MATHS

1. Let $A=\{x/x=n^3+2n+1, n\in R\}$ and $B=\{x/x=3n^2+7, n\in R\}$ then $A\cap B$ is a subset of

   1) $\{x/x=3n+5, n\in N\}$ 2) $\{x/x=n^2+n+1, n\in N\}$

   3) $\{x/x=7n-1, n\in N\}$ 4) $\{x/x\in 7n+2, n\in N\}$

2. Let $X=\{(x,y,z)/x,y,z\in N,\ x+y+z=10, x<y<z\}$ and $Y=\{(x,y,z)/x,y,z\in N,\ y=|x-z|\}$ then number of elements in $X\cap Y$ is equal to

   1) 0 2) 1 3) 2 4) 4

3. Let $X=\{1,2,3,4,5\}$ the number of different ordered pairs (Y,Z) that can be formed such that $Y\subseteq X$, $Z\subseteq X$, $Y\cap Z$ is empty is

   1) 2^5 2) 5^3 3) 5^2 4) 3^5

4. $A=\{4^n-3n-1/n\in N\}$ and $B=\{9n-9/n\in N\}$ then $A\cup B$ is equal to

   1) B 2) A 3) N 4) ϕ

5. If R and S are two symmetric relations then

1) ROS is a symmetric relation

2) SOR is a symmetric relation

3) ROS^{-1} is a symmetric relation

4) ROS is a symmetric relation if and only if ROS=SOR

6. If A and B are matrices of order 2×2 such that $A*B=\frac{AB-BA}{2}$ then which of the following is false

1) $A*A=0$

2) $A*(B*C)+B*(C*A)+C*(A*B)=0$

3) $A*(B+C)=A*B+A*C$

4) $A*(B*C)=(A*B)*C$

7. The number of symmetric relations then can be defined on a set of 7 elements is

1) 2^{49} 2) 49 3) 7^7 4) 2^{28}

8. Let S be set of all real numbers. Then the relation $R=\{(a,b):1+ab>0\}$ on S is

1) reflexive and symmetric but not transitive

2) Reflexive and transitive but not symmetric

3) symmetric and transitive but not reflexive

4) reflexive, symmetric and transitive

9. The set $(A\cup B\cup C)\cap\left(A\cap B^c\cap C^c\right)^c\cap C^c$ is equal to

1) $B\cap C^c$ 2) $A\cap C^c$ 3) $B\cap C$ 4) A

10. From 50 students taking examinations in maths, physics and chemistry, 37 passed maths, 24 physics and 43 chemistry. At most 19 passed maths and physics, at most 29 maths and chemistry and at most 20 physics and chemistry. The largest possible number that could have passed all three exams is

1) 10 2) 12 3) 9 4) 14

11. If $n(A)=m$ then $n\left((x,y,z);x,y,z\in A;\ x\neq y,y\neq z,z\neq x\right)$ where $A\subseteq R$

1) m^3 2) $m(m-1)^2$ 3) $m^2(m-2)$ 4) m^3-3m^2+2m

12. In a battle, 70% of the combatants lost one eye, 80% an ear, 75% an arm, 85% a leg x% lost all the four limbs. The minimum value of x is

1) 10 2) 12 3) 15 4) 5

13. Consider the set A of all determinants of order 3x3 with entries 0 or 1 only. Let B be the subset of A containing of all determinants with value 1 let C be the subset of containing of all determinants with value -1 , then

1) C is empty 2) B has same number of elements as C

3) A = B$\cup$C 4) B has twice as many elements as C

14. A set A has 10 elements. The number of ways of choosing two subsets P and Q of A such that (P-Q) $\cup$(Q-P)= ϕ is

1) 10_{C_2} 2) 2^{10} 3) 10^2 4) $2^5\left(10_{C_2}\right)$

15. The no.of triplets, (A,B,C) are there of the sets with $A\cup B\cup C=\{a_1,a_2.....a_{10}\}$ and $A\cap B\cap C=\phi$

