7E1732

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B. Tech. VII - Sem. (Main) Exam., Feb.- March - 2021
PEC Electrical Engineering
7EE5 – 11 Wind and Solar Energy Systems

Time: 2 Hours **[To be converted as per scheme]**

Max. Marks: 82

Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Explain the relation between power generated by a wind turbine and wind velocity.

Q.2 Explain the term 'stall'.

Q.3 Explain the reason for deploying induction generators in a wind turbine.

Q.4 What is a Sun angle?

Q.5 Explain application of MPPT.

Q.6 What is a wind farm?

Q.7 Explain some application of solar thermal power generation.

Q.8 Explain a major difference between monocrystalline & polycrystalline.

Q.9 Explain uses of PV solar module.

Q.10 What is the maximum efficiency of a wind turbine?

PART – B

(Analytical/Problem solving questions) **[4×8=32]**

Attempt any four questions

Q.1 Explain the history of wind power and Indian & Global statistics.

Q.2 Explain the generator converter configurations in a wind turbine.

Q.3 Explain working of Doubly fed induction generators in wind generator topologies.

Q.4 Explain estimation of solar energy availability.

Q.5 Explain Betz law and derive its mathematical model.

Q.6 Explain 'Gird Code' and explain its technical requirements.

Q.7 Explain concept of 'Solar Pond' and its application.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Explain fixed and variable speed wind turbines.

Q.2 Design a power electronic base converters to obtain supply for an Indian active distribution network.

Q.3 With reference to solar resources, explain the following –

(a) Earth Sun angle

(b) Solar Day length

(c) Solar Geometry

Q.4 Explain Hybrid and Isolated operations of Solar PV and wind systems.

Q.5 Write short note on any two –

(a) Parabolic trough

(b) Fresnel

(c) Central Receivers
