Padasalai's Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

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12 th Mathematics volume 2
One mark Question

Chapter 7

1.The volume of a sphere is increasing in volume at the rate of $3\pi cm^3$ /sec. The rate of change of its radius when radius is ½ cm
1)3cm/s 2) 2cm/s 3) 1cm/s 4)½ cm/s

2.A balloon rises straight up at 10m/s. An observer is 40m away from the spot where the balloon left the ground. Find the rate of change of the balloon's angle of elevation in koradian per sec when the balloon is 30m above the ground.
1)3/25 radians /sec 2) 4/25 radian/sec
3) 1/5 radians/sec 4)1/3radians /sec

3.The position of a particle moving along a horizontal line of any time t is given by $s(t) = 3t^2 - 2t -$ 8. The time at which the particle is at rest is
1)t=0 2) t=⅓ 3) t=1 4) t=3

4. A stone is thrown up vertically. The height it reaches at time t seconds is given by $x = 80t-16t^2$. The stone reaches the maximum height in time t seconds is given by
1)2 2) 2.5 3) 3 4) 3.5

5. Find the point on the curve $6y=x^3+2$ at which y-coordinate changes 8 times as fast as x-coordinate is
1)(4,11) 2) (4, --11) 3) (–4,11) 4)(–4,--11)

6. The abscissa of the point on the f(x) = square root of 8–2x at which the slope of tangent is -0.5?
1)–8 2) –4 3) –2 4) 0

7. The slope of the line normal to the curve f(x) =2cos4x at x=π/12 is
1)$-4\sqrt{3}$ 2) –4 3) $\sqrt{3}/12$ 4) $4\sqrt{3}$

8. The tangent to the curve $y^2-xy+9=0$ is vertical when
1)y=0 2)y=±√3 3) y=½ 4) y=±3

9.Angle between $y^2=x$ and $x^2=y$ at the origin is
1)$\tan^{-1}3/4$ 2) $\tan^{-1}(4/3)$ 3)π/2 4)π/4

10. The value of the limit $\lim_{x\to 0}(\cot x - 1/x)$
1)0 2) 1 3) 2 4) ∞

11. The function $\sin^4x+\cos^4x$ is increasing in the interval
1)[5π/8,3π/4] 2) [π/2,5π/8]

3)[π/4,π/2] 4) [0,π/4]

12. The number given by the Rolle's theorem for the function x^3-3x^2, $x \in [0,3]$ is
1)1 2)√2 3)3/2 4) 2

13. The number given by the Mean value theorem for the function 1/x, $x \in [1,9]$ is
1)2 2)2.5 3) 3 4)3.5

14. The minimum value of the function |3–x|+9 is
1)0 2)3 3)6 4)9

15. The maximum slope of the tangent to the curve $y=e^x \sin x$, $x \in [0,2\pi]$
1)x=π/4 2)x=π/2 3) x=π 4)x=3π/2

16. The maximum value of the function $x^2 e^{-2x}$, x>0 is
1)1/e 2)1/2e 3) $1/e^2$ 4)$4/e^4$

17. One of the closests points on the curve $x^2 - y^2 = 4$ to the point (6,0) is
1)(2,0) 2)(√5,1) 3)(3,√5) 4)(√13,– √3)

18. The maximum value of the product of two positive numbers, when their sum of the squares is 200, is
1)100 2) 25√7 3) 23 4)24√1.4

19. The curve $y=ax^4 - bx^2$ with ab>0
1) has no horizontal tangent
2) is concave up
3) is concave down
4) has no points of inflection

20. The point of inflection on the curve $y=(x-1)^3$ is
1) (0,0)
2) (0,1)
3) (1,0)
4) (1,1)

Chapter 8

1. A circular template has a radius of 10 cm. The measurement of radius has an approximate error of 0.02 cm. Then the percentage error in calculating area of these template is
1)0.2% 2) 0.4% 3) 0.04% 4)0.08%

2. The percentage error of fifth root of 31 is approximately how many times the percentage error is 31?
1)1/31 2) ⅕ 3) 5 4) 31

3.If $u(x, y) = e^{x^2+y^2}$, then $\partial u/\partial x$ is equal to
1)$e^{x^2+y^2}$ 2) $2xu$ 3)x^2u 4)y^2u

