Question No: 1 (Marks: 1) - Please choose one
If p = It is raining
q = She will go to college
"It is raining and she will not go to college" will be denoted by

- ▶ $p \wedge \sim q$ **Correct.**
- ▶ $p \wedge q$
- ▶ $\sim (p \wedge q)$
- ▶ $\sim p \wedge q$

Question No: 2 (Marks: 1) - Please choose one
In a directed graph of a Irreflexive relation, there should be

- ▶ Loop on a one point
- ▶ **No loop at any point (Page 89)**
- ▶ No point connected

Question No: 4 (Marks: 1) - Please choose one
How many functions are there from a set with three elements to a set with two elements?

- ▶ 6
- ▶ **8**
- ▶ 12

$n^n = 2^3 = 8$

Question No: 5 (Marks: 1) - Please choose one
If a set contains exactly *m* distinct elements where *m* denotes some non negative integer then the set is.

- ▶ **Finite (Page 40)**
- ▶ Infinite
- ▶ None of these

Question No: 6 (Marks: 1) - Please choose one
Let f and g be the functions defined by

f(x)= 2x+3 & g(x)= 3x+2 then composition of f and g is

- 6x+6
- 5x+5
- **6x+7**

$$fog = f(3x+2)$$
$$= 2(3x+2)+3$$
$$= 6x+4+3$$
$$= 6x+7$$

Question No: 7 (Marks: 1) - Please choose one
Let f is defined recursively by

F(0)=3
F(n+1)=2f(n)+2
Then f(2)=

- 8
- 10
- **18**
- 21

$$f(1) = 2f(0)+2 = 2(3)+2 = 6+2 = 8$$
$$f(2) = 2f(1)+2 = 2(8)+2 = 16+2 = 18$$

Question No: 9 (Marks: 1) - Please choose one
If a pair of dice is thrown then the probability of getting a total of 5 or 11 is

- $\frac{1}{18}$
- $\frac{1}{9}$
- $\frac{1}{6}$

$$Outcomes\ with\ sum\ of\ 5 = (1,4)(2,3),(3,2),(4,1)$$
$$Outcomes\ with\ sum\ of\ 11 = (5,6),(6,5)$$
$$Total\ outcomes\ for\ 5\ \&\ 11 = 6$$
$$Total\ outcome\ for\ 2\ dice = 6\times 6 = 36$$
$$\text{Probability} = \frac{6}{36} = \frac{1}{6}$$

Question No: 10 (Marks: 1) - Please choose one
If a die is rolled then what is the probability that the number is greater than 4

- $\frac{1}{3}$
- $\frac{3}{4}$
- $\frac{1}{2}$

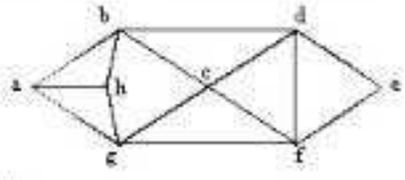
Number greater than $4 = 5, 6$

Probability $= \frac{2}{6} = \frac{1}{3}$

Question No: 11 (Marks: 1) - Please choose one
What is the expectation of the number of heads when three fair coins are tossed?

- 1
- 1.34
- 2
- **1.5 (Page 277)**

Question No: 13 (Marks: 1) - Please choose one
The Hamiltonian circuit for the following graph is



- abcdefgh
- abefgha
- **abcdefgha (Page 297)**

Question No: 14 (Marks: 1) - Please choose one
Let n and d be integers and d ≠ 0. Then n is divisible by d or d divides n
If and only if

- **n= k.d for some integer k (Page 179)**
- n−d
- n.d−1
- none of these

Question No: 16 (Marks: 1) - Please choose one
The sum of two irrational number must be an irrational number

- **False (Page 197)**
- True

Question No: 17 (Marks: 1) - Please choose one

The square root of every prime number is irrational

- ► True
- ► False
- ► Depends on the prime number given

Question No: 18 (Marks: 1) - Please choose one
The greatest common divisor of 27 and 72 is

- ► 27
- ► 9
- ► 1
- ► None of these

Solution:
1.Divide 72 by 27:
This gives $72 = 27 \cdot 2 + 18$
2.Divide 27 by 18:
This gives $27 = 18 \cdot 1 + 9$
3.Divide 18 by 9:
This gives $18 = 9 \cdot 2 + 0$
Hence greatest common divisor $(72, 27) = 9$.

