A Government College of Engineering, Aurangabad
(An Autonomous Institute of Government of Maharashtra)

Old

B. E. (EEP-PT) Examination
End Semester Examination [illegible] 2016

11 NOV 2016

EE401: High Voltage Engineering

Time: Three Hours ***Date:*** *Max. Marks: 60*

N.B:-
1. Solve any five questions.
2. Figures to the right indicate full marks
3. Assume suitable data if necessary and state it clearly
4. Use of non-programmable calculator is allowed

Q1 (a) Define Townsend's first and second ionization coefficient. Derive the following expression for current growth 8M

$$I = \frac{I_0 e^{\alpha d}}{1 - \gamma(e^{\alpha d} - 1)}$$

Mentioned Townsend's criteria for breakdown.

(b) In an expression in a certain gas it was found that the steady state current is $5.5X10^{-8}$ Amp at 8 KV at a distance of 0.4 cm between the plate electrodes. Keeping field constant and reducing the distance to 0.1 cm results in a current of $5.5X10^{-9}$Amp. Calculate Townsend's first ionization coefficient α. 4M

Q2 (a) What is the time lag? Discuss its components and factors which affect these components. 6M

(b) Explain thermal breakdown of solid dielectrics. How this mechanism is more significant than other mechanism. 6M

Q3 (a) What do meant by self and non self sustained discharge? Give some practical examples. Explain in short photo-ionization and electron attachment process for ionization 6M

(b) Explain and compare the performance of half wave rectifier and voltage doublers circuits for generation of high D. C. voltage. 6M

Q4 (a) What is cascaded transformer? Explain why the cascading is done? Described with the neat diagram a three stage cascaded transformer. Label the power ratings of various stages of the transformer. 8M

(b) Define following terms, 4M
(i)Impulse voltage.
(ii) Chopped voltage
(iii)Impulse flashover voltage.
(iv)Impulse puncture voltage

Q5 (a) What is the principle of operation of a resonant transformer? Explain in detail. How its advantages over the cascade connected transformer. 6M

(b) What are the requirements of a sphere gap for measurement of high voltages? Discuss the disadvantages of sphere gap for measurement. 6M

Q6 (a) How are the partial discharges in high voltage insulation detected and measured? 6M

(b) Explain the different aspects of insulation design and insulation co-ordination adopted for EHV systems. 6M

Q7 (a) What are different methods employed for lightning protection of overhead lines? Discuss in detail. 6M

(b) What is the significance of impulse tests? Briefly explain the impulse testing of insulator. 6M