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Question Paper Code	13005
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M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Third Semester

M.E. - Power Electronics and Drives

20PPEEL301 - POWER ELECTRONIC APPLICATION TO POWER SYSTEM

Regulations – 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. List the topologies used in HVDC system.	2	K1	CO1
2. Show the values of PPR, PIV of 12 pulse converter.	2	K2	CO1
3. Outline the benefits of 'Sunshine Projects' in Japan.	2	K2	CO2
4. Draw the block diagram of standalone PV system.	2	K2	CO2
5. What is the need of converters in HVDC?	2	K1	CO3
6. Compare constant α control and inverse cosine control.	2	K2	CO3
7. Interpret the most common techniques for mitigating flicker in HVDC systems.	2	K2	CO4
8. What are the common types of faults in wind turbine systems?	2	K1	CO4
9. Illustrate the role of power converters in renewable energy systems.	2	K2	CO5
10. Classify the various power converters used in wind turbines.	2	K2	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Explain the effects of Harmonics in power system due to power converters.	13	K2	CO1
OR			
b) Derive the expression for PIV, peak -to- peak ripple, valve volt ampere rating for 12 pulse converter.	13	K2	CO1
12. a) Analyze the protection methods employed for PV system in detail.	13	K4	CO2
OR			
b) Examine the procedure to estimate the solar insolation data.	13	K4	CO2
13. a) Explain the control characteristics of converter in HVDC.	13	K2	CO3
OR			
b) Summarize about the following	13	K2	CO3
(a) Constant Alpha control			(b) Inverse cosine control.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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14. a) Identify the common types of faults that occur in wind turbine systems, and how do these faults impact the overall performance and reliability of the system? 13 K3 CO4

OR

b) Select the key challenges in harmonizing international standards for grid integration of renewable energy in detail. 13 K3 CO4

15. a) Select the best practices for ensuring the reliability and efficiency of protection schemes in HVDC systems. 13 K3 CO5

OR

b) Identify the role of FACTS controllers in improving fault tolerance in HVDC systems. 13 K3 CO5

PART - C (1 × 15 = 15 Marks)

16. a) i) Explain the harmonic sources from commercial loads and residential loads in detail. 8 K2 CO4

ii) Choose the main challenges in integrating power converter-based renewable energy sources into the existing power grid, and how can these challenges be addressed? 7 K3 CO5

OR

b) i) Summarize the impact of environmental factors, such as extreme weather conditions; contribute to faults in wind systems. 8 K2 CO4

ii) Making use of simulation tools to test and validate protection mechanisms for power converters in HVDC system in detail. 7 K3 CO5