F.Y. B. SC. (Computer Science) SEM – I (2014 COURSE) : WINTER - 2018

SUBJECT: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE – I

Day : Monday
Date : 15/10/2018

W-2018-0940

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following: **[10]**

a) Prove that $\sqrt{2}$ is irrational by using proof of contradiction.

b) Prove the following logical equivalence $p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$.

c) Solve the recurrence relation
$a_r - 8a_{r-1} + 16a_{r-2} = 0$
With initial conditions $a_2 = 16$ and $a_3 = 80$.

Q.2 Attempt **ANY TWO** of the following: **[10]**

a) Prove that "Every distributive lattice is modular lattice".

b) Find CNF of $f(x, y, z) = \bar{x} + \left(y.\left(\bar{z} + x\right)\right)$.

c) Solve the recurrence relation
$a_n = -4a_{n-1} - 4a_{n-2};\ a_0 = 0,\ a_1 = 1$.

Q.3 Attempt **ANY TWO** of the f following: **[10]**

a) State and prove principle of Inclusion – Exclusion.

b) There are 6 boys and 3 girls in a class. A committee of 5 is to be selected such that there are 3 boys and 2 girls in the committee in how many ways can the committee be selected? Determine the number ways, if there is at least one girl in the committee.

c) Find the particular solution of
$a_r + 5a_{r-1} + 6a_{r-2} = 3r$.

Q.4 Attempt **ANY FIVE** of the following: **[10]**

a) Write the negation of the following statement
$\exists x \left(P(x) \wedge \sim Q(x)\right)$.

b) Define the term contradiction.

c) Draw Hasse diagram for $(D_{30}, |)$.

d) Define Bounded Lattice.

e) State Pigeon-hole principle.

f) How many three digits number can be form using the numbers 5 and 4?

g) Define Homogeneous solution.

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