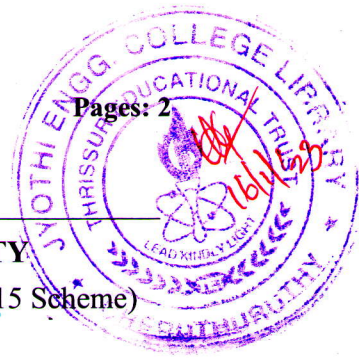Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree (S, FE) Examination January 2023 (2015 Scheme)

Course Code: EE301

Course Name: POWER GENERATION, TRANSMISSION AND PROTECTION

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each carries5 marks.   Marks

1	Analyze any five advantages of non conventional sources of energy.	(5)
2	With the help of a vector diagram, derive an expression for voltage regulation of a short transmission line.	(5)
3	Define string efficiency. Discuss the different methods to improve string efficiency.	(5)
4	Derive an expression for capacitance of a single core cable.	(5)
5	Discuss the different factors which affect arc extinction in circuit breakers.	(5)
6	With the help of a diagram, explain the working of an axial blast air circuit breaker.	(5)
7	Describe the differential pilot wire method of protection of transmission lines with the help of a diagram.	(5)
8	With the help of a diagram, explain the working of a surge diverter.	(5)

PART B
Answer any two full questions, each carries10 marks.

9	a)	With neat figure, explain the working of a hydro electric power station	(7)
	b)	Discuss any three factors to be considered while selecting a site of a thermal power station?	(3)
10	a)	Derive ABCD constants of a medium transmission line using nominal T method. Also, draw the vector diagram.	(7)
	b)	A 3-phase 3-wire system has its conductor arranged at the corners of an equilateral triangle of 2m side. The diameter of each conductor is 2.5cm. Calculate the inductance of each conductor.	(3)
11	a)	What do you mean by diversity factor? What is its significance?	(5)
	b)	What are composite conductors? Explain how inductance of a transmission line with composite conductors can be derived.	(5)

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

12 a) 3-phase, 220 kV, 50 Hz transmission line consists of 1·5 cm radius conductor spaced 2 metres apart in equilateral triangular formation. If the temperature is 40ºC and atmospheric pressure is 76 cm, calculate the corona loss per km of the line. Take $m_o = 0·85$. (6)

b) Derive the expression of sag when supports are at equal levels (4)

13 a) Prove that the dielectric stress in an underground cable is maximum at conductor surface. (4)

b) Explain the different methods of controlling power flow in HVDC systems (6)

14 a) Discuss the advantages of suspension insulators. (2)

b) Discuss the factors on which visual critical voltage depend upon. (3)

c) Explain the configuration of TCSC. State its advantages. (5)

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

15 a) Explain the operation of SF_6 circuit breaker using a neat sketch. List out any two advantages. (6)

b) Draw a neat sketch of watt-hour meter type electromagnetic induction relay and explain its working (4)

16 a) With neat diagram explain the differential protection scheme of a Star/Delta power transformer (6)

b) With the help of a diagram, explain the working of Buchholz relay. (4)

17 a) With the help of block diagram explain the working of numerical relay (5)

b) A 2-wire d.c. distributor 200 meters long is uniformly loaded with 2A/meter. Resistance of single wire is 0.3 ohm/km. If the distributor is fed at one end, calculate:

(i). The voltage drop up to distance of 150m from the feeding point.

(ii). The maximum voltage drop. (5)

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