4.If $v(x, y) = \log(e^x+e^y)$, then $\partial v/\partial x + \partial v/\partial y$ is equal to
1)e^x+e^y 2) $1/e^x+e^y$ 3) 2 4)1

5.If $w(x,y) = x^y$, $x>0$, then $\partial w/\partial x$ is equal to
1)$x^y \log x$ 2) $y \log x$ 3) yx^{y-1} 4)xlogy

6.If $f(x, y) = e^{xy}$, then $\partial^2 f/\partial x\partial y$ is equal to
1)$xy\, e^{xy}$ 2) $(1+xy)\, e^{xy}$ 3) $(1+y)\, e^{xy}$ 4) $(1+x)\, e^{xy}$

7. If we measure the side of a cube to be 4 cm with an error of 0.1 cm, then the error in our calculation of the volume is
1)0.4cu.cm 2) 0.45 cu.cm 3) 2 cu.cm
4) 4.8cu.cm

8) The change in the surface area $S = 6x^2$ of a cube when the edge length varies from x_0 to x_0+dx is
1)$12x_0+dx$ 2) $12x_0dx$ 3)$6x_0dx$ 4)$6x_0+dx$

9. The approximate change in the volume V of a cube of side X metres caused by increasing the side by 1% is
1)$0.3x dx\ m^3$ 2)$0.03\ x\ m^3$ 3) $0.03x^2m^3$ 4)$0.03x^3\ m^3$

10. If $g(x,y) = 3x^2-5y+2y^2$, $x(t) = e^t$ and $y(t) = \cos t$, then dg/dt is equal to
1) $6e^{2t}+5\sin t-4\cos t \sin t$
2) $6e^{2t}-5\sin t+4\cos t \sin t$
3) $3e^{2t}+5\sin t+4\cos t \sin t$
4) $3e^{2t}-5\sin t+4\cos t \sin t$

11)If $f(x) = x/x+1$, then its differential is given by
1)$-1/(x+1)^2\, dx$ 2) $1/(x+1)^2\, dx$ 3)$1/x+1\, dx$ 4) $-1/x+1\, dx$

12.If $u(x,y) = x^2+3xy+y-2019$, then $\partial u/\partial x\ (4,-5)$ is equal to
1) –4 2) –3 3) –7 4)13

13.Linear approximation for $g(x) = \cos x$
at $x=\pi/2$ is
1) $x+\pi/2$ 2) $-x+\pi/2$ 3) $x-\pi/2$ 4) $-x-\pi/2$

14.If $w(x,y,z) = x^2(y-z)+y^2(z-x)+z^2(x-y)$, then $\partial w/\partial x+ \partial w/\partial y+ \partial w/\partial z$ is

1)xy+yz+zx 2)x(y+z) 3)y(z+x) 4)0

15.If f(x,y,z) = xy+yz+zx, then $f_x - f_z$ is equal to
1) z–x 2)y–z 3)x–z 4)y–x

Chapter 9

1.The value of $\int_0^{2/3} dx/\sqrt{4-9x^2}$ is
1) π/6 2) π/2 3) π/4 4) π

2.The value of $\int_{-1}^{2} |x|\, dx$ is
1) ½ 2) 3/2 3) 5/2 4)7/2

3.For any value of $n \in \mathbb{Z}$, $\int_0^{\pi} e^{\cos^2 x} \cos^3 x[(2n+1)x]dx$ is
1) π/2 2) π 3) 0 4) 2

4.The value of $\int_{-\pi/2}^{\pi/2} \sin^2 x \cos x\, dx$ is
1) 3/2 2)½ 3)0 4)⅔

5.The value of $\int_{-4}^{4} [\tan^{-1}(x^2/x^4+1) + \tan^{-1}(x^4+1/x^2)]\, dx$ is
1) π 2) 2π 3) 3π 4)4π

6.The value of $\int_{-\pi/4}^{\pi/4} (2x^7 - 3x^5 + 7x^3 - x + 1/\cos^2 x)$ is
1) 4 2) 3 3) 2 4) 0

7.If $f(x) = \int_0^x t \cos t\, dt$, then df/dx=
1)cosx–xsinx 2)sinx +xcosx 3)xcosx 4) xsinx

8.The area between $y^2=4x$ and its latus rectum is
1)⅔ 2)4/3 3)8/3 4)5/3

9.The value of $\int_0^1 x(1-x)^{99} dx$ is
1)1/11000 2)1/10100 3)1/10010
4)1/10001

