KUMARAGURU
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Register Number:……

M.E DEGREE EXAMINATIONS: JUNE 2017

(Regulation 2015)

Second Semester

POWER ELECTRONICS AND DRIVES

P15PETE08 **:** Power Electronics in Wind and Solar Power Conversion

COURSE OUTCOMES

CO1: Choose a power converter for the control and conversion of wind and solar energy.

CO2: Use the skills, modern engineering tools necessary for engineering practice.

CO3: Design a system, component or process to meet desired needs.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A) : Fossil fuel is a Inexhaustible resource. CO3 [K_1]

   Reason (R) : Fossil fuel used in producing electricity, releasing green house gases.

   a) A and R are true but not related b) A and R are true and related

   c) A is true and R is false d) R is true and A is false

2. Arrange the following based on installed capacity of Renewable energy in India in descending order 1)Wind energy 2) Hydro energy 3) solar energy CO3 [K_2]

   a) 2,3,1 b) 1,3,2

   c) 3,2,1 d) 3,1,2

3. Solar radiation is measured using CO2 [K_2]

   a) Encoder b) Pyranometer

   c) Pyrheliometer d) Both b) and c)

4. Match the following CO2 [K_2]

Type of cell	Efficiency(approximately)
A. polycrystalline	i. 7-13%
B. Monocrystalline	ii. 13% to 16%
C. Thin flim	iii. 15% to 20%

	A	B	C
a)	ii	iii	i
b)	ii	i	iii
c)	iii	i	ii
d)	iii	ii	i

5. Assertion (A) : Fixed speed turbine is directly connected with grid CO1 [K_2]
Reason (R): Variable speed turbine generator is connected to grid through electronic converters .

a) A and R are true but not related
b) A and R are true and related
c) A is true and R is false
d) R is true and A is false

6. Which type of system helps to reduce emission with generating electricity and useful heat from the same fuel input CO3 [K_1]

a) Hybrid system
b) Co generation system
c) PV system
d) Off shore wind power system

7. Grid interface issues in WECS are CO1 [K_2]

1. Voltage sag
2. Voltage swell
3. Frequency fluctuations
4. Harmonics

Choose the correct answers

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

8. Match the following CO3 [K_2]

Energy storage	Form of energy
1. Mechanical energy storage	- A. Hydrogen
2. Electrical energy storage	- B. Fly wheel
3. Chemical energy storage	- C. Lead acid battery

a) 1-B,2-C,3-A
b) 1-B,2-A,3-C
c) 1-C,2-A,3-B
d) 1-C,2-B,3-A

9. Arrange the following based on wind speed at various level from earth surface in increasing order. A)height of 60m from earth surface B) height of 20m from earth surface C)height of 40m from earth surface. CO2 [K_L]

a) B)C)A)
b) A)C)B)
c) C)B)A)
d) C)A)B)

10. The mechanical methods to limit the wind powers are CO1 [K_2]

1. Pitch control
2. Yaw control
3. Load frequency control

Choose the correct answers

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

PART B (10 x 2 = 20 Marks)

11.	What is the energy need of growing economy?	CO3	[K_2]
12.	Compare different types of energy.	CO3	[K_2]
13.	Draw the VI characteristics of solar cell with Maximum power point.	CO2	[K_3]
14.	What are the DC-DC converters used for solar energy conversion?	CO1	[K_2]
15.	Classify Wind energy conversion system.	CO1	[K_2]
16.	List the wind farm accessories.	CO2	[K_2]
17.	What is multi level inverter?	CO1	[K_2]
18.	How to select power conversion ratio for grid connected converters?	CO1	[K_3]
19.	What is optimization technique in power generation system?	CO3	[K_3]
20.	List the types of cogeneration system.	CO2	[K_2]

PART C (6 x 5 = 30 Marks)

21.	List some rules and regulations of MNRE in energy consumption.	CO2	[K_2]
22.	What are the applications of solar energy conversion? Explain any one in detail.	CO3	[K_2]
23.	Differentiate different converters used for grid connected solar conversion system.	CO1	[K_2]
24.	Explain the basic principle in wind energy conversion system.	CO2	[K_2]
25.	How Matrix converter used in WECS? Explain.	CO1	[K_2]
26.	How to select the power converters for distributed power generation system? Explain.	CO1	[K_2]

Answer any FOUR Questions

PART D (4 x 10 = 40 Marks)

27.	Explain different energy sources and their availability in India.	CO2	[K_2]
28.	Explain the solar energy system with DC-DC converter.	CO1	[K_2]
29.	Explain Grid related issues and methods to overcome those issues.	CO3	[K_2]
30.	What are all the schemes for electric generation in Wind energy conversion system? Explain.	CO3	[K_3]
31.	Explain hybrid wind/PV system model and optimization of system components.	CO2	[K_3]

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