UG (except BBA) CET Sample Paper

MATHEMATICS: (50 Questions)

1. If n is a positive integer , then n^3+2n is divisible by :

   A. 2
   B. 6
   C. 15
   D. 3

2. If x+y=k is a normal to $y^2=12x$, then k=

   A. 3
   B. 6
   C. 9
   D. none of the above

3. The number of proper subsets of {1,2,3} is
   A. 8
   B. 7
   C. 6
   D. 5

4. A survey shows that 63% of the Americans like cheese and 76% like apples. If x% of the Americans like both cheese and apples , then
   A. x=39
   B. x=63
   C. $39 \leq x \leq 63$
   D. none of these

5. The conjugate of 1/ (2+i) is
   A. (2+i)/5
   B. (2-i)/5
   C. 5/ (2-i)
   D. 5/ (2+i)

6. If $x+x^{-1} = 2\cos(p)$ then x^n+x^{-n} =
   A. 2cos(np)
   B. 2sin(np)
   C. Cos(np)
   D. Sin(np)

7. What is the equation of a line passing through (0,1) and making an angle with the y-axis equal to the inclination of the line x-y=4 with the x-axis ?
   A. y=x+1
   B. x=y+1
   C. 2x=y+2
   D. none of the above

8. What is [[sin (a)/cosec (a)] + [cos (a)/sec (a)]] equal to?
   A. 2
   B. 1
   C. 0.5
   D. 0.4

9. What is the distance between the lines 3x+4y=9 and 6x+8y=18 ?
   A. 0
   B. 3 units
   C. 9 units
   D. 18 units

10. If a and b are the roots of the equation $2x^2 + 6x + b = 0$ (b<0) the [(a/b)+(b/a)] equals
   A. 2
   B. -2
   C. 18
   D. none of these

11. What is the solution set of the equation $x^4-26x^2+25=0$?
   A. {-5,-1, 1, 5}
   B. {-5,-1}
   C. {1, 5}
   D. {-5, 0, 1, 5}

12. If H is the harmonic mean between P and Q , then the value of ((H/P)+(H/Q)) is :
   A. PQ/(P+Q)
   B. (P+Q)/PQ
   C. 2
   D. none of these

13. The first, second and the middle terms of an A.P are a, b, c respectively. Then their sum is equal to:
   A. 2(c-a)/ (b-a)
   B. [2c(c-a)/ (b-a)] + c
   C. 2c(c-a)/ (b-a)
   D. none of these

14. The number of ways in which (m*n) students can be distributed equally among m sections is:
   A. $(m!)^n/n!$
   B. $(m!)^n/ (n!)^m$
   C. (m*n)! /m! n!
   D. $(m*n)^m$

15. The number of six digit numbers that can be formed from the digits 1,2,3,4,5,6,7 so that the digits do not repeat and the terminal digits are even is

A.144
B. 72
C. 288
D. 720

16. The number of divisors of the form $4n+2$ ($n \geq 0$) of the integer 240 is

A. 4
B. 10
C. 8
D. 9

17. Four couples (husband and wife) decide to form a committee of four members. The number of different committees that can be formed in which no couple finds a place is

A. 10
B. 12
C. 14
D. 16

18. If the second, third and fourth term in the expansion of $(x+a)^n$ are 240 , 720 and 1180 respectively, then the value of n is

A. 15
B. 20
C. 10
D. 5

19. The coefficient of x^4 in the expansion of $[(x/2)-(3/x^2)]^{10}$ is equal to

A. 405/256
B. 504/259
C. 2450/263
D. none of the above

20. The lines $px+qy+r=0$, $qx+ry+p=0$ and $rx+py+q=0$ are concurrent if

A. $pq+qr+rp=0$
B. $p^2+q^2+r^2=2pqr$
C. $p^3+q^3+r^3=3pqr$
D. none of these

21. The value of λ for which the system of equations $3x-y+4z=3$, $x+2y-3z=-2$, $6x+5y-\lambda z=-3$ has infinite number of solutions is

A. 5
B. -5
C. 0
D. -1

22. If $a^2+4b^2=12ab$, then log (a+2b) =
A. (log a + log b – log 2)/2
B. log (a/2) + log (b/2) + log 2
C. (log a +log b + 4log 2)/2
D. (log a – log b +4log 2)/2

23. The number $\log_2 7$ is
A. an integer
B. a rational
C. an irrational
D. a prime number.

24. Let A be a skew-symmetric matrix of an odd order. Then det(A) is equal to
A. 0
B. 1
C. -1
D. 2

25. If T is an identity matrix of order 3, then $T^2 + 2T$ is equal to
A. T
B. 2T
C. 3T
D. 4T

26. The range of the function f(x)=1/(2-cos (3x)) is equal to
A. [-1/3, 0]
B. R
C. [1/3, 1]
D. none of these

27. Which of the following functions is an even function?
A. $f(x) =\log(x+ (1+x^2)^{1/2})$
B. $f(x) = \log_e((1+x)/ (1-x))$
C. $f(x) = x ((a^x+1)/ (a^x-1))$
D. $f(x) = x\sin^2 x-x^3$

