**MID TERM ASSIGNMENT**

**DEPARMENT OF SOFTWERE ENGINEERING**

**NAME: JIBRAN KHAN**

**ID NO: 16107**

**SEMESTER: 2nd**

**COURSE TITLE : DISCRETE STRUCTURE**

**COURSE INSTRUCTOR: SIR ABRAR**

**Q.No.1:**

**Answer:** 1: The Apple Macintosh is a 16 bit computer.

 2: There is a largest even number.

 3: 8+7=13. (These are the prepositions)

**Q.No.2:**

**Answer:** (a) x ≥ 5

 (b) x ≤ 40

 (c) 40 < x < 50

 (d) x < 50 or x > 40

This is True for all values of x.

 (e) x ≥ 50

 (f) x ≥ 50 and x ≤ 40.

This can never be True whatever the value of x.

**Q.No.3:**

**Answer:**

**Part (a):**

“Everybody dislikes Maths”.

**Part (b):**

“Neither 2 nor 3 is the answer”.

**Part (c):**

“Someone in my class is short or fat”.

**Q.No.4:**

**1: ¬p V ¬q**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  p |  Q |  ¬p |  ¬q |  ¬p V ¬q |
|  T |  T |  F |  F |  F |
|  T |  F |  F |  T |  T |
|  F |  T |  T |  F |  T |
|  F |  F |  T  |  T |  T |

**2: q^ (¬p V q)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  p |  Q |  ¬p |  ¬p V q |  q^(¬p V q) |
|  T |  T |  F |  T |  T |
|  T |  F |  F |  F |  F |
|  F |  T |  T |  T |  T |
|  F |  F |  T  |  T |  F  |

**3: p^ (q V r)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  p |  Q |  r |  q V r |  p^(q V r) |
|  T |  T |  T |  T |  T |
|  T |  T |  F |  T |  T |
|  T |  F |  T |  T |  T |
|  T |  F |  F |  F |  F |
|  F |  T |  T |  T |  F |
|  F |  T |  F |  T |  F |
|  F |  F |  T |  T |  F |

**4: (p^ q) V r**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  p |  Q |  r |  p ^ q |  (P ^q) V r |
|  T |  T |  T |  T |  T |
|  T |  T |  F  |  T |  T |
|  T |  F |  T |  F |  T |
|  T |  F |  F |  F |  F |
|  F |  T |  T |  F |  T |

**Q.no.5:**

**Answer:**

**¬ ((p V q) V (r ^ (p V ¬q)))≡ ¬p ^ q**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  p |  q |  r |  ¬p |  ¬q |  p V ¬q  | r^(pV¬q) | ((pVq)V(r^(pV¬q) | ¬(((pV¬q)V(r^(pVq))) | ¬p^q |
| T | T | T | F | F | T | T |  T | F | F |
| T | T | F | F | F | T | F |  T | F | F |
| T | F | T | F | T | T | T |  T | F | F |
| T | F | F | F | T | T | F |  T | F | F |
| F | T | T | T | F | F | F |  F | T | T |
| F | T | F | T | F | F | F |  F | T | T |
| F | F | T | T | T | T | T |  T |  F | F |

**Q.No.6:**

**( z ^ w) V (¬z ^ w) V (z ^ ¬ w) ≡ z V w**

**Answer:** ( z ^ w) V (¬z ^ w) V (z ^ ¬ w)=(z^¬w) V (z^¬w) V (¬z^ w) ***Commutative Law***

 =(z^(w V ¬w))V(¬z^w) **Distributive Law**

= (z^ T) V (¬z^ w) **Identity Law**

 =(z V ¬z) ^ (z V w) **Distributive Law**

 =T^(z V w) **Complement Law**

 =(z V w) ^T **Commutative Law**

 =z V w **Identity Law**

 **THE END**