10.The value of $\int_0^{\pi} dx/\ 1+5^{\cos x}$ is
1) π/2 2) π 3) 3π/2 4) 2π

11.If Γ(n+2) / Γ(n) = 90 then n is
1) 10 2) 5 3) 8 4) 9

12.The value of $\int_0^{\pi/6} \cos^3 3x\, dx$ is
1) ⅔ 2) 2/9 3) 1/9 4) ⅓

13. The value of $\int_0^{\pi} \sin^4 x\, dx$ is
1) 3π/10 2) 3π/8 3) 3π/4 4) 3π/2

14. The value of $\int_0^{\infty} e^{-3x} x^2\, dx$ is
1) 7/27 2) 5/27 3)4/27 4)2/27

15. If $\int_0^{a} \frac{1}{4+x^2}\, dx = \pi/8$ then a is
1) 4 2) 1 3) 3 4) 2

16. The volume of solid of revolution of the region bounded by $y^2=x(a-x)$ about x-axis is
1)πa^3 2) $\pi a^3/4$ 3)$\pi a^3/5$ 4) $\pi a^3/6$

17. If $f(x) = \int_0^{x} e^{\sin u}/u\, du$,x>1 and $\int_1^{3} e^{\sin x^2}/x\, dx = \frac{1}{2}[f(a)-f(1)]$,then one of the possible value of a is
1) 3 2) 6 3) 9 4) 5

18. The value of $\int_0^{1} (\sin^{-1}x)^2\, dx$ is
1)$\pi^2/4-1$ 2) $\pi^2/4+2$ 3) $\pi^2/4+1$ 4) $\pi^2/4-2$

19. The value of $\int_0^{a} (\sqrt{a^2-x^2})^3\, dx$ is
1)$\pi a^3/16$ 2) $3\pi a^4/16$ 3) $3\pi a^2/8$ 4)$3\pi a^4/8$

20. If $\int_0^{x} f(t)\, dt = x+\int_x^{1} tf(t)dt$, then the value of f(1) is
1)½ 2) 2 3) 1 4)¾

Chapter 10

1. The order and degree of the differential equation $d^2y/dx^2+(dy/dx)^{1/3}+\frac{1}{4}=0$
1) 2,3 2) 3, 3 3) 2,6 4) 2,4

2. The differential equation representing the family of curves y=A cos(x+B), where A and B are parameters, is
1)$d^2y/dx^2-y = 0$ 2)$d^2y/dx^2+y = 0$
3)$d^2y/dx^2 = 0$ 4) $d^2y/dx^2 = 0$

3. The order and degree of the differential equation $\sqrt{\sin x}(dx+dy) = \sqrt{\cos x}(dx-dy)$ is
1) 1,2 2) 2,2 3) 1,1 4) 2,1

4. The order of the differential equation of all circles with centre at (h, k) and radius 'a' is
1) 2 2) 3 3) 4 4) 1

5. The differential equation of the family of curves $y=Ae^x + Be^{-x}$, where A and B are arbitrary constants is
1)$d^2y/dx^2+y = 0$ 2)$d^2y/dx^2-y = 0$
3)$dy/dx + y = 0$ 4)$dy/dx-y = 0$

6. The general solution of the differential equation dy/dx=y/x
1)xy=k 2)y=k logx 3)y=kx 4)logy=kx

7. The solution of the differential equation 2x dy/dx – y =3 represents
1) straight lines 2) circles 3) parabola
4) ellipse

8.The solution of dy/dx +p(x) y=0 is
1)$y=ce^{\int pdx}$ 2) $y=ce^{-\int pdx}$ 3) $x=ce^{-\int pdy}$ 4)$x=ce^{\int pdy}$

9.The integrating factor of the differential equation dy/dx+=1+y/λ is
1)x/e^{λ} 2)e^{λ}/x 3)λe^{x} 4) e^{x}

10.The integrating factor of the differential equation dy/dx+p(x)y=Q(x) is , then p(x)
1)x 2)$x^2/2$ 3)1/x 4) $1/x^2$

11. The degree of the differential equation $y(x) = 1+dy/dx +1/1\cdot2 (dy/dx)^2 +1/1\cdot2\cdot3 (dy/dx)^3 +.....$ is
1)2 2) 3 3) 1 4) 4

