Code No: R1621025 **R16** SET - 1

II B. Tech I Semester Supplementary Examinations, May - 2019
THERMAL AND HYDRO PRIME MOVERS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

~~~~~~

PART –A

1. a) What is meant by ignition? What is the interrelation between ignition and combustion? (2M)
   b) Determine the entropy of 1 kg of wet steam at a pressure of 10.5 bar and of dryness fraction 0.9. (3M)
   c) State the assumptions made for thermal efficiency of a gas turbine plant. (2M)
   d) What are the functions of i) strainer and ii) foot valve in any pump installation? (2M)
   e) What is a hydraulic turbine? (3M)
   f) What do you understand by firm power? (2M)

PART -B

2. a) Compare four-stroke and two-stroke cycle engines. Bring out clearly their relative merits and demerits. (7M)
   b) What is the necessity for gasoline injection? Explain with suitable sketch. (7M)

3. a) Explain the difference between impulse and reaction steam turbines. (7M)
   b) One kg of steam at 18bar and 280^0C undergoes a constant pressure process until the quality of steam becomes 0.5 dry. Find the work done, the heat transferred and the change in entropy. (7M)

4. a) Describe with a suitable sketch the constant pressure open cycle gas turbine. (7M)
   b) A constant pressure open cycle gas turbine plant works between temperature range of 15^0C and 700^0C and pressure ratio of 6. Find the mass of air circulating in the installation, if it develops 1100 kW. Also find the heat supplied by the heating chamber. (7M)

5. a) Describe with a neat sketch, the operation of a multi-stage pump. (5M)
   b) A jet of water, 60mm in diameter, strikes a curved vane at its centre with a velocity of 18m/s. The curved vane is moving with a velocity of 6 m/s in the direction of the jet. The jet is deflected through an angle of 165^0. Assuming the plate to be smooth, find: i) Thrust on the plate in the direction of jet; ii) Power of the jet and iii) Efficiency of the jet. (9M)

||''|'''|''|'|''''||
~~~~~~

6. a) Explain with sketches the salient features of main characteristics curves of different types of hydraulic turbines. (6M)
   b) A Kaplan turbine produces 44000 kW under a head of 24.7m, with an overall efficiency of 90%. Taking the value of speed ratio as 1.6, flow ratio as 0.5 and the hub diameter as 0.35 times the outside diameter, find the runner diameter and speed of the turbine. (8M)

7. a) Derive the relation between load factor, capacity factor and utilization factor. (7M)
   b) What are the different types of hydro power plants? Describe each one briefly. (7M)