*

The minimum number of students in a class to be sure that three of them are born in the same month is
A. 22
B. 23
C. 24
D. 25

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

In how many ways can two letters be selected from the set {a, b, c, d} when repetition of the letters is allowed, if the order of the letters matters?
A. 10
B. 20
C. 12
D. 16

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

The number of ways in which n persons can be seated round a table is
A. n!
B. (n - 1)!
C. (n + 1)!
D. (n + 2)!

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

From a club consisting of 6 men and 7 women, in how many ways can we select a committee of 3 men and 4 women
A. 750
B. 700
C. 850
D. 600

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

If n pigeonholes are occupied by kn + 1 pigeons, where k is a positive integer, then atleast one pigeonhole is occupied by
A. k pigeons
B. k + 1 pigeons
C. k - 2 pigeons
D. k - 3 pigeons

- ◯ Option A
- ◉ Option B
- ◯ Option C
- ◯ Option D

*

Using pigeonhole principle, find how many people in any group of six people can be
A. at least 2 must be mutual friends
B. at least 2 must be mutual strangers
C. at least 3 must be mutual friends or at least 3 must be mutual strangers
D. no group can be formed

- ◯ Option A
- ◯ Option B
- ◉ Option C
- ◯ Option D

*

Of any five points chosen within an equilateral triangle whose sides are of length one, then the any two points are within a distance of
A. 2 distance apart
B. 1/3 of each other
C. 1/2 of each other
D. 1/4 of each other

- ○ Option A
- ○ Option B
- ◉ Option C
- ○ Option D

*

There are 250 students in a college. Of these 188 have taken a course in Mathematics, 100 have taken a course in English and 35 have taken a course in Science. Further 88 have taken courses in both Mathematics and English. 23 have taken courses in both English and Science and 29 have taken courses in both Mathematics and Science. If 19 of these students have taken all the three courses, how many of these 250 students have not taken a course in any of these three courses?
A. 140
B. 202
C. 58
D. 48

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

Using the inclusion-exclusion principle, find the number of integers from a set of 1 to 100 that are not divisible by 2, 3 and 5.
A. 22
B. 25
C. 26
D. 33

- ○ Option A
- ○ Option B
- ◉ Option C
- ○ Option D

*

Let $a, b, c \in Z$, the set of integers. If $a \mid b$ and $a \mid c$, then
A. $b \mid ma$
B. $b \mid na$
C. $(m+n) \mid b+c$
D. $a \mid (mb+cn)$

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

If $n > 1$ is a composite integer and p is a prime factor of n, then

A. $p \geq \sqrt{n}$

B. $p \leq \sqrt{n}$

C. $p < \sqrt{n}$

D. $p > \sqrt{n}$

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

If a and b are coprime and a and c are coprime, then
A. ab and bc are coprime
B. a is not prime
C. a and bc are coprime
D. a and bc are not coprime

- ( ) Option A
- ( ) Option B
- (•) Option C
- ( ) Option D

*

If a and b are any two integers, b>0, there exists unique integers q and r such that $a = bq + r$, where
A. $a \leq r < b$
B. $0 > r > b$
C. $r < 0$
D. $b = 0$

- (•) Option A
- ( ) Option B
- ( ) Option C
- ( ) Option D

*

Fundamental Theorem of Arithmetic states that
A. Every integer n > 1 can be written as a sum of prime numbers
B. Every integer n > 1 can be written as a product of composite numbers
C. Every integer n > 1 can be written uniquely as a product of prime numbers
D. Every integer n < 1 can be written uniquely as a product of prime numbers

- [ ] Option A
- [ ] Option B
- [x] Option C
- [ ] Option D

*

If the prime factorization of a and b are $a = p_1^{a_1}.p_2^{a_2}.p_3^{a_3}\ldots p_n^{a_n}$ and $b = p_1^{b_1}.p_2^{b_2}.p_3^{b_3}\ldots p_n^{b_n}$, where each exponent is a non-negative integer then

A. $\gcd(a,b) = p_1^{\min(a_1,b_1)}.p_2^{\min(a_2,b_2)}.p_3^{\min(a_3,b_3)}\ldots p_n^{\min(a_n,b_n)}$

B. $\gcd(a,b) = p_1^{\max(a_1,b_1)}.p_2^{\max(a_2,b_2)}.p_3^{\max(a_3,b_3)}\ldots p_n^{\max(a_n,b_n)}$

C. $\gcd(a,b) = p_1.p_2.p_3\ldots p_n$

D. $\gcd(a,b) = a\,b$

- [x] Option A
- [ ] Option B
- [ ] Option C
- [ ] Option D

*

Which of the following is pairwise relatively prime numbers?
A. (6, 12, 22, 27)
B. (121, 122, 123)
C. (30, 42, 70, 105)
D. (10, 19, 24)

