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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree (S,FE) Examination January 2022 (2015 Scheme)

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	Suppose a power station has to meet the following demands : Group A : 200 kW between 10 AM and 8 PM Group B : 100 kW between 6 AM and 10 AM Group C : 50 kW between 7 AM and 11 AM Group D : 100 kW between 8 AM and 4 PM and then between 6 PM and 6 AM Plot the daily load curve and hence determine the number of units generated per day.	(5)
2	A two-conductor single phase transmission line operates at 50Hz. Diameter of each conductor is 20mm and the spacing between the conductors is 3m. Calculate loop inductance of line/km and inductive reactance/km.	(5)
3	With the help of a diagram, explain what do you mean by an ACSR conductor. What are its advantages?	(5)
4	Analyse any five advantages of HVDC systems over HVAC systems.	(5)
5	Define RRRV. Derive an expression for it.	(5)
6	With the help of a neat diagram, explain the working of a thermal relay.	(5)
7	Discuss the different causes of over voltages.	(5)
8	With the help of a neat diagram, illustrate how stator inter turn protection of an alternator is done.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	With the help of a block diagram, explain the working of a wind energy conversion system. Discuss about any four disadvantages of wind power.	(10)

10	a)	With the help of a vector diagram, derive an expression for capacitance required to improve the power factor from $\cos\varphi_1$ to $\cos\varphi_2$.	(5)
	b)	Discuss the need for transposition of conductors and explain how it is done.	(5)
11	a)	Derive ABCD Constants of a medium transmission lines using nominal π method. Also draw the phasor diagram.	(7)
	b)	With the help of a vector diagram, explain what do you mean by Ferranti effect.	(3)

PART C

Answer any two full questions, each carries10 marks.

12	a)	What do you mean by sag template? Explain its necessity.	(5)
	b)	In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) voltage across the top, middle and bottom unit and (ii) string efficiency.	(5)
13	a)	Compare the volume of conductor material required in a 2 wire d.c system with a single phase 2 wire ac system.	(5)
	b)	The core diameter of a single-core cable is 2·5 cm and resistivity of insulation is $4{\cdot}5 \times 10^{14}$ Ω-cm. If the insulation resistance is 495 MΩ per km, find the insulation thickness.	(5)
14	a)	Analyse the benefits of FACTS devices.	(5)
	b)	Illustrate the need for grading of underground cables. Explain any one method with the help of a diagram.	(5)

PART D

Answer any two full questions, each carries 10 marks.

15	a)	Explain the working of a vacuum circuit breaker with the help of a diagram.	(6)
	b)	Define the different ratings of a circuit breaker.	(4)
16	a)	With the help of a block diagram, explain the working of a microprocessor-based relay.	(5)
	b)	With necessary sketches, explain different types of AC distributors.	(5)
17	a)	What do you mean by insulation co-ordination? Why is it necessary?	(4)
	b)	With the help of a neat diagram, explain the working of a percentage differential protection of transformers.	(6)

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