

M.TECH/RE/3<sup>RD</sup> SEM/REEN 6102/2018  
RENEWABLE ENERGY III  
(REEN 6102)

Time Allotted : 3 hrs

Full Marks : 70

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group – A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) Hydropower is  
(a) Renewable (b) Eco-friendly  
(c) Economic (d) All of these.
- (ii) Which of the following is not part of a water turbine?  
(a) Runner (b) Impeller  
(c) Governor (d) Casing.
- (iii) The flow-mass curve is an integral curve of  
(a) the hydrograph (b) the hyetograph  
(c) The flow duration curve (d) The S-curve.
- (iv) The discharge of water canal is measured using  
(a) Venturi meter (b) Orifice meter  
(c) Weirs (d) Turbine meter
- (v) Pelton Turbine is  
(a) a reaction turbine (b) an impulse turbine  
(c) a low head turbine (d) a radial flow turbine
- (vi) A Hydrograph is a plot of  
(a) Rainfall intensity vs. time (b) Stream discharge vs. time  
(c) Cumulative rainfall vs. time (d) Cumulative runoff vs. time.
- (vii) Kaplan turbine is suitable for  
(a) High head and low discharge (b) High head and high discharge  
(c) Low head and high discharge (d) Low head and low discharge
- (viii) Surge tank is used to protect  
(a) Dam (b) Draft tube  
(c) Penstock (d) Turbine.

M.TECH/RE/3<sup>RD</sup> SEM/REEN 6102/2018

- (ix) A draft tube is not required for  
(a) Francis turbine (b) Kaplan turbine  
(c) Bulb turbine (d) All of the above.
- (x) Cavitation may occur  
(a) at the entrance of the turbine  
(b) at the exit of the turbine  
(c) at the exit of the pump  
(d) at entrance of the pump.

**Group – B**

2. (a) Discuss briefly about the different components of a hydrologic cycle.  
(b) What are the advantages of small hydro project (SHP)? **6 + 6 = 12**
3. (a) What do you mean by catchment area? Discuss its characteristics.  
(b) What are the site selection criteria of a stream gauging station? **6 + 6 = 12**

**Group – C**

4. (a) Draw a schematic diagram of SHP with its major components.  
(b) Draw different type of typical cross sections of canal used for small hydro projects. **6 + 6 = 12**
5. (a) What is forebay tank ? Briefly discuss its functions and importance in SHP.  
(b) What is surge tank? Briefly explain its functions and working principles. **6 + 6 = 12**

**Group – D**

- 6.(a) What is power factor? Briefly explain its origination and correction methodologies.  
(b) What are the different functions of an excitation system? **6 + 6 = 12**
- 7.(a) Draw a typical hydraulic governor system and discuss its operation.  
(b) Write a short note on "SCADA". **6 + 6 = 12**

**Group - E**

8. (a) Discuss the selection criteria of hydro-turbines.  
(b) What is PAT? Discuss its working principles.

**6 + 6 = 12**

9. (a) Discuss about the causes of cavitation and its impact on hydro-turbines.  
(b) Write a short note on "Draft Tube".

**6 + 6 = 12**