



Answer the Following Questions:

- 1- All the questions according to ILOs a 1, a 3, b2, b 6, b14, b15, b18, b20, c3, c10, c11, c15.
- 2- Number of pages :2 No. of questions : 3
- 3- The weight of each problem is indicated.
- 4- This a closed book exam "**allowable the arrester catalogue tables**".
- 5- Clear, systematic answers and solutions are required in general, marks will not be assigned for answers and solutions that require unreasonable (in the opinion of the instructor) effort to decipher.
- 6- Ask for clarification if any question statement is not clear to you.
- 7- Attempts in all questions.
- 8- The exam will be marked out of 70.

Question (1):

(25 Marks)

- a Explain how can generate DC Voltage higher than doubler circuit ? 10
- b The total voltage ripple of a Cock-Walton type voltage multiplier is 18 kV at a supply frequency of 90 Hz. If the load current is 3.799 mA and the circuit capacitance is 0.03518 μ F, calculate: 15
1. The number of stages
 2. The percentage ripple
 3. The maximum secondary voltage of the supply
 4. The total voltage drop and the regulation

Assume that: The optimum number of stages for minimum voltage drop is 17 stages.

Question (2):

(15 Marks)

- a How can overcome the drawbacks of measuring the DC High voltages in AC voltages " state the drawbacks and overcome methods"? 5
- b A sphere gap is used to measure a high voltage. The sparkover voltage under standard conditions is found to be 500kV. Calculate the sparkover voltage under the following conditions: 36 °C, 755 mmHg. The relation between the correction factor and the 10

air density factor is:

δ	0.7	0.75	0.8	0.85	0.9	0.95	1.0
K	0.72	0.77	0.82	0.86	0.91	0.95	1.0

Question (3):

(30 Marks)

- a What are the lightning different damaging effects? 5
- b Illustrate the transmission line equation for travelling waves. 5
- c Design with all verifications the arrester with the new technique 20
for Egyptian Unified Grid "E. U. G" for 500 kV line voltages. Use
the accompanied tables for the old and new design. (Take $V_a=0.8$
Vm). State in the design the economical distances.

Good Luck

Dr. Fathalla selim and committee