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

The gcd (1819, 3587) is
A. 21
B. 19
C. 17
D. 11

- ( ) Option A
- ( ) Option B
- (•) Option C
- ( ) Option D

*

Using prime factorization find the gcd and lcm of (231, 1575)
A. 21, 17325
B. 19, 2100
C. 17, 1525
D. 21, 1570

- (•) Option A
- ( ) Option B
- ( ) Option C
- ( ) Option D

*

If a and b are two positive numbers, then the product of gcd (a, b) and lcm (a, b) is
A. a^2b^2
B. ab
C. a^2b
D. ab^2

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

The lcm (a, b) is always __________ if either or both a and b are negative
A. prime
B. negative
C. neither positive nor negative
D. positive

- [ ] Option A
- [ ] Option B
- [ ] Option C
- [x] Option D

*

Find the integers m and n in $512m + 320n = 64$.

A. m = 2, n = -3

B. m = -3, n = 2

C. m = -2, n = -3

D. m = -3, n = -2

- (selected) Option A
- Option B
- Option C
- Option D

*

If $\gcd(a, b) = d$ then

A. $\gcd(ad, bd) = 1$

B. $\gcd(\frac{d}{a}, \frac{d}{b}) = 1$

C. $\gcd(a, b) = 1$

D. $\gcd(\frac{a}{d}, \frac{b}{d}) = 1$

- [ ] Option A
- [ ] Option B
- [ ] Option C
- [x] Option D

*

If $\gcd(a,b)=1$ then for any integer c

A. $\gcd(ac,b)=\gcd(c,b)$

B. $\gcd(a,bc)=\gcd(c,b)$

C. $\gcd(a,b)=\gcd(c,b)$

D. $\gcd(a,bc)=1$

- (selected) Option A
- Option B
- Option C
- Option D

*

If a = qb + r, then
A. gcd (a, r) = gcd (b, r)
B. gcd (a, b) = gcd (a, r)
C. gcd (a, r) = gcd (b, r)
D. gcd (a, b) = gcd (b, r)

- ( ) Option A
- ( ) Option B
- ( ) Option C
- (•) Option D

*

If an event can occur in m ways and a second event in n ways and if the number of ways the second event occurs does not depend upon the occurrence of the first event, then the two events can occur simultaneously in
A. m ways
B. n ways
C. m + n ways
D. mn ways

- ( ) Option A
- ( ) Option B
- ( ) Option C
- (•) Option D

*

$p \leftrightarrow q$ is equivalent to

A. $(\neg p \vee q) \wedge (\neg q \vee p)$

B. $(p \vee \neg q) \wedge (\neg p \wedge q)$

C. $(p \vee q) \wedge (\neg p \vee q)$

D. $(p \wedge q) \wedge (\neg p \wedge q)$

- (selected) Option A
- Option B
- Option C
- Option D

*

In the conclusion of the any given compound proposition if all the entries are false, then it is called a

A. Tautology

B. contradiction

C. negation

D. contrapositive

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

$P \vee T$ is equivalent to

A. neither T nor F

B. p

C. T

D. F

- [ ] Option A
- [ ] Option B
- [x] Option C
- [ ] Option D

*

$(p \to r) \wedge (q \to r) \equiv$

A. $(p \vee q) \to r$

B. $(p \wedge q) \to r$

C. $p \to (q \wedge r)$

D. $p \to (q \vee r)$

- (x) Option A
- ( ) Option B
- ( ) Option C
- ( ) Option D

*

$p \vee q$ is equivalent to

A. $p \rightarrow q$

B. $p \rightarrow \neg q$

C. $\neg p \rightarrow q$

D. $\neg p \rightarrow \neg q$

- [ ] Option A
- [ ] Option B
- [x] Option C
- [ ] Option D

*

The value of the proposition $p \wedge (p \vee q)$ is

A. p

B. $p \vee q$

C. q

D. $p \wedge q$

- (●) Option A
- ( ) Option B
- ( ) Option C
- ( ) Option D

*

The truth table for $(p \vee q) \vee \neg p$ is

A. Tautology

B. Contradiction

C. Converse of $p \rightarrow q$

D. Negation of P.

- (selected) Option A
- Option B
- Option C
- Option D

*

Which of the following proposition is equivalent?

