

JK LAKSHMIPAT UNIVERSITY, JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination November 2018

B. Tech. in Electrical Engineering, Semester V

Roll No.....

EE706: Advance in power delivery

Time: 3 hours

Max. Marks: 80

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

- Q.1 Objective type multiple choice questions (10 questions @ 1 mark) 10
- i. What is the permissible limit of voltage variations allowed in the distribution systems?
(a) $\pm 2\%$ (b) $\pm 5\%$ (c) $\pm 10\%$ (d) $\pm 6\%$
 - ii. Which of the following is not a source of harmonic current:
(a) Computers (b) UPS Systems (c) Resistive Load (d) Capacitor Switching
 - iii. Select three wireless technologies from the list below: (a) Powerline Communication
(b) Cellular (c) Cognitive Radio (d) Satellite (e) Fiber Optic
 - iv. What the long term benefits of demand response. (Select all that apply):
(a) Reduce peak demand (b) Increase network life (c) Increase reliability (d) Postpone upgrades
 - v. Surge impedance of transmission line is given by
(A) $(L/C)^{1/2}$ (B) $(C/L)^{1/2}$ (C) $(CL)^{1/2}$ (D) $1/(CL)^{1/2}$
 - vi. Which of the following is reduced due to the use of bundled conductors ?
(A) Capacitance of the circuit (B) Inductance of the circuit
(C) Power loss due to corona (D) All of the above.
 - vii. Which system is not defined in an HVDC system:
(a) Monopolar (b) Bipolar (c) Unipolar (d) Homopolar.
 - viii. If the firing angle of the Converter bridge is less than 90° :
(a) The bridge acts as a rectifier operation (b) the bridge acts as an inverter operation (c) the bridge does not operate (d) none of these.
 - ix. FACTS devices generally deals: (a) S (b) P (c) Q (d) Load Angle
 - x. STATCOM + SSSC will make: (a) UPQC (b) TCSC (c) UPFC (d) SVR
- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- i. Why is SCADA is necessary?
 - ii. What is the necessity of EHV lines?
 - iii. What is meant by break even distance?
 - iv. How does regulating transformer work?
- Q.3A Describe Auto-Regressive Model and Auto-regressive Moving Average Model for load forecasting. 05
- Q.3B Draw a block diagram and explain for a typical distribution system planning process? 05
- Q.4A What is reactive power compensation? Explain reactive power compensation of radial transmission line for: (a) On no load and (b) Heavy loading condition 05
- Q.4B Draw and explain the structure of modern power systems with typical voltage levels. 05
- Q.5A On what factors does the design of the insulation systems of a transmission line depend? Which factor is the most important in EHV systems? 05
- Q.5B Explain in detail the reasons for adoption of bundled conductors in EHV ac transmission lines. 05

Q.6A Explain the principle of HVDC system operation. Discuss the technical and economic advantages of dc systems over ac systems. 05

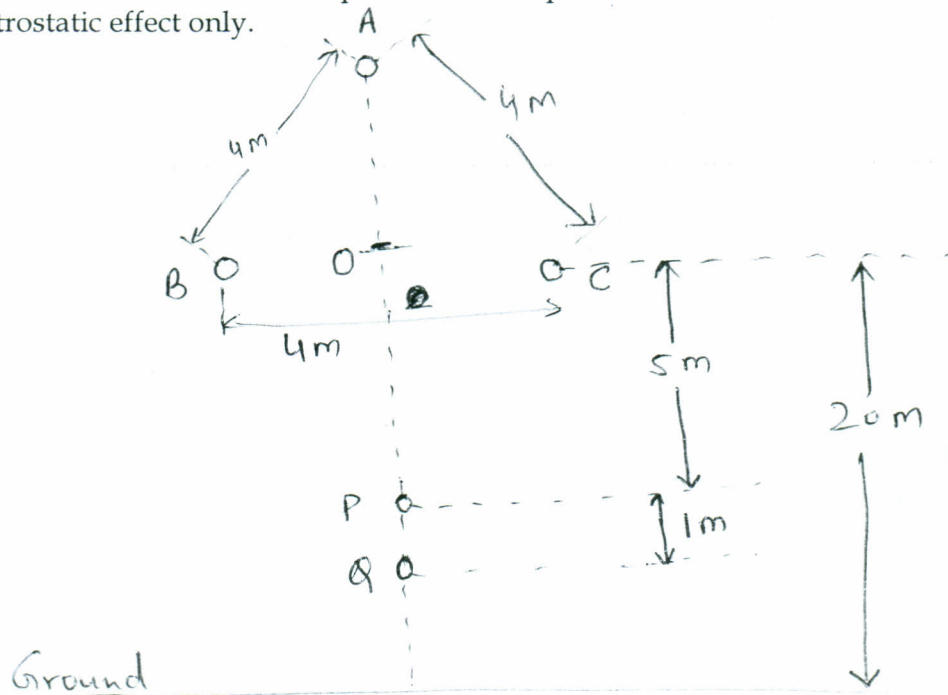
Q.6B Why is dc interconnection considered superior to EHV ac interconnection? 05

OR

Q.6B Why there is need of compensation in power systems ? How the reactive power compensation is done using STATCOM. 05

Q.7 A 3-phase, 50 Hz, 200 km long 132 kV transmission line delivers a total load of 28,000 kW at 0.85 pf lagging. The conductor arrangement is shown in fig. the radius of each power conductor is 5 mm. 10

Determine the induced voltage at fundamental frequency in the telephone circuit due to electromagnetic effect. Also determine the potential of telephone conductor P above the earth due to electrostatic effect only.



Q.8 Why are harmonics generated in HVDC converter and what are the problems associated with the harmonics. 10

OR

Q.8 A synchronous motor improves the pf of a load from 0.7 to 0.9 lagging. The losses and other mechanical load on it amount to (250 + 200) kW, while the load for which pf considered is 1500 kW. Find out the input to the synchronous motor in kVA and its pf. 10