1) 3^{10} 2) 6^{10} 3) 10^3 4) 10^6

16. The total number of ways of partitioning a set of 5 elements in to 2 non empty sets is

1) 31 2) 90 3) 15 4) 55

17. On a set of 4 elements, the number of relations, which are not reflexive is

1) 2^5 2) 2^{16} 3) 14.2^{12} 4) 15.2^{12}

18. The set $S=\{1,2,3,4,....12\}$ is to be partitioned into three sets, of A,B,C of equal size i.e $A\cup B\cup C=S\ A\cap B=B\cap C=A\cap C=\phi$ the number of ways to partition is

1) $\frac{\lfloor 12}{\lfloor 3(\lfloor 4)^3}$ 2) $\frac{\lfloor 12}{\lfloor 3(\lfloor 3)^4}$ 3) $\frac{\lfloor 12}{(\lfloor 4)^3}$ 4) $\frac{\lfloor 12}{(3)^4}$

19. Let N denote the set of all numbers and R be relation on N×N defined by (a,b) R (c,d) if ad(b+c)=bc (a+d) then R is _____

1) Symmetric only 2) reflexive only

3) transitive only 4) an equivalence only

20. Let $R=\{(3,3),(6,6)(9,9),(12,12),(6,12),(3,9),(3,12),(3,6)\}$ be a relation on $A=\{3,6,9,12\}$ then R is

1) reflexive and transitive only 2) reflexive only

3) an equivalence relation 4) reflexive and symmetric only

21. The value of the sum in the n^{th} bracket of $(1)+(2+3)+(4+5+6+7)+(8+9+.....15)+.....$ is,

1) $2^n\left(2^n+2^{n-1}-2\right)$ 2) $2^{n-1}\left(2^n+2^{n-1}-1\right)$

3) $2^{n-2}\left(2^n+2^{n-1}-1\right)$ 4) $\frac{2^{n+1}-2^n-1}{2}$

22. For each $n\in N$, which of the following is divisible by 9

1) 8^n+1 2) 4^n-3n-1 3) $3^{2n}+3n+1$ 4) 10^n+1

23. The inverse of " if two triangles are congruent then they are similar" is

1) If two triangles are similar then they are congruent

2) If two triangles are not congruent then they are not similar

3) If two triangles are not similar then they are not congruent

4) If two triangles are not congruent then they are similar.

24. The contra positive of " if $x \in A \cap B$ then $x \in A$ and $x \in B$ is

1) *If* $x \in A$ and $x \in B$ then $x \in A \cap B$ 2) If $x \notin A \cap B$ then $x \notin A$ *or* $x \notin B$

3) If $x \notin A$ *or* $x \notin B$ *then* $x \notin A \cap B$ 4) *if* $x \notin A$ *or* $x \notin B$ *then* $x \in A \cap B$

25. $(p \Rightarrow q) \rightarrow ((r \vee p) \rightarrow (r \vee q))$ is

1) a tautology 2) a contradiction

3) a tautology and a contradiction 4) neither a tautology nor a contradiction.

26. P: Raju is brilliant Q: Raju is rich R : Raju is honest

The negation of statement " Raju is brilliant and dishonest if and only if Raju is rich "can be expressed as

1) $\sim (P \wedge \sim R) \leftrightarrow Q$ 2) $\sim P \wedge (Q \leftrightarrow \sim R)$

3) $\sim (Q \leftrightarrow (P \wedge \sim R))$ 4) $\sim Q \leftrightarrow \sim P \wedge R$

27. Let p,q be two statements , then $\sim(\sim p \wedge q) \wedge (p \vee q)$ is logically equivalent to

1) q 2) p $\vee$ q 3) p 4) p $\vee \sim$ q

28. If the mean deviation of about median of the number a, 2a, ……,50a is 50 then $|a|$ equal to

1) 5 2) 2 3) 3 4) 4

29. A group of 10 items, has arithmetic mean 6. If arithmetic mean of 4 of them is 7.5 then mean of remaining items is

1) 6.5 2) 5.5 3) 4.5 4) 5

30. Suppose a population A has 100 observations, 101, 102, …… 200 and another population B has 100 observations, 151, 152, …….., 250. If V_A and V_B represent variances of the two populations respectively, then $\frac{V_A}{V_B}$=

1) $\frac{4}{9}$ 2) $\frac{2}{3}$ 3) 1 4) $\frac{9}{4}$