A. $\neg(p \leftrightarrow q) \equiv p \leftrightarrow \neg q$

B. $p \leftrightarrow q \equiv (p \rightarrow q) \vee (q \rightarrow p)$

C. $p \rightarrow q \equiv p \vee \neg q$

D. $p \leftrightarrow q \equiv \neg p \leftrightarrow q$

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

Let p: food is good, q: food is cheap, the symbolic form of the statement "good food is not cheap" is

A. $p \wedge q$

B. $p \rightarrow q$

C. $\neg p \rightarrow q$

D. $p \rightarrow \neg q$

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

The truth table for $\neg(\neg p \vee \neg q)$ is

A.	B.	C.	D.
T	T	F	T
T	F	F	F
T	F	F	T
T	F	F	F

- ( ) Option A
- (•) Option B
- ( ) Option C
- ( ) Option D

*

The truth table for $(p \rightarrow q) \rightarrow (q \rightarrow p)$ is

A.	B.	C.	D.
T	T	T	F
F	T	F	F
F	F	F	F
T	T	F	F

- ( ) Option A
- (•) Option B
- ( ) Option C
- ( ) Option D

*

$(p \to q) \wedge (p \to r)$ is equivalent to

A. $p \to q$

B. $p \to r$

C. $p \wedge (q \to r)$

D. $p \to (q \wedge r)$

- ( ) Option A
- ( ) Option B
- ( ) Option C
- (x) Option D

*

If $A:(\neg p \vee r)\wedge(\neg q \vee r)$ then the duality of A is

A. $(p\vee r)\vee(q\vee r)$

B. $(p\wedge r)\vee(q\wedge r)$

C. $(\neg p\wedge r)\vee(\neg q\wedge r)$

D. $(p\wedge r)\vee(q\wedge r)$

- ○ Option A
- ○ Option B
- ◉ Option C
- ○ Option D

*

The truth table for $(\neg q \wedge (p \to q)) \to \neg p$ is equivalent to

A.	B.	C.	D.
F	T	T	T
F	F	T	T
F	F	F	T
F	F	F	T

- ( ) Option A
- ( ) Option B
- ( ) Option C
- (•) Option D

*

The conclusion of the premises $r \to d$, $t \to \neg d$ and t is

A. $\neg r$

B. $\neg d$

C. $\neg t$

D. r

- (•) Option A
- ( ) Option B
- ( ) Option C
- ( ) Option D

*

A set of premises $R_1, R_2, \ldots R_n$ is said to be an inconsistent if their conjunction implies a __________

A. Conditional statement

B. Tautological implication

C. Contradiction

D. Tautology

- [ ] Option A
- [ ] Option B
- [x] Option C
- [ ] Option D

*

If the premises are $p \to q, q \to \neg r, r$ and $p \vee (t \wedge s)$ then the conclusion is

A. $p \vee q$

B. $t \wedge s$

C. $q \vee s$

D. $p \wedge q$

- ( ) Option A
- (•) Option B
- ( ) Option C
- ( ) Option D

*

The conclusion of the premises are $(a \to b) \wedge (a \to c), \neg(b \wedge c)$ and $(d \vee a)$ is

A. b

B. a

C. d

D. c

- ( ) Option A
- ( ) Option B
- (•) Option C
- ( ) Option D

*

Symbolize the statement, p: It's raining; q: I get wet, "If I do not get wet then it is not raining".

A. $p \to q$

B. $q \to p$

C. $\neg p \to \neg q$

D. $\neg q \to \neg p$

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

Let p: its rain; q: there is traffic dislocation, r: sports day will be held, s: cultural programmes will go on. The symbolic form of the statement is "If it does not rain or if there is no traffic dislocation then the sports day will be held and the cultural programme will go on"

A. $\neg p \vee \neg q$

B. $\neg q \rightarrow \neg p$

C. $(\neg p \vee \neg q) \rightarrow r \wedge s$

D. $(\neg q \rightarrow \neg p) \rightarrow r \wedge s$

- ( ) Option A
- ( ) Option B
- (•) Option C
- ( ) Option D

*

The conclusion for the set of premises $p \to q, q \to r, s \to \neg r$ and $q \wedge s$ is

A. $p \wedge q$

B. $q \wedge r$

C. $s \wedge \neg r$

D. inconsistent

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

The conclusion of the premises $p \to (q \vee r), (q \to \neg p), (s \to \neg r)$ and p is

A. $p \to s$

B. $\neg s \to p$

C. $p \wedge s$

D. $p \to \neg s$

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D

*

The conclusion of the premises are $r \rightarrow \neg q, r \vee s, s \rightarrow \neg q, p \rightarrow q$ is

A. r

B. $\neg p$

C. $\neg r$

D. $\neg q$

- ( ) Option A
- (•) Option B
- ( ) Option C
- ( ) Option D

*

The conclusion of the premises $p \to (q \to s), \neg r \vee p$ and q is

A. $r \to s$

B. $r \wedge s$

C. $r \vee s$

D. $s \to r$

- [ ] Option A
- [x] Option B
- [ ] Option C
- [ ] Option D

*

Let $P(K) = 3^K + 7^K - 2$ then P(K+1) is divisible by

A. 5

B. 6

C. 7

D. 8

- ○ Option A
- ○ Option B
- ○ Option C
- ◉ Option D