Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **M.Tech.**
P2SUCC11

2nd Semester Back Examination 2017-18
HYDROPOWER ENGINEERING
BRANCH : GEOTECHNICAL ENGG, SOIL MECHANICS, SOIL MECHANICS & FOUNDATION ENGG, STRUCTURAL & FOUNDATION ENGG, STRUCTURAL ENGG, TRANSPORTATION ENGG, WATER RESOURCE ENGG, WATER RESOURCE ENGG AND MANAGEMENT
Time : 3 Hours
Max Marks : 100
Q.CODE : C1090
Answer Question No.1 which is compulsory and any four from the rest.
The figures in the right hand margin indicate marks.
Natural graph sheet should be supplied.
Answer all parts of a question at a place.

Q1 **Answer the following questions:** **(2 x 10)**

a) What are the advantages of using biomass?
b) What is diversity factor?
c) Name different components of a hydropower plant.
d) What are the basic objective of powerhouse planning?
e) What do you understand by valley dam plants?
f) What do you mean by economic diameter of a penstock?
g) What are the functions of valves?
h) What are the major factors which causes variations in tidal waves?
i) Name different types of PS plants.
j) What is the function of surge tank?

Q2 **a)** What are the different sources of energy? Explain geothermal power. **(10)**
b) Explain with sketches various methods of tidal power generation. **(10)**

Q3 **a)** What is the power factor of a utility that has to meet a maximum demand of 2500 KW real power, when the reactive power at the time of the demand is 1400 kVAR. If the reactive power is to be reduced by external means to 900 kVAR for the same supplied power, how much will be the improvement in the power factor and in real power that could be provided? **(12)**
b) Why is it necessary to predict future load demand? What are the methods of load forecasting? **(8)**

Q4 **a)** Differentiate between impulse turbine and reaction turbine. What should be the criteria for the selection of type of turbine required in a particular hydroelectric scheme? **(8)**
b) A reaction turbine works at 450 rpm and is under a head of 120 m. If the diameter at inlet is 1.2 m, flow area at inlet is 0.4 m^2. The angle made by absolute and relative velocity at the inlet with tangent of wheel are 20^0 and 60^0 respectively. Determine **(12)**
(i) Flow rate
(ii) Runner power developed
(iii) Hydraulic efficiency
Assume that discharge is radial at outlet.

Q5 **a)** Explain the basic features of a pumped storage project and enumerate its advantages. **(12)**

b) Differentiate between runoff river plant and storage hydel plants. **(8)**

Q6 **a)** What are the locations of a underground power station? Discuss different layout of underground powerhouse. **(10)**

b) What is the function of anchor blocks? What are the forces which should be taken into account in their stability analysis? **(10)**

Q7 **Write short note on any TWO of the followings :** **(10 x 2)**

a) Power house dimensions

b) Governing of Pelton wheel

c) Water hammer

d) Estimation of waterpower potential