Reg. No.															

Question Paper Code	14348

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Seventh Semester

Electrical and Electronics Engineering

20EEPC701 - DISTRIBUTED GENERATION AND MICROGRID

Regulations - 2020

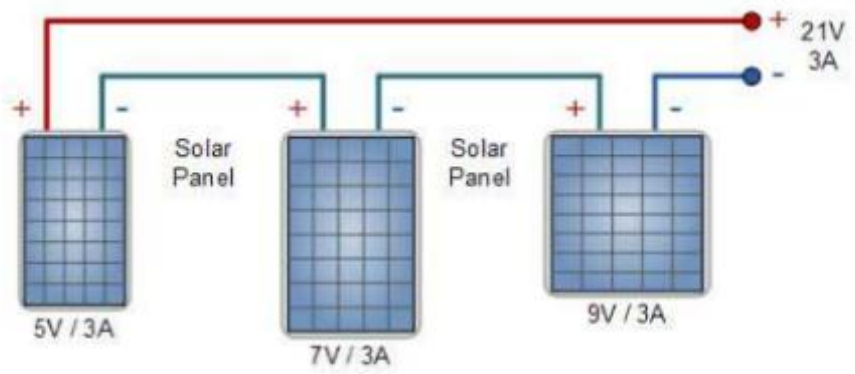
Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)

	Marks	K – Level	CO

Answer ALL Questions

1. A wind turbine designed too to come into operation at a minimum wind speed is called _____ — *1* *K1* *CO1*
   a) Cut in velocity b) Windward
   c) Cut out velocity d) Upwind location
2. The wind turbine used to produce electricity in a large scale is — *1* *K2* *CO1*
   a) Multi Blade b) Dutch type
   c) High Speed Propeller d) Savonius Rotor
3. According to betz limit the maximum power extracted from the wind is — *1* *K3* *CO1*
   a)16/27 of Power Contained in the wind b) 8/27 of Power Contained in the wind
   c) 1/27 of Power Contained in the wind d) 32/27 of power Contained in the wind
4. The Unit of solar irradiance is — *1* *K1* *CO2*
   a) W/m^2 b) J/s
   c) KWh/s d) J/m
5. What is the type of connection is given as shown in the fig — *1* *K3* *CO2*



   a) Parallel b) Series
   c) Series and Parallel d) Series with different current levels
6. Calculate fill factor using the data: Pmax=15 W, Voc=18 V, Isc=4 A. — *1* *K2* *CO2*
   a) 65 b) 59
   c) 20 d) 98
7. The by-product of the ocean thermal energy conversion is — *1* *K1* *CO3*
   a) Hot Water b) Cold Water
   c) Chemicals d) Gasses
8. The term biomass most commonly refers to — *1* *K3* *CO3*
   a) Inorganic matter b) Chemicals
   c) Ammonium compounds d) Organic matter

9. The chemical reaction taking place in a fuel cell is — 1 K3 CO3

a) $H_2 + \frac{1}{2} O_2 = H_2O$ b) $2H_2 + \frac{1}{2} O_2 = H_2O$

c) $2H_2 + \frac{1}{2} O_2 = H_2O_2$ d) $H_2 + 2O_2 = H_2O$

10. Match the type of energy storage — 1 K3 CO4

a. Chemical	1. Flywheel
b. Mechanical	2. Battery
c. Electrochemical	3. Fuel cell
d. Electromagnetic	4. Superconducting magnetic energy storage

a) a-2, b-3, c-1, d-4 b) a-3, b-2, c-1, d-4

c) a-3, b-1, c-2, d-4 d) a-4, b-3, c-1, d-2

11. IEEE Standard 1547.3-2007 "IEEE Guide for — 1 K1 CO4

a) Test Procedures for Equipment Interconnecting b) Monitoring

c) Information Exchange and Control of Distributed d) Resources Interconnected with Electric Power Systems

12. If the Depth of Discharge of a battery is x%, what is its SoC? — 1 K2 CO4

a) x % b) (100-x) %

c) 100x % d) (x-100) %

13. _____ can be defined as the amount of stored energy relative to the total energy storage capacity of the battery — 1 K3 CO5

a) State of Charge b) Depth of Discharge

c) Self discharge d) Specific Energy

14. Microgeneration falls under — 1 K1 CO5

a) 1KW to 5KW b) 5KW to 5MW

c) 5MW to 50MW d) 50MW to 300MW

15. The off grid operation includes — 1 K2 CO5

a. black start

b. grid-forming operation:

c. improvement of power quality

d. voltage and frequency control support

a) only a b) a and b

c) b and c d) all of these

16. The process of reviving power in critical units of a micro grid power system after a blackout using external power system architecture is known as ..... — 1 K3 CO5

a) Shut down b) Scalability

c) Black Start d) Load fluctuation

PART – A (ii) (Short Answer Questions)

(8 × 3 = 24 Marks)

Answer ALL Questions

17. Apply the various control strategies of wind turbines and mention which control is implemented for varying wind speeds. — 3 K3 CO1
18. Identify the advantages of high speed propeller type windmills compared to multi blade. — 3 K3 CO1
19. Apply the function of a boost converter in a solar photovoltaic system. — 3 K3 CO2
20. Make use of charge controller and show its operation in a PV system. — 3 K3 CO2
21. Examine how fuel cells use hydrogen to produce clean electrical energy with minimal pollution. — 3 K4 CO3
22. Illustrate the importance of IEEE1547 standards. — 3 K3 CO4

23.		Classify the different topologies of DG.	*3*	*K4*	*CO4*
24.		Analyze the concepts of microgrid and compare it with conventional utility grid.	*3*	*K4*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Make use of the various components of WPPs and explain its operation with a neat diagram.	*12*	*K3*	*CO1*
		OR			
	b)	Develop the different control strategies in Wind Power Plants (WPPs) and elaborate any one in detail.	*12*	*K3*	*CO1*
26.	a)	Apply the configuration of a standalone solar photovoltaic system and mention the functions of its main components.	*12*	*K3*	*CO2*
		OR			
	b)	Apply the different MPPT techniques and describe the incremental conductance MPPT algorithm using a flow chart.	*12*	*K3*	*CO2*
27.	a)	Assume biomass as fuel and demonstrate the concept of electrical power generation.	*12*	*K4*	*CO3*
		OR			
	b)	Analyze the principles of energy production of hydrogen and explain the operation of Hydrogen energy system with a schematic diagram.	*12*	*K4*	*CO3*
28.	a)	Classify the various energy storage system and explain about the Ultra capacitor.	*12*	*K4*	*CO4*
		OR			
	b)	List the standards for interconnecting distributed resources to electric power systems.	*12*	*K4*	*CO4*
29.	a)	Utilize the concept of microgrid and explain its typical structure with its configuration.	*12*	*K3*	*CO5*
		OR			
	b)	Apply the phenomenon of the microgrid drivers and its benefits.	*12*	*K3*	*CO5*