



First Question

(27/40)

Q1 A: Consider the propositions:

p: Mary laughs.

q: Sally cries.

r: Jo shouts.

Write in words the following compound propositions:

1) $(r \wedge q) \leftrightarrow p$

2) $p \rightarrow (q \vee r)$

Q1 B: Prove that:

$$(\bar{q} \rightarrow \bar{p}) \vdash (p \rightarrow q)$$

Q1 C: State the converse, inverse and contrapositive of the proposition: ‘If it’s Friday then the School is not open’.

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University of Palestine



Mid-Term Exam

Summer term
2010/2011

Total Grade: 40

Course No: **ESGD2206**

Course Title: **Introduction to
Discrete Mathematics**

Date: **16 / 07 / 2011**

No. of Questions: **2**

Time: **1.5 hr**

Using Calculator (**Yes**)

Instructor: **Eng. Tasneem Darwish**

Student No.: _____

Student Name: _____

College Name: **Eng. College**

Dep. / Specialist: **Software Engineering**

Using Dictionary (**No**)

Q1 D: Test the validity of the following argument using a truth table:

'If you find this difficult then you're not clever or you have not done your homework. You have done your homework and you're clever therefore you will not find this difficult.'



Q1 E: Establish the validity of the following argument:

“All those who read books have strong memory. All those who don’t read books are not educated. John hasn’t strong memory. Therefore John is not educated.”

Some of the rules that you may use:

1. $(p \wedge q) \vdash p$ (simplification)
2. $(p \wedge q) \vdash q$ (simplification)
3. $p \vdash (p \vee q)$ (addition)
4. $[(p \vee q) \wedge \bar{p}] \vdash q$ (disjunctive syllogism)
5. $[(p \rightarrow q) \wedge p] \vdash q$ (modus ponens)
6. $[(p \rightarrow q) \wedge \bar{q}] \vdash \bar{p}$ (modus tollens)
7. $[(p \rightarrow q) \wedge (q \rightarrow r)] \vdash (p \rightarrow r)$ (hypothetical syllogism)
8. $(p \rightarrow q) \vdash [p \rightarrow (p \wedge q)]$ (absorption).

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Second Question

(13/40)

Q2 A: By proving the contrapositive, prove that, if n^2 is not divisible by 7, then n is not divisible by 7.

Q2 B: using mathematical induction prove that, for every positive integer n , the expression $2^{n+2} + 3^{2n+1}$ is divisible by 7.

Good luck
