INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

ASSIGNMENT QUESTIONS

Course Name	:	**FLUID MECHANICS AND HYDRAULIC MACHINERY**
Course Code	:	A30102
Class	:	II-I
Branch	:	**ELECTRICAL AND ELECTRONICS ENGINEERING**
Year	:	2016 – 2017
Course Coordinator	:	Mr. G Sarat Raju, Assistant Professor
Course Faculty	:	Mr. G Sarat Raju, Assistant Professor

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S. No	Question	Blooms Taxonomy Level	Course Outcome
	ASSIGNMENT-I		
1	Explain in detail mass density, write its units and explain the effect of temperature and pressure on mass density	Understand	1
2	Explain in detail weight density, write its units and explain the effect of temperature and pressure on weight density	Apply	1
3	Explain with a neat sketch the viscosity, newton's law of viscosity, and the effect of temperature and pressure on viscosity	Apply	1
4	Derive Euler's equation for a fluid flow	Understand	2
5	State the principle and Derive Bernoulli's equation for a fluid flow	Analyze	2
6	State the assumptions of Bernoulli's equation and list the applications of Bernoulli's equation	Apply	2
7	State and explain the momentum equation.	understand	2
8	A jet of water having a velocity of 35m/s impinges on a series of vanes moving with a velocity of 20m/s the jet makes an angle of 30^0 to the director of motion of vanes. When entering and leaves at angle of 120^0 draw the inlet and outlet velocity triangles and find	Apply	3

S. No	Question	Blooms Taxonomy Level	Course Outcome
	i. The angles of vane tip so that water enters and leaves without shock. ii. The work done per unit weight of water iii. Efficiency		
9	A jet of water of diameter 50mm, having a vel of 20m/s. strikes a curved vane which moving a velocity of 10m/s in the direction of the jet. The jet leaves the vane at an angle of 60^0 to the direction of motion of vane at outlet. Determine. i. The force exerted by the jet on the vane in the dirn of motion ii. WD/sec by the jet.	Apply	3
10	A jet of water 75 mm in diameter having velocity of 20 m/s strikes a series of the flat plates arranged around the periphery of a wheel such that each plate appears successively before the jet. If the plates are moving at a velocity of 5 m/s, calculate the force exerted by the jet on the plate, the work done per second on the plate and the efficiency of the jet.	Apply	3
	ASSIGNMENT – II		
1	Derive an expression for work done/sec and efficiency when the jet of water striking tangentially at the tip of the vane of an un symmetrical curved vane.	Understand	3
2	Derive work done and efficiency when the jet of water striking tangentially of a radial curved vanes.	Understand	3
3	Explain the concept of pumped storage plants.	Understand	3
4	Two turbo-generators each of capacity 25000kW have been installed at a hydel power station. During a certain period the load on the hydel plant varies from 15000kW to 4000kW. Calculate i. The total installed capacity, ii. The load factor, iii. The plant factor and iv. The utilization factor	Understand	4
5	Explain the working principles of Francis turbine and derive expression for efficiency	Understand	4
6	A turbine develops 9000 KW when running at 100 rpm. The head on the turbine is 30 m. if the head on the turbine reduced to 18m, determine the speed and power developed by the turbine.	Understand Analyze	4
7	What is the necessity of a surge tank in turbines? Explain different types of surges with the aid of neat diagrams.	Understand	4
8	A centrifugal pump is to discharge 0.118 m^3/s at a speed of 1450 rpm against a head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.	Understand	5
9	The diameter of an impeller of a centrifugal pump at inlet and outlet are 30 cm and 60 cm respectively. Determine the minimum starting speed of the pump, if it works against a head of 30 m.	understand	5
10	A centrifugal pump having an overall efficiency of 80% delivers 1850 liters of water per minute to a height of 20 meters through a pipe of 100mm diameter and 95 meters length. Taking f=0.0075, find the power required to drive the pump.	Apply & analyze	5

Prepared By: Mr. G Sarat Raju, Assistant Professor

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