28. The value of lim $[(\sin(x) – x + x^3/6)/ x^5]$ as x tends to 0 is
A. 0
B. 1
C. 1/60
D. 1/120

29. If $y=\sin^n x \cos nx$ then dy/dx is equal to
A. $n \sin^{n-1} x \cos ((n+1) x)$
B. $n \sin^{n-1} x \sin ((n+1) x)$
C. $n \sin^{n-1} x \cos ((n-1) x)$
D. $n \sin^{n-1} x \cos (nx)$

30. If $x=a(\cos\theta + \theta\sin\theta)$ and $y=a(\sin\theta - \theta\cos\theta)$, then dy/dx is equal to
A. $\cos\theta$
B. $\tan\theta$
C. $\sec\theta$
D. $\text{cosec}\,\theta$

31. The value of k in order that $f(x)= \sin x - \cos x - kx + b$ decreases for all real values is given by :
A. $k<1$
B. $k>1$
C. $k>2^{1/2}$
D. $k<2^{1/2}$

32. The two curves $x^3 - 3xy^2 + 2 = 0$ and $3x^2y - y^3 = 2$,
A. cut at right angles
B. touch each other
C. cut at an angle $\pi/3$
D. cut at an angle $\pi/4$

33. A circular plate expands under the influence of heat so that its radius increases from 5cm to 5.06cm. The approximate increase in the area of the circular plate is:
A. 0.88cm^2
B. 1.88cm^2
C. 2.88cm^2
D. none of these

34. If $\int [2^x/((1-4^x)^{1/2})]\,dx = k\sin^{-1}(2^x) + C$ (C is an arbitrary constant) , then k =
A. $\log 2$
B. $0.5\log 2$
C. 0.5
D. $1/\log 2$

35. $\int (1-\cos x)\text{cosec}^2 x\,dx$ equals
A. $\tan(x/2) + C$
B. $\cot(x/2) + C$
C. $0.5\tan(x/2) + C$
D. $2\tan(x/2) + C$

36. The area bounded by the curve $y=2x-x^2$ and the straight line $y=-x$ is given by
A. 9/2
B. 43/6
C. 35/6
D. none of these

37. Area of the region bounded by the curve y=tan x , tangent drawn to the curve at x=$\prod/4$ and the x-axis is equal to
A. log ($\sqrt{2}$)
B. log ($\sqrt{2}$) + 0.25
C. log ($\sqrt{2}$) - 0.25
D. 0.25

38. Which of the following is the integrating factor of xlog x dy/dx + y = 2 log x ?
A. x
B. e^x
C. log x
D. log (log x)

39. The differential equation representing the family of curves $y^2=2c(x+c^{1/2})$ where c is a positive parameter, is of
A. order 1, degree 3
B. order 2, degree 2
C. order 3, degree 3
D. order 4, degree 4

40. The solution of the differential equation $(1+x^2)dy/dx + 1+y^2=0$ is
A. $\tan^{-1}x - \tan^{-1}y = \tan^{-1}c$
B. $\tan^{-1}y - \tan^{-1}x = \tan^{-1}c$
C. $\tan^{-1}x - \tan^{-1}y = \tan c$
D. $\tan^{-1}x + \tan^{-1}y = \tan^{-1}c$

41. The differential equation of a simple harmonic oscillator of period $2\prod/n$ is
A. $d^2x/dt^2 + nx =0$
B. $d^2x/dt^2 + n^2x =0$
C. $d^2x/dt^2 - n^2x =0$
D. $d^2x/dt^2 + x/n^2 =0$

42. The possible value of p for which the line $x\cos\varphi + y\sin\varphi = p$ is a tangent to the circle $x^2+y^2-2qx\cos\varphi - 2qy\sin\varphi = 0$ is / are:
A. 0 and q
B. q and 2q
C. 0 and 2q
D. q

43. If one end of the diameter of the circle $x^2+y^2-8x-4y+c=0$ is (-3,2), then the other end is
A. (5, 3)
B. (6, 2)
C. (1,-8)
D. (11, 2)

44. The line $y=mx+1$ is a tangent to the parabola $y^2=4x$ if
A. m=1
B. m=2
C. m=4
D. m=3

45. $x^2-4y^2-2x+16y-24=0$ represents :
A. a pair of straight lines
B. an ellipse
C. a hyperbola
D. a parabola

46. The eccentricity of the ellipse $9x^2+5y^2-30y=0$ is equal to
A. 1/3
B. 2/3
C. ¾
D. none of these

47. The points with position vectors $7i-4j+7k$, $i-6j+10k$, $-i-3j+4k$ and $5i-j+k$ form a :
A. square
B. rectangle
C. parallelogram
D. rhombus

48. One set containing 5 numbers has mean=8 and variance=24 and the second set containing 3 numbers has mean=8 and variance=24. The variance of the combined set is :
A. 42
B. 24
C. 20
D. 25

49. Bag A contains 2 white and 3 red balls and bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. The probability that it is drawn from bag B is
A. 5/9
B. 4/9
C. 25/52
D. none of these

50. The probability that A can solve a problem is 2/3 and B can solve is ¾. If both attempt the problem, what is the probability that the problem gets solved?
A. 11/12
B. 7/12
C. 5/12
D. 9/12