90 d) 3√10

26. A variable chord is drawn through the origin to the circle $x^2 + y^2 - 2ax = 0$. Then the locus of the centre of the circle drawn on this chord as diameter is

a) $x^2 + y^2 + ax = 0$ b) $x^2 + y^2 + ay = 0$ c) $x^2 + y^2 - ax = 0$ d) $x^2 + y^2 - ay = 0$

27. The centre of the circle $r^2 = 2 - 4r\cos\theta + 6r\sin\theta$ is

a) (2, 3) b) (-2, 3) c) (2, -3) d) (-2, -3)

28. The locus of the centre of the circle of radius 2 which rolls on the outside of the circle $x^2 + y^2 + 3x - 6y - 9 = 0$ is

a) $x^2 + y^2 + 3x - 6y + 5 = 0$ b) $x^2 + y^2 + 3x - 6y - 31 = 0$

c) $x^2 + y^2 + 3x - 6y + 29/4 = 0$ d) $x^2 + y^2 + 3x + 6y - 31 = 0$

29. A circle with focal chord of the parabola $y^2 - 4x - y - 4 = 0$ as diameter will touch the line

a) 3x + 4 = 0 b) 32x + 13 = 0 c) 13x + 22 = 0 d) 16x + 33 = 0

30. If S_1 & S_2 be the foci of the hyperbola whose T – axis length is 4 & C – axis length is 6. S_3 & S_4 be the foci of the conjugate hyperbola. Then area of the quadrilateral $S_1S_2S_3S_4$ is _____ sq units

a) 24 b) 26 c) 22 d) 30

31. Equation of the tangent to the parabola $y^2 = 4x$ which makes an angle θ with its axis is

a) $y = x\tan\theta + \cot\theta$ b) $y = x\tan\theta + \sec\theta$ c) $x = y\cot\theta + \cot^2\theta$ d) $x = y\cot\theta + \tan\theta$

32. Angle between the asymptotes of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

a) $\cos^{-1}\left(\frac{2-e^2}{e^2}\right)$ b) $\tan^{-1}\left(\frac{\sqrt{2\left(e^2-1\right)}}{2-e^2}\right)$ c) $\sin^{-1}\left(\frac{2\sqrt{e^2-1}}{e}\right)$ d) $\cos^{-1}\left(\frac{2+e^2}{e^2}\right)$

33. The eccentricity of the hyperbola where the angle between the asymptotes is 60^o is

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

34. The line $y = x + 5$ touches

a) $y^2 = 25x$ b) $9x^2 - 16y^2 = 144$ c) $\frac{x^2}{29} - \frac{y^2}{4} = 1$ d) $x^2 + y^2 = 16$

35. The solution set of the equation $\frac{\cos\theta}{1+\sin\theta} + \frac{1+\sin\theta}{\cos\theta} = \frac{2}{\cos\theta}$ is

a) $R - \{\theta \mid \theta = n\pi, n \in Z\}$ b) $R - \{\theta \mid \theta = (2n + 1)\ \pi/2, n\ n \in Z\}$

c) $R - \{\theta\}$ d) R

36. G. S of $\sin^2\theta\sec\theta + \sqrt{3}\tan\theta = 0$ is

a) $n\pi + (-1)^{n+1}\pi/3, n \in Z$ b) $n\pi, n \in Z$ c) $n\pi + (-1)^{n+1}\pi/3, n \in Z$ d) $n\pi/2, n \in Z$

37. Value of $\sin[2\cos^{-1}(\sqrt{5}/3)]$ is

a) $\sqrt{5}/3$ b) $2\sqrt{5}/3$ c) $4\sqrt{5}/3$ d) $4\sqrt{5}/9$

38. If $\sin(\sin^{-1}1/5 + \cos^{-1}x) = 1$ then x is

a) -1 b) 2/5 c) 1/3 d) 1/5

39. Value of $\frac{i^{4n+1} - i^{4n-1}}{2}$, if $n \in N$ is

a) 1 b) -1 c) i d) –i

40. If $(\cos\theta + i\sin\theta)(\cos2\theta + i\sin2\theta)(\cos3\theta + i\sin3\theta)\ldots\ldots(\cos n\theta + i\sin n\theta) = 1$ then θ is

a) $\frac{4m\pi}{n(n+1)}$ b) $\frac{4m\pi}{n(n-1)}$ c) $\frac{m\pi}{n(n+1)}$ d) $\frac{m\pi}{n(n-1)}$

41. If $(\sqrt{8} + i)^{50} = 3^{49}(a + ib)$ then $a^2 + b^2$ is

a) 3 b) 8 c) 9 d) 4

42. Value of $\left[\frac{-1}{2} + \frac{\sqrt{3}i}{2}\right]^{2009}$ is

a) ω b) 1 c) ω^2 d) 0

43. $\lim_{x\to 2} \frac{2^x + 2^{3-x} - 6}{\sqrt{2^{-x}} - 2^{1-x}}$ is

a) 16 b) 8 c) 4 d) 2

44. $\lim_{x\to -1} \frac{\sqrt{\pi} - \sqrt{\cos^{-1}x}}{\sqrt{1+x}}$ is

a) $\frac{1}{\sqrt{2\pi}}$ b) 0 c) 1 d) -1

45. If $f(x) = \begin{cases} \frac{\left(5^x - 1\right)^3}{\sin\left(\frac{x}{a}\right)\log\left(1 + \frac{x^2}{3}\right)} & , x \neq 0 \\ 9(\log 5)^3 & , x = 0 \end{cases}$ is continuous at x = 0 then a is

