

**B. SC. (APPLIED SCIENCE-
ENERGY) (BSCAEY)**

Term-End Examination

June, 2026

BEY-009 : WIND ENERGY

Time : 3 Hours

Maximum Marks : 70

Note : (i) Attempt any **five** questions.

(ii) All questions carry equal marks.

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1. (a) Discuss in detail the mechanism of wind formation, highlighting the role of Solar radiation, Earth's rotation, pressure gradient and Coriolis force. 7
 - (b) Discuss how wind characteristics influence wind resource assessment and site selection in detail. 7

2. (a) Describe wind measurement techniques including Anemometers, Acoustic Doppler Sensors (SODAR) and Laser Doppler Sensors (LIDAR). 7
- (b) Explain atmospheric boundary layer and atmospheric stability and its effect on surface pollen levels. 7
3. (a) Analyze how wind data is used in wind farm layout design and energy estimation. 7
- (b) Explain lift, drag and tip speed ratio in wind turbines. 7
4. Describe in detail the components and working of Wind Energy Conversion Systems (WECS). Explain the function of each component with support of a neat schematic diagram. 14
5. Explain the working principle of induction generator used in wind turbine and discuss their advantages and limitations. 8+4+2

6. (a) Critically compare Horizontal Axis Wind Turbines (HAWT) and Vertical Axis Wind Turbines (VAWT) in terms of design, efficiency and application. 7
- (b) Discuss the pitch and yaw control mechanisms. How do they regulate power output and ensure safe turbine operation ? 7
7. Write short note on any *two* of the following : 2×7=14
- (a) Hybrid wind-solar energy systems and their benefits.
- (b) Environmental impacts of wind energy and mitigation measures.
- (c) Aerodynamic principles of wind turbines.

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