Question No: 19 (Marks: 1) - Please choose one
If T is a full binary tree and has 5 internal vertices then the total vertices of T are

- ► 11
- ► 12
- ► 13
- ► None of the these

$2k + 1 = 2(5) + 1 = 10 + 1 = 11$

Question No: 20 (Marks: 1) - Please choose one
Suppose that a connected planar simple graph has 30 edges. If a plane drawing of this graph has 20 faces, how many vertices does the graph have?

- ► 12 (Page 318)
- ► 13
- ► 14

Question No: 21 (Marks: 1) - Please choose one
How many different ways can three of the letters of the word BYTES be chosen if the first letter must be B ?

- ► P(4,2)
- ► P(2,4)
- ► C(4,2)
- ► None of these

Question No: 22 (Marks: 1) - Please choose one
The value of 0! Is

- 0
- 1 (Page 160)
- Cannot be determined

Question No: 23 (Marks: 1) - Please choose one
An arrangement of objects with the consideration of order is called

- Permutation (Page 219)
- Combination
- Selection
- None of these

Question No: 25 (Marks: 1) - Please choose one
Among 200 people, 150 either swim or jog or both. If 85 swim and 60 swim and jog, how many jog?

- 125 (Page 241)
- 225
- 85
- 25

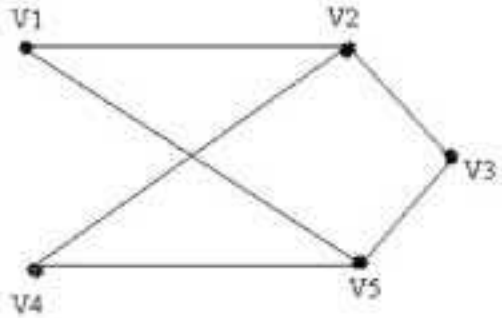
Question No: 26 (Marks: 1) - Please choose one
If a graph is a tree then

- it has 2 spanning trees
- it has only 1 spanning tree (Page 329)
- it has 4 spanning trees
- it has 5 spanning trees

Question No: 27 (Marks: 1) - Please choose one
Euler formula for graphs is

- f = e-v
- f = e+v +2
- f = e-v-2
- f = e-v+2 (Page 317)

Question No: 28 (Marks: 1) - Please choose one
The given graph is



- ►Simple graph
- ►Complete graph
- ►Bipartite graph
- ►Both (i) and (ii)
- ►Both (i) and (iii)

Question No: 29 (Marks: 1) - Please choose one
An integer n is odd if and only if n = 2k + 1 for some integer k.

- ► True (Page 187)
- ► False
- ► Depends on the value of k

Question No: 30 (Marks: 1) - Please choose one
If $P(A \cap B) = P(A)P(B)$ then the events A and B are called

- ► Independent (Page 272)
- ► Dependent
- ► Exhaustive

FINALTERM EXAMINATION
Spring 2010
MTH202- Discrete Mathematics (Session - 1)

Question No: 1 (Marks: 1) - Please choose one
Whether the relation R on the set of all integers is reflexive, symmetric, antisymmetric, or transitive, where $(x, y) \in R$ if and only if $xy \geq 1$

- ➢ Anti symmetric
- ➢ Transitive
- ➢ Symmetric
- ➢ Both Symmetric and transitive

http://www.maths.uq.edu.au/courses/MATH1061/wkbooksols/chap10/S10_5_3solution.htm

