Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

Course Code: EE301

Course Name: POWER GENERATION, TRANSMISSION AND PROTECTION

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each carries 5 marks.   Marks

1	With neat sketch explain the working of a nuclear power station.	(5)
2	A long transmission line when lightly loaded causes the receiving end voltage to exceed the sending end voltage. Justify with neat phasor diagram.	(5)
3	Obtain the most economical size of conductor according to Kelvin's law. Also list any 4 limitations of Kelvin's law.	(5)
4	Explain the construction of underground cables with neat figure.	(5)
5	Illustrate the significance of dividing the power system into various protection zones.	(5)
6	Differentiate between breaking capacity and making capacity with necessary equations.	(5)
7	Explain stator inter-turn protection method of alternator.	(5)
8	With necessary figures explain the actions performed by a lightning arrester.	(5)

PART B
Answer any two full questions, each carries 10 marks.

9   A power station has to meet the following demand: (10)

Group A: 300 kW between 8 AM and 6 PM

Group B: 200 kW between 6AM and 10 AM

Group C: 50 kW between 6 AM and 10 AM

Group D: 100 kW between 10 AM and 6 PM and then between 6 PM and 6 AM. Plot daily load curve and determine (i) Diversity factor (ii) Units generated per day (iii) Load factor

10 a) Explain the significance of transposition in transmission lines.   (4)

b) Find the inductance per phase per km of double circuit three phase line shown   (6) in figure. The conductors are transposed and are of radius 0.9cm each. The

phase sequence is ABC.
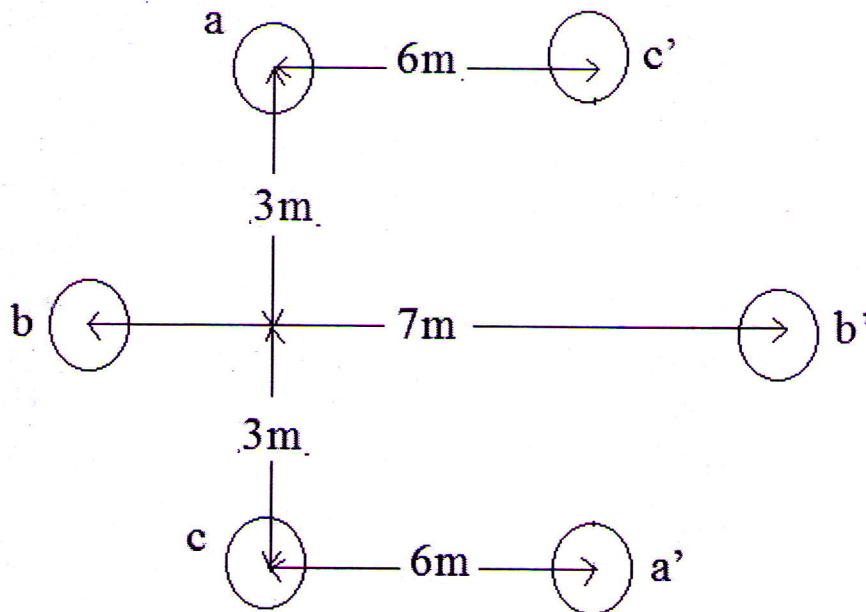
11 a) Explain the role of synchronous condensers in improving power factor with phasor diagram. (5)

b) Derive the ABCD constants of nominal π configuration in transmission lines with necessary figures. (5)

PART C
Answer any two full questions, each carries 10 marks.

12 a) "The disc nearest to the conductor has maximum voltage drop across it." Prove for a 3 disc suspension string insulator with neat figure. (6)

b) Illustrate the configuration of ACSR conductors and list its main features. (4)

13 a) Derive maximum and minimum dielectric stress for a single core cable with neat figure. (5)

b) Explain the different types of DC links with neat figures. (5)

14 a) A transmission line has a span of 375m between level supports. The conductor has an effective diameter of 1.96cm and weighs 0.865kg/m. Its ultimate strength is 6000kg. If the conductor has ice coating of radial thickness 1.27cm and is subjected to a wind pressure of 3.9gm/cm^{2}nof projected area, calculate sag for a safety factor of 2. Weight of 1cc of ice is 0.91gm. (6)

b) Explain any four factors affecting corona. (4)

PART D
Answer any two full questions, each carries 10 marks.

15 a) With neat figure explain the following: (4)

      (a) Arc Voltage (b) Restriking Voltage (c) Recovery Voltage

  b) Explain the working principle of electromagnetic induction type relays.   (6)

16 a) Explain the basic protection scheme employed using microprocessor.   (5)

  b) With neat figure explain principle of operation of thermal relays.   (5)

17 a) An electric train runs between two sub-stations 6km apart maintained at   (7)
voltages 600V and 590V respectively and draws a constant current of 300A
while in motion. The track resistance of go and return path is 0.04Ω/km.
Calculate:

      (i)   The point along the track where minimum potential occurs

      (ii)   The current supplied by the two sub-stations when the train is at the
point of minimum potential.

  b) Write short notes on insulation coordination.   (3)

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