12. If p and q are the order and the degree of the differential equation $y\,dy/dx + x^3(d^2y/dx^2) + xy = \cos x$,when
1)p<q 2)p=q 3) p>q 4) p exists and q does not exist

13. The solution of the differential equation $dy/dx +1/\sqrt{1-x^2} = 0$ is
1)$y+\sin^{-1}$ 2)$x+ \sin^{-1}$ 3) $y^2+2 \sin^{-1}x$ 4)$x^2+2 \sin^{-1} y = 0$

14. The solution of the differential equation dy/dx =2xy is
1)$y=Ce^{x^2}$ 2) $y=2x^2+C$ 3)$y=Ce^{-x^2}+C$ 4)$y=x^2+C$

15. The general solution of the differential equation log(dy/dx)=x+y is
1)$e^{x}+e^{y} = C$ 2)$e^{x}+e^{-y} = C$ 3)$e^{-x}+e^{y}=C$
4)$e^{-x}+e^{-y}= C$

16.The solution of $dy/dx =2^{y-x}$ is
1)$2^{x}+2^{y} = C$ 2)$2^{x}-2^{y}=C$
3)$1/2^{x} – 1/2^{y} =C$ 4) x+y =C

17. The solution of the differential equation $dy/dx = y/x + \Phi(y/x) / \Phi'(y/x)$ is
1)$x\Phi(y/x) = k$ 2) $\Phi(y/x)=kx$
3)$y\Phi(y/x) = k$ 4) $\Phi(y/x)=ky$

18. If sin x is the integrating factor of the linear differential equation dy/dx + Py = Q, then P is
1)log sin x 2) cos x 3) tan x 4) cot x

19. The number of arbitrary constants in the general solution of order n and n + 1 are respectively
1)n–1, n 2) n, n+1 3) n+1,n+2 4)n+1,n

20. The number of arbitrary constants in the particular solution of a differential equation of third order is
1)3 2) 2 3) 1 4) 0

21. Integrating factor of the differential equation dy/dx =x+y+1/x+1 is 1)1/x+1 2) x+1 3) 1/√x+1 4)√x+1

22. The population P in any year t is such that the rate of increase in the population is proportional to the pollution. then
1)$P=Ce^{kt}$ 2)$P=Ce^{-kt}$ 3) P=Ckt 4) P=C

23.P is the amount of certain substance left in after time t.If the rate of evaporation of the substance is proportional to the amount remaining, then
1)$P=Ce^{kt}$ 2) $P=Ce^{-kt}$ 3) P=Ckt 4)Pt=C

24. If the solution of the differential equation dy/dx =ax+3/2y+f represents a circle, then the value of a is
1)2 2) –2 3)1 4) –1

25.The slope at point of a curve y =f(x) is given by $dy/dx =3x^2$ and it passes through (–1,1). Then the equation of the curve is
1)$y=x^3+2$ 2)$y=3x^2+4$
3)$y=3x^3+4$ 4)$y=x^3+5$

Chapter 11
1. Let X be radium variable with the probability density function f(x) ={$2/x^3$ x≥1
0 x<1 which of the following statement is correct?
1) both mean and variance exist
2) mean exist but variance does not exist
3)both mean and variance does not exist
4)variant sexiest but mean does not exist

2. A rod of length 2l is broken into two pieces at random.The probability density function of the shorter of the two piece is
f(x)={1/l 0<x<l 0 l≤x<2l
the mean and variance of the shorter of the two pieces are respectively

1)$l/2,l^2/3$ 2)$l/2,l^2/6$ 3)$l,l^2/12$ 4)$l/2,l^2/12$

3. Consider a game where the player tosses a six-sided far die. If the face that comes up is 6, the player wins ₹ 36, otherwise he losses ₹ k^2,where k is the face that comes up k= {1, 2, 3, 4, 5} .The expected amount to win at this game in ₹ is 1)19/6 2)–19/6 3) 3/2 4)–3/2

4. A para of dice numbered 1, 2, 3, 4, 5, 6 of a six-sided die and 1, 2, 3, 4 of four sided die is rolled and the sum is determined. Let the random variable X denote this sum. Then the number of elements in the inverse image of 7 is
1)1 2) 2 3)3 4)4

