GGSIPU mathmatics 2007

1. If p ^ ~r → ~p^q is false,then the truth values of p,q and r are respectively

   a T,F and F b F,F and T

   c F,Tand T d T,F and T

2. If α,β and γ are the roots of equation x^3-8x+8 = 0,then $\sum \alpha^2$ and $\sum \frac{1}{\alpha\beta}$ are respectively

   a 0 and -16 b 16 and 8

   c -16 and 0 d 16 and 0

3. The GCD of 1080 and 675 is

   a 145 b 135

   c 225 d 125

4. If a,b and c ∈ N, then which one of the following is not true ?

   a a |b and a| c⇒a| 3b+2c

   b a |b and a| c⇒a| c

   c a |b+c ⇒a| ba and a | c

   d a |b and a| c⇒a| b+c

5. x = 4 1+cos θ amd y=3 1-1+sinθ are the paramatic equations of

   a $\frac{x-3)^2}{9}+\frac{y-4)^2}{16} = 1$

   b $\frac{x+4)^2}{16}+\frac{y+3)^2}{9} = 1$

   c $\frac{x-4)^2}{16}-\frac{y-3)^2}{9} = 1$

   d $\frac{x-4)^2}{16}+\frac{y-3)^2}{9} = 1$

6. If the distance between the foci and the distance between the directrices of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}$ = 1 are in the ratio 3:2,then a:b is

   a $\sqrt{2}:1$

b $\sqrt{3}:\sqrt{2}$

c 1:2

(c 2 2

7. The ellipse $\frac{x^2}{25}+\frac{y^2}{16}$ = 1 have in common

a centre only

b centre,foci and directrices

c centre,foci and vertices

d centre and vertices only

8. If sec θ=m and tan θ=n, then $\frac{1}{m}$[m+n + $\frac{1}{m+n)}$] is

a 2 b 2m

(c) 2n (d) m

9. The value of $\frac{\sin 85^0 - \sin 35^0}{\cos 65^0}$ is

a 2 b -1

c 1 d 0

10. If the length of the tengent from any point on the circle x -3 ^{2}+y+2 ^{2}= 5r^2 to the circle x -3 ^{2}+y+2 ^{2} = r^2 is 16 unit,then the area between the two circles in sq unit is

a 32 π b 4 π

b 8 π d 256 π

11. The equation of the common tangent of the two touching circles $y^2+x^2-6x-12y+37=0$ and $x^2+y^2-6y+7=0$ is

a x+y-5 = 0 b x -y+5=0

c x -y-5=0 d x+y+5=0

12. The equation of the parabolas with vertex at -1,1 and focus 2,1 is

a $y^2-2y-12x-11=0$

b $x^2+2x-12y+13=0$

c y ^{2}-2y+12x+11= 0

d y ^{2}-2y-12x+13 = 0

13. The equation of the line which is tangent to both the circle $x^2+y^2=5$ and the parabola $y^2=40x$ is

a 2x -y$\pm$5 = 0

b 2x -y+5 = 0

c 2x -y-5 = 0

(d) 2x+-5 5 = 0

14. If 2A + 3B = $\begin{bmatrix} 2 & -1 & 4 \\ 3 & 2 & 4 \end{bmatrix}$ and A+2B= $\begin{bmatrix} 5 & 0 & 3 \\ 1 & 6 & 2 \end{bmatrix}$,then B is

a $\begin{bmatrix} 8 & -1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$ (I $\begin{bmatrix} 8 & 1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$

(c) $\begin{bmatrix} 8 & 1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$ (d $\begin{bmatrix} 8 & 1 & 2 \\ 1 & 10 & 1 \end{bmatrix}$

15. If A = $\begin{bmatrix} 1 & -3 \\ 2 & k \end{bmatrix}$ and A^2- 4A+ 10I = A,then k is equal to

a 0 b -4

c:) 4 annnct L d d](1 or 4

16. The value of $\begin{vmatrix} x+y & y+z & z+x \\ x & y & z \\ x-y & y-z & z-x \end{vmatrix}$ is equal to

a 2x+y+z ^{2} b 2x+y+z ^{3}

c x+y+z ^{3} d 0

17. On the set Q of all rational numbers the operation * which is both associative and commutative is given by a*b,is

a a+b+ab b a^2+b^2

c ab+1 d 2a+3b

18. From an aeroplane flying,vertically above a horizontal road,the angles of depression of two consecutive stones on the same side of aeroplane are observed to be 30^0 and 60^0respectively.The height at which the aeroplane is flying in km is