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

46. If $f^1(x) = g(x)$ & $g^1(x) = -f(x)$ then $\frac{d}{dx}(f^2(x) + g^2(x))$ is

a) 0 b) -1 c) 1 d) ½

47. If $y = \sin x^\circ$ & $z = \log_{10} x$ then $\frac{dy}{dz}$ is

a) $\frac{x^\circ \cos x^\circ}{\log_{10} e}$ b) $\frac{x \cos x^\circ}{\log_e 10}$ c) $\frac{\pi \cos x^\circ}{180^\circ \times \log_{10} e}$ d) $\frac{x^\circ \cos x^\circ}{\log_e 10}$

48. If $y = a^x.b^{2x-1}$ then $\frac{d^2y}{dx^2}$ is

a) $y^2 \log(ab^2)$ b) $y \log(ab^2)^2$ c) y^2 d) $y \log(ab^2)$

49. If $y = x + e^x$ then $\frac{d^2x}{dy^2}$ is

a) e^x b) $\frac{e^x}{(1+e^x)^2}$ c) $\frac{-e^x}{(1+e^x)^2}$ d) $\frac{-1}{(1+e^x)^3}$

50. If $4x^2 + py^2 = 45$ & $x^2 - 4y^2 = 5$ cut orthogonally then p is

a) 9 b) 18 c) 1/9 d) 1/3

51. The maximum value of xy when $x + 2y = 8$ is

a) 20 b) 16 c) 24 d) 8

52. $\int \frac{\sec^2 x - 7}{\sin^7 x} dx$ is

a) tanx b) $\frac{\tan x}{\sin^7 x}$ c) $\frac{\sin^7 x}{\tan x}$ d) cot x $\text{cosec}^7 x$

53. $\int_0^1 x(1-x)^4 dx$ is

a) 0 b) 1 c) 1/30 d) 1/5

54. $\int_{-3}^{7} \frac{|x|}{x} dx$ is

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

55. $\int_2^4 log[x] dx$ is

a) log2 b) log 3 c) log 5 d) log 6

56. Area bounded by the curve $y = 2x - x^2$ & the line $y = -x$ is _____ square units

a) ½ b) 9/3 c) 9/2 d) 2

57. $\int_0^{2\pi} log\left(\frac{a+b\sec x}{a-b\sec x}\right) dx$ is

a) $\frac{\pi(a+b)}{a-b}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{2}(a^2 - b^2)$ d) 0

58. The D. E. of all non – vertical lines in a plane is

a) $\frac{d^2y}{dx^2} = 0$ b) $\frac{d^2x}{d^2y} = 0$ c) $\frac{dy}{dx} = 0$ d) $\frac{dx}{dy} = 0$

59. Solution of $x^2 + y^2 \frac{dy}{dx} = 4$ is

a) $x^2 + y^2 = 12x + c$ b) $x^2 + y^2 = 3x + c$ c) $x^3 + y^3 = 3x + c$ d) $x^3 + y^3 = 12x + c$

60. The order and degree of the D. E $\left(\frac{d^2y}{dx^2}\right) + \frac{\left(\frac{dy}{dx}\right)^2}{\frac{d^3y}{dx^3}} + 2\frac{d^3y}{dx^3} + 1 = 0$ are respectively

a) 5, 2 b) 2, 3 c) 3, 2 d) 2, 5

ಙ ಙ ಙ ✷ ✷ ✷ ॐ ✷ ✷ ✷ ಐ ಐ ಐ

Answers & Explanations for above questions watch our Online-Phone in Programme on 7th Feb. 2009 at 7.00 P.M. in Channel-9 through PCN in your TV.

OFFER

Get Top THREE Places and
Attend FREE coaching for CET – 2009 (Vacation Batch) in AMBIKA VIDYALAYA!!! .

Write CET Model Test papers in Physics, Chemistry, and Mathematics (given above) at home and submit your answer sheet (format given below) at our Office on or before 5-2-09.

Top places will be decided on the aggregate marks scored in the all the three papers

UTILIZE THIS RARE OPPORTUNITY.

✂ Cut Here

Ambika VIDYALAYA
BUILDS YOUR FUTURE

Online-CET Programme in your PCN Channel

Answer Sheet format

Mathematics

Name :														
Name of your College :														
Date of Birth:														
Address:														
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Phone Number:									**Signature:**					

✂ Cut Here

✂ Cut Here

✂ Cut Here

Ambika VIDYALAYA
BUILDS YOUR FUTURE