5. A random variable X has Binomial Distribution with n= 25 and P=0.8 then standard deviation of X is
1)6 2)4 3)3 4)2

6. Let X represents the difference between the number of heads and the number of tails obtained when a coin is tossed n times .Then the possible values of X are
1)i+2n,i=0,1,2…n 2)2i–n,i=0,1,2...n
3)n–i,i=0,1,2...n 4)2i+2n,i=0,1,2...n

7. If the function f(x) = 1/12 for a<x<b, represent a probability density function of a continuous random variable X, then which of the following cannot be the value of a and b?
1)0 and 12 2) 5 and 17
3) 7 and 19 4) 16 and 24

8. Four buses carrying 160 students from the same school arrive at a football stadium. The buses carry, respectively, 42, 36, 34 and 48 students. one of the students is randomly selected. Let X denote the number of students that were on the bus carrying the randomly selected student. one of the 4 bus drives is also randomly selected. Let Y denote the number of students on that bus
Then E[X] and E[Y] respectively are
1)50,40 2) 40,50 3)40.75,40 4)41, 41

9. Two coins are to be flipped. The first coin will land on heads with probability 0.6,the second with probability 0.5. Assume that the results of the flips are Independent, and let X equal the total number of heads that result. The value of P of X is
1)0.11 2)1.1 3)11 4)1

10. On a multiple-choice exam with 3 possible destructives for each of the 5 questions, the probability that a student will get 4 or more correct answers just by guessing is
1)11/243 2)⅜ 3)1/243 4)5/243

11.If P(X=0)=1–P(X=1).If E[X] =3 Var(X), then P(X=0) is

1)⅔ 2) ⅖ 3)⅕ 4)⅓

12. If X is a binomial random variable with expected value 6 and variance 2.4, then P(X = 5) is
1)(10/5)(⅗)^6(⅖)^4 2)(10/5)(⅗)^{10}
3)(10/5)(⅗)^4(⅖)^6 4)(10/5)(⅗)^5(⅖)^5

13.The random variable X has the probability density function
f(x) ={ax+b 0<x<1 0 otherwise
and E(X) =7/12, then a and b are respectively
1)1 and ½ 2)½ and 1
3)2 and 1 4)1 and 2

14.Suppose that X takes on one of the values 0,1, and 2. If for some constant k, P(X=i) =k P(C=i–1) for i=1,2 and P(X=0)=1/7, then the value of k is
1)1 2) 2 3) 3 4) 4

15. Which of the following is a discrete random variable?
1.The number of cars crossing a particular signal in a day.
2. The number of customers in queue to buy train tickets at a moment.
3. The time taken to complete your telephone call.
1)1 and 2 2) 2 only 3) 3 only 4)2 and 3

16.If f(x) ={2x 0≤x≤a 0 otherwise
is a probability density function of a random variable, then the value of a is
1)1 2) 2 3) 3 4) 4

17.The probability mass function of a random variable is defined as:

x	–2	–1	0	1	2
f(x)	k	2k	3k	4k	5k

Then E(X) is equal to :
1)1/15 2)1/10 3)⅓ 4)⅔

18. Let X have a Bernoulli distribution with mean 0.4,then the variance of(2x - 3) is
1)0.24 2)0.48 3)0.6 4)0.96

19. If in 6 trials, X is a binomial variable which follows the relation 9P(X=4)=P(X=2) then the probability of success is
1)0.125 2)0.25 3)0.375 4)0.75

20.A computer salesperson knows from his past experience that he sells computers to one in every 20 customers who enter the showroom. what is the probability that he will sell a computer to exactly two of the next three customers?
1)$57/20^3$ 2)$57/20^2$ 3)$19^3/20^3$ 4)$57/20$

Chapter 12
1.A binary operation on a set S is a function from
1)$S \to S$ 2)$(S \times S) \to S$
3)$S \to (S \times S)$ 4)$(S \times S) \to (S \times S)$

2.subraction is not a binary operation is
1)$\mathbb{R}$ 2) $\mathbb{Z}$ 3) $\mathbb{N}$ 4) $\mathbb{Q}$

3.Which one of the following is a binary operation on$\mathbb{N}$?
1)Subtraction 2)Multiplication
3)Division 4)All the above

4.In the set $\mathbb{R}$ of real numbers 'x' is defined as follows. Which one of the following is not a binary operation on$\mathbb{R}$?
1)$a*b=\min(a \bullet b)$ 2)$a*b=\max(a,b)$
3)$a*b=a$ 4)$a*b=a^b$