Question No: 2 (Marks: 1) - Please choose one

For a binary relation R defined on a set A , if for all $t \in A, (t,t) \notin R$ then R is

- Anti symmetric
- Symmetric
- **Irreflexive (Page 77)**

Question No: 3 (Marks: 1) - Please choose one

If ($A \cup B$) = A, then ($A \cap B$) = B

- **True**
- False
- Cannot be determined

Question No: 4 (Marks: 1) - Please choose one

Let

$a_0 = 1, a_1 = -2 \text{ and } a_2 = 3$

$then \sum_{j=0}^{2} a_j =$

- -6
- **2**
- 8

$1+(-2)+3=2$

Question No: 5 (Marks: 1) - Please choose one

The part of definition which can be expressed in terms of smaller versions of itself is called

Base

Restriction

Recursion (page 159)

Conclusion

Question No: 6 (Marks: 1) - Please choose one

$$\left\lceil \frac{N}{6} \right\rceil = 9$$

What is the smallest integer N such that

- 46
- 29
- **49**

$N = 6 \times (9-1) + 1$

$= 6 \times 8 + 1 = 49$

Question No: 7 (Marks: 1) - Please choose one

In probability distribution random variable f satisfies the conditions

- $f(x_i) \leq 0$ *and* $\sum_{i=1}^{n} f(x_i) \neq 1$
- $f(x_i) \geq 0$ *and* $\sum_{i=1}^{n} f(x_i) = 1$ **(Page 275)**
- $f(x_i) \geq 0$ *and* $\sum_{i=1}^{n} f(x_i) \neq 1$
- $f(x_i) < 0$ *and* $\sum_{i=1}^{n} f(x_i) = 1$

Question No: 8 (Marks: 1) - Please choose one
What is the probability that a hand of five cards contains four cards of one kind?

- 0.0018
- $\frac{1}{2}$
- **0.0024 (page 253)**

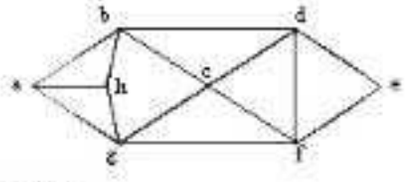
Question No: 9 (Marks: 1) - Please choose one
A rule that assigns a numerical value to each outcome in a sample space is called

- One to one function
- Conditional probability
- **Random variable (Page 274)**

Question No: 10 (Marks: 1) - Please choose one
A walk that starts and ends at the same vertex is called

- Simple walk
- Circuit
- **Closed walk (Page 292)**

Question No: 11 (Marks: 1) - Please choose one
The Hamiltonian circuit for the following graph is



- abcdefgh
- abefgha
- **abcdefgha (Page 297)**

Question No: 14 (Marks: 1) - Please choose one
The square root of every prime number is irrational

- **True**
- False
- Depends on the prime number given

Question No: 15 (Marks: 1) - Please choose one
If a and b are any positive integers with b≠0 and q and r are non negative integers such that a= b.q+r then

- **gcd(a,b)=gcd(b,r) (Page 207)**
- gcd(a,r)=gcd(b,r)
- gcd(a,q)=gcd(q,r)

Question No: 16 (Marks: 1) - Please choose one
The greatest common divisor of 27 and 72 is

- 27
- **9**
- 1
- None of these

Solution:
1.Divide 72 by 27:
This gives $72 = 27 \cdot 2 + 18$
2.Divide 27 by 18:
This gives $27 = 18 \cdot 1 + 9$
3.Divide 18 by 9:
This gives $18 = 9 \cdot 2 + 0$
Hence greatest common divisor $(72, 27) = 9$.