a $\frac{4}{\sqrt{3}}$ b $\frac{\sqrt{3}}{2}$

c $\frac{2}{\sqrt{3}}$ d 2

19. If the angles of a triangle are in the ratio 3:4:5,then the sides are in the ratio

a 2: $\sqrt{6}$:$\sqrt{3}$+1 b $\sqrt{2}$:$\sqrt{6}$:$\sqrt{3}$+1

c 2: $\sqrt{3}$:$\sqrt{3}$+1 d 3:4:5

20. if $\cos^{-1} x = \alpha$, 0<x<1 and $\sin^{-1} 2x\sqrt{1-x^2} + \sec^{-1}\left(\frac{1}{2x^2-1}\right) = \frac{2\pi}{3}$, than $\tan^{-1}2x$ equals

a $\frac{\pi}{6}$ b $\frac{\pi}{4}$

c $\frac{\pi}{3}$ d) $\frac{\pi}{2}$

21. If a>b>0,than the value of $\tan^{-1}\left(\frac{a}{b}\right) + \tan^{-1}\left(\frac{a+b}{a-b}\right)$ depends on

a both a and b b b and not a

c a and not b d neither a nor b

22. If A={a,b,c},B={b,c,d} and C={a,d,c}, then A -B x B $\cap$C is equal to

a {a,c , a,d}

b {a,b , c,d}

c {c,a , d,a}

d {a,c , a,d ,b,d}

23. The function f:X $\rightarrow$ Y defined by f(x = sin x is one one but not onto,If X and Y are respectiv ely equal to

a R and R

b [0, π] and [0,1]

c [0, $\frac{\pi}{2}$] and [-1,1]

d [$\frac{-\pi}{2}$, $\frac{\pi}{2}$] and [-1,1]

24. If $\log_4 2+\log_4 4+ \log_4 x+ \log_4 16 = 6$,then value of x is

a 64 b 4 c 8 d 32

25. If $S_n = \frac{1}{6.11}+\frac{1}{11.16}+\frac{1}{16.21}+ \ldots$ to n terms then $6S_n$ equals

a $\frac{5n-4}{5n+6}$ b $\frac{n}{5n+6)}$

b $\frac{2n-1}{5n+6}$ d $\frac{1}{5n+6)}$

26. The remainder obtained when $1!^2+2!^2+3!^2+....+100!^2$ is divided by 10^2 is

a 27 b 28

c 17 d 14

27. In the group G={1,5,7,11} under multiplication modulo 12,the solution of $7^{-1} \otimes_{12} x \otimes_{12} 11= 5$ is equals

a 5 b 1

c 7 d 11

28. A subset of the additive group of real numbers which is not a subgroup is

a {0},+ b Z,+

(c) (N,· d (d)

29. If $\vec{p} = \hat{\imath}+\hat{\jmath}$, $\vec{q}= 4\hat{k}-\hat{\jmath}$ and $\vec{r} = \hat{\imath} + \hat{k}$,then the unit vector in the direction of $3\vec{p} + \vec{q} -2\vec{r}$ is

a $\frac{1}{3}$ $\hat{\imath}+2\hat{\jmath}+2\hat{k}$

b $\frac{1}{3}$ $\hat{\imath}-2\hat{\jmath}-2\hat{k})$

c $\frac{1}{3}(\hat{\imath}-2\hat{\jmath}+2\hat{k}$

d $\hat{\imath}+2\hat{\jmath}+2\hat{k}$

30. If $\vec{a}$ and $\vec{b}$ are the two vectors such that $|\vec{a}| = 3\sqrt{3}$,$|\vec{b}| = 4$ and $|\vec{a}+\vec{b}| = \sqrt{7}$,then the angle between $\vec{a}$ and $\vec{b}$ is

a 120^0 b 60^0

c 30^0 d 150^0

31. if $\vec{a}$ is vector perpendicular to both $\vec{b}$ and $\vec{c}$,then

a $\vec{a}+\vec{b}+\vec{c} = \vec{0}$

b $\vec{a}\times\vec{b}+\vec{c} = \vec{0}$

c $\vec{a} \times \vec{b} \times \vec{c} = \vec{0}$

d $\vec{a} \cdot \vec{b} \times \vec{c} = \vec{0}$

32. If the area of the parallelogram with $\vec{a}$ and $\vec{b}$ as two adjacent sides is 15 sq unit ,than the area of the parallelogram having, $3\vec{a} + 2\vec{b}$ and $\vec{a} + 3\vec{b}$ as two adjacent sides in sq unit is

a 120 b 105

c 75 d 45

33. if the lines x+3y-9 = 0, 4x+by-2 = 0 nand 2x-y-4 = 0 are concurrent,then b equals

a -5 b 5

c 1 d 0

34. The equation of the circle having x-y-2 = 0 and x-y+2 = 0 as two tangents and x-y=0 as a diameter is

a $x^2+y^2+2x-2y+1 = 0$

b $x^2+y^2-2x+2y-1 = 0$

c $x^2+y^2 = 2$

d $x^2+y^2 = 1$

35. A circular sector of parimeter 60 m with maximum area is to be constructed.The radius of the circular arc in meter must be