5.The operation * defined by $a*b = ab/7$ is not a binary operation on
1)$\mathbb{Q}^+$ 2) $\mathbb{Z}$ 3) $\mathbb{R}$ 4) $\mathbb{C}$

6. In the set $\mathbb{Q}$ define $a \bullet b = a+b+ab$.For what value of y, $3 \bullet (y \bullet 5)=7$?
1)$y=⅔$ 2)$y=-2/3$ 3)$y=-3/2$ 4)$y=4$

7.If $a*b = \sqrt{a^2+b^2}$ on real numbers then *is
1)commutative but not associative
2)associative but not commutative
3)both commutative and associative
4)neither commutative nor associative

8. Which one of the following statements as a truth value T ?
1) sin x is an even function.
2) every square matrix is non-singular
3) the product of complex number and its conjugate is purely imaginary
4)$\sqrt{5}$ is an irrational number

9. Which one of the following statements are true value F ?
1)Chennai is in India or $\sqrt{2}$ is an integer
2)Chennai is in India or $\sqrt{2}$ is an irrational number

3)Chennai is in China or $\sqrt{2}$ is an integer
4) Chennai is in China or $\sqrt{2}$ is an irrational number

10.If a compound statement involves three simple statements, then the number of rows in the truth table is
1)9 2)8 3)6 4)3

11. Which one is the inverse of the statement $(p \vee q) \rightarrow (p \wedge q)$?
1)$(p \wedge q) \rightarrow (p \vee q)$ 2)$\neg(p \vee q) \rightarrow (p \wedge q)$
3)$(\neg p \vee \neg q) \rightarrow (\neg p \wedge \neg q)$ 4)$(\neg p \wedge \neg q) \rightarrow (\neg p \vee \neg q)$

12. Which one is the contrapositive of the statement$(p \vee q) \rightarrow r$?
1)$\neg r \rightarrow (\neg p \wedge \neg q)$ 2) $\neg r \rightarrow (p \vee q)$
3)$r \rightarrow (p \wedge q)$ 4)$p \rightarrow (q \vee r)$

13. The truth table for $(p \wedge q) \vee \neg q$ is given

p	q	$(p \wedge q) \vee (\neg q)$
T	T	(a)
T	F	(b)
F	T	(c)
F	F	(d)

which one of the following is true?

	(a)	(b)	(c)	(d)
1)	T	T	T	T
2)	T	F	T	T
3)	T	T	F	T
4)	T	F	F	F

14. In the last column of the truth table for $\neg(P \vee \neg q)$ the number of final outcomes of the truth value 'F'
1)1 2) 2 3) 3 4) 4

15. Which one of the following is incorrect? For any two propositions p and q, we have
1)$\neg(p \vee q) \equiv \neg p \wedge \neg q$ 2)$\neg(p \wedge q) \equiv \neg p \vee \neg q$
3)$\neg(p \vee q) \equiv \neg p \vee \neg q$ 4)$\neg(\neg p) \equiv q$

16.

p	q	$(p \wedge q) \rightarrow \neg p$
T	T	a)
T	F	b)
F	T	c)
F	F	d)

Which of the following is correct for the truth table of $(p \wedge q) \rightarrow \neg P$

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

17.The dual of $\neg(p \vee q) \vee [p \vee (p \wedge \neg r)]$ is

1)$\neg(p \wedge q) \wedge [p \vee (p \wedge \neg r)]$

2)$(p \wedge q) \wedge [p \wedge (p \vee \neg r)]$

3)$\neg(p \wedge q) \wedge [p \wedge (p \wedge r)]$

4)$\neg(p \wedge q) \wedge [p \wedge (p \vee r)]$

18. The proposition $p \wedge (\neg p \vee q)$ is

1)a tautology 2) a contradiction

3)logically equivalent to $p \wedge q$ 4)logically equivalent to $p \vee q$

19. Determine the truth table of each of the following statements :

a)4+2=5 and 6+3=9 b)3+2=5 and 6+1=7

c)4+5=9 and 1+2 =4 d)3+2=5 and 4+7=11

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

20. Which one of the following is not true?

1)Negation of a negation of a statement is the statement itself

2)If the last column of the truth table contains only T then it is a Tautology

3)If the last column of its truth table contains only F then it is a contradiction

4)If p and q are any two statements then $p \leftrightarrow q$ is a Tautology