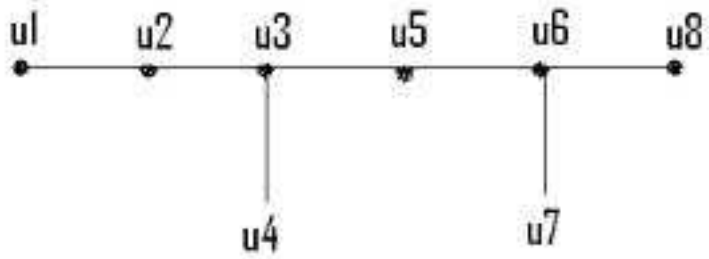
Question No: 17 (Marks: 1) - Please choose one
In how many ways can a set of five letters be selected from the English Alphabets?

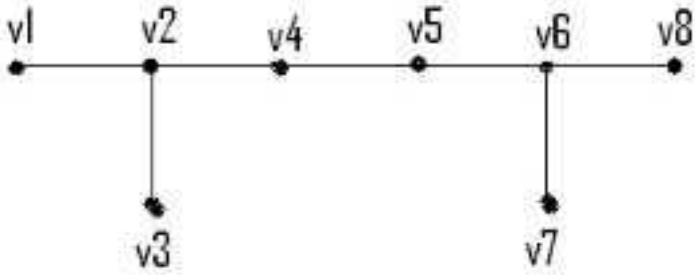
- **C(26,5)**
- C(5,26)
- C(12,3)
- None of these

Question No: 18 (Marks: 1) - Please choose one
A vertex of degree greater than 1 in a tree is called a

- **Branch vertex (Page 323)**
- Terminal vertex
- Ancestor

Question No: 19 (Marks: 1) - Please choose one
For the given pair of graphs whether it is



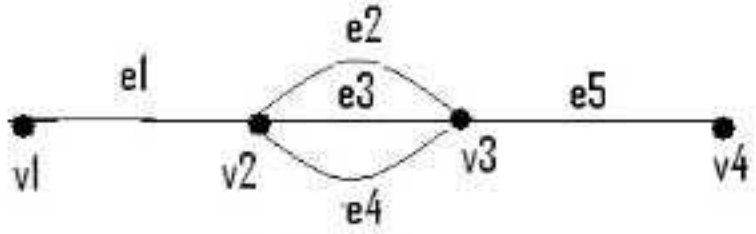


- **Isomorphic**
- Not isomorphic

Question No: 20 (Marks: 1) - Please choose one
The value of (-2)! Is

- 0
- 1
- **Cannot be determined (Page 217)**

Question No: 21 (Marks: 1) - Please choose one
In the following graph



How many simple paths are there from v_1 to v_4

- 2
- **3**
- 4

Question No: 22 (Marks: 1) - Please choose one

$$\frac{(n+1)!}{(n-1)!}$$

The value of is

- 0
- n(n-1)
- n^2+n
- Cannot be determined

$$\frac{(n+1)!}{(n-1)!}=\frac{(n+1)n.\cancel{(n-1)!}}{\cancel{(n-1)!}}=(n+1)n=n^2+n$$

Question No: 24 (Marks: 1) - Please choose one
Any two spanning trees for a graph

- Does not contain same number of edges
- Have the same degree of corresponding edges
- **contain same number of edges (Page 329)**
- May or may not contain same number of edges

Question No: 25 (Marks: 1) - Please choose one
When 3^k is even, then $3^k+3^k+3^k$ is an odd.

- True
- **False**

Question No: 26 (Marks: 1) - Please choose one
Quotient –Remainder Theorem states that for any positive integer d, there exist unique integer q and r such that n=d.q+ r and _____.

- **$0\le r<d$ (Page 201)**
- $0<r<d$
- $0\le d<r$
- None of these

Question No: 27 (Marks: 1) - Please choose one
The value of $\lceil x \rceil$ for x = -3.01 is

- -3.01
- **-3**
- -2
- -1.99

$$\lfloor -3.01 \rfloor=\lfloor -4+0.99 \rfloor=-4$$
$$\lceil -3.01 \rceil=\lceil -4+0.99 \rceil=-4+1=-3$$