a 20 b 5

c 15 d 10

36. $\int \frac{x^3+3x^2+3x+1)}{(x+1)^5}$ dx is equal to

a $-\frac{1}{x+1)}$ +c b $\frac{1}{5}$ logx+1+c

c logx+1+c d $\tan^{-1}$ x +c

37. $\int \frac{\cos e\, x}{\cos^2 1+\log\tan\frac{x}{2})}$ dx is equal to

a $\sin^2[1+\log\tan\frac{x}{2}]$ +c

b tan[1+log tan $\frac{x}{2}$] +c

c sec ^{2}[1+log tan $\frac{x}{2}$] +c

d - tan[1+log tan $\frac{x}{2}$] +c

38. The complex number $\frac{(-\sqrt{3+3i})(1-i)}{3+\sqrt{3i)\ i)}\sqrt{3+\sqrt{3i)}}}$ when re[presents in the argand diagram is

a in the second quadrant

b in the first quadrant

c on the y -axis imaginary axis

d on the x -axis real axis

39. If 2x=-1+$\sqrt{3}$I, then the value of 1 -x^2+x ^{6} – 1 -x+x^2 ^{6} is equal to

a 32 b -64

c 64 d 0 0

40. The modulus and amplitude of I + I $\sqrt{3}$ ^{8} are respectively

a 256 and $\frac{\pi}{3}$ b 256 and $\frac{2\pi}{3}$

(c) 2 ad $\frac{2\pi}{3}$ d 256 and $\frac{8\pi}{3}$

41. The value of $\lim_{x\to 0}\frac{5^x-5^{-x}}{2x}$ is

a log 5 b 0

c 1 d 2 log 5

42. Which one of the following is not true always ?

a if f(x is not continuous at x=a,then it is not differentiable at x=a

b If fx is continuous at x= a,then it is differentiable at x=a

c If f(x and gx are differentiable at x=a,then f(x +gx is also differentiable at x=a d If a function f(x is continuous at x=a,then $\lim_{x \to a} f(x)$ exists

43. $\int \frac{dx}{x\sqrt{x^6-16}}$ is equal to

a $\frac{1}{3}\sec^{-1}\left(\frac{x^3}{4}\right) + c$ b $\cosh^{-1}\left(\frac{x^3}{4}\right) + c$

c $\frac{1}{12}\sec^{-1}\left(\frac{x^3}{4}\right) + c$ d $\sec^{-1}\left(\frac{x^3}{4}\right) + c$

44. If $I_1 = \int_0^{\pi/2} x\sin x\,dx$ and $I_2 = \int_0^{\pi/2} x\cos x\,dx$,then which one of the following is true ?

a $I_1+I_2 = \frac{\pi}{2}$ b $I_1-I_2 = \frac{\pi}{2}$

d $I_1+I_2 = 0$ d $I_1=I_2$

45. If f(x is defined [-2,2] by f(x = $4x^2$-3x+1 and gx = $\frac{f(-x)-f(x)}{x^2+3}$, then $\int_{-2}^{2} g\,x$ dx is equal to

a 64 b -48 c 0 d 24

46. The area enclosed between the parabola $y=x^2-x+2$ and the line y=x+2 in sq unit equals

a $\frac{8}{3}$ b $\frac{1}{3}$

c $\frac{2}{3}$ d $\frac{4}{3}$

47. The solution of the differential equation e^{-x}y+1 dy+$\cos^2 x + \sin^2 x$ ydx = 0 subjected to the condition that y=1 when x=0 is

a Y+log y+$e^x \cos^2 x$ = c
b Logy+1+$e^x \cos^2 x$ =1
c Y+log y=$e^x \cos^2 x$
d y+1 + $e^x \cos^2 x$ =2

48. If the curve $y=2x^3+ax^2+bx+c$ passes through the origin and the tengents drawn to it at x= - 1 and x=2 are parallel to the x axis,then the values of a,b and c are respectively

a 12, -3 and 0 b -3,-12 and 0

c -3,12 and 0 d 3, -12 and 0

49. The locus of the point which moves such that the ratio of its distance from two fixed point in the plane is always a constant k(<1 is

a hyperbola b ellipse

c straight line d circle

50. The circles $ax^2+ay^2+2g_1 x+2f_1 y+c_1 = 0$ and $bx_2+by^2+2g_2x+2f_2y+c_2=0$ $a \neq 0$ and $b \neq 0$cut orthogonally if

a $g_1g_2 + f_1f_2 = ac_1 + bc_2$

b $2g_1g_2 + f_1f_2 = bc_1 + ac_2$

c $bg_1g_2 + a f_1f_2 = bc_1 + ac_2$

d $g_1g_2 + f_1f_2 = c_1 + c_2$