AR13

CODE: 13ME2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, November-2016
FLUID MECHANICS & HYDRAULIC MACHINES
(Electrical & Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. Explain the following
   a) Physical properties of fluids
   b) Vacuum pressure
   c) Stream line flow of fluids
   d) Surface and body forces
   e) Minor losses in pipes
   f) Venturimeter
   g) Classification of turbines
   h) Geometric similarity of hydraulic turbines
   i) Classification of centrifugal pumps
   j) Working principle of reciprocating pumps

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) What is vapour pressure? Discuss its influence on fluid motion — 6 M
   b) Define the terms specific weight, specific volume, specific gravity and capillarity of a fluid — 6 M

(OR)

3. a) Define the terms Absolute pressure, Gauge Pressure and Vacuum pressure of a Fluid at any point — 6 M
   b) A Simple U-tube manometer containing mercury is connected to a pipe in which a fluid of *sp.gr.0.8* and having vacuum pressure is flowing. The other end of the monometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15 cm below. — 6 M

UNIT-II

4. Derive the Bernoulli's equation of motion through the derivation of Euler's equation of motion. — 12 M

(OR)

5. a) Classify the different types of fluid flows with suitable examples — 6 M
   b) A pipeline carrying oil of specific gravity 0.8, changes in diameter from 300 mm at a position A to 500 mm diameter of a position B, which is 5m at a higher level. If the pressures at A and B are 200 kPa and 152 kPa respectively and discharge is 150 litre/sec, determine the loss of head and direction of flow — 6 M

UNIT-III

6. Derive the Darcy Weisbach equation of closed conduit flow. 12 M

(OR)

7. Sketch and explain the working principle and applications of the following 12 M
i. Orifice meter ii. Flow nozzle

UNIT-IV

8. a) Explain the process governing the turbines with neat sketches 6 M
b) A Francis turbine operates under a head of 5 m at 210 rpm and develops 75 kW, when the discharge is 1.8 cum/sec. The runner diameter is 1 m. If the head on this turbine is increased to 16 m, determine its new speed, discharge and power 6 M

(OR)

9. a) Write a short notes on types of draft tubes and their importance in reaction turbines 6 M
b) A single jet pelton turbine is required to drive generator (4 pole) to develop 10 MW. The available head at the nozzle is 762 m. assuming electric generator efficiency 95%, Pelton wheel efficiency 87%, coefficient of velocity for nozzle 0.97, mean bucket velocity 0.46 of jet velocity, outlet angle of the bucket 15° and the friction of the bucket reduces the relative velocity by 15 percent, find a) the diameter of the jet, and b) the rate of flow of water through the turbine c) the force exerted by the jet on the buckets. If the ratio of mean bucket circle diameter to the jet diameter is not to be less than 10, find the best synchronous speed for generation at 50 cycles per second and the corresponding mean diameter of the runner 6 M

UNIT-V

10. a) Explain about the efficiencies of a Centrifugal Pump **6 M**
b) The impeller of a centrifugal pump having external and internal diameters 500 mm and 250 mm respectively, width at outlet 50 mm and running at 1200 rpm works against a head of 48 m. The velocity of flow through the impeller is constant and equal to 3 m/s. The vanes are back at an angle of 40° at outlet. Determine inlet vane angle, work done by the impeller on water per second and manometric efficiency **6M**

(OR)

11. a) Define slip, percentage slip and negative slip of a reciprocating pump **6 M**
b) A double acting reciprocating pump, running at 40 r.p.m, is discharging 1.0 m^3 of water per minute. The pump has a stroke of 400 mm. the diameter of the piston is 200 mm. the delivery and suction head are 20 m and 5 m respectively. Find the slip of the pump and power required to drive the pump. **6 M**

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AR13

CODE: 13EE2008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Regular / Supplementary Examinations, November-2016

ELECTRICAL TECHNOLOGY
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) List out the applications of differential compound generators.
   b) What is the main purpose of performing open circuit on a transformer
   c) Find the slip of a 4pole, 50HZ, 3-phase induction motor running 1460 rpm.
   d) Define regulation of a transformer
   e) Define synchronous impedance
   f) List out the applications of squirrel cage induction motor
   g) Can we use for measurement of alternating quantities in moving coil instrument
   h) A 6pole alternator running at 1000rpm calculate frequency of the supply.
   i) What is the type of a motor which is used for electric traction?
   j) Write the speed equation of a dc motor.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a Classify the generators based on excitation **6M**
   b A 4pole lap connected dc generator has no load generated emf of 500V when driven at 1200rpm.calculate the flux per pole if armature has 120 slots with six conductors per slot. If each conductor has a resistance of 0.01Ω, find the armature resistance. **6M**

(OR)

3. a Draw and explain characteristics curves of a dc shunt and series motor **6M**
   b When running on no load, a 400V shunt motor takes 5A. Armature resistance is 0.5Ω and field resistance 200Ω. Find the output of the motor and efficiency when running on full load and taking a current of 50A. Also, find the percentage change in speed from no load to full load. **6M**

UNIT-II

4. a Draw and explain no load and load vector diagrams of a 1phase transformer **6M**
   b A 100KVA, 6.6KV/41 V/415V, 1-phase transformer has an effective impedance of (3+8j) Ω referred to HV side. estimate the full load voltage regulation at 0.8 pf lagging and 0.8 pf leading **6M**

(OR)

5.		How u are going to measure **i**ron and copper losses of a given transformer in your laboratory & explain with the help of neat circuit diagram.	**12M**

UNIT-III

6.	a	Explain the principal operation of 1phase induction motor	**8M**
	b	Explain the necessity of a starter for induction motor & explain any one of the starter with neat circuit diagram.	**4M**

(OR)

7.	a	Draw and explain torque slip curves of a 3phase induction motor	**6M**
	b	A 3phase induction motor, on full load , delivers a torque of 73.3 Nm with speed of 1433rpm when the supply frequency is 49.5HZ the friction and windage losses are 250 W and the stator copper and iron losses amount to 900W. calculate (i) Mechanical power developed (ii)Rotor copper loss and (iii) Efficiency at this load conditions.	**6M**

UNIT-IV

8.	a	Derive EMF equation of alternator interms of distribution &coil span factor	**6M**
	b	A 3phase, 16pole synchronous generator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03ws and the speed is 375 rpm calculate the frequency and line induced emf.	**6M**

(OR)

9.	a	Explain the constructional difference between salient and non-salient pole alternator	**6M**
	b	A 100KVA, 300V 50HZ, star connected alternator has effective armature resistance of 0.2Ω.a field current of 40A produces short circuit current of 200A and an open circuit e.m.f .of 1040 V (line value) . Calculate the full load percentage regulation at a power factor of 0.8 lagging. how will the regulation be affected if the alternator delivers its full load output at a power factor of 0.8 leading	**6M**

UNIT-V

10.	a	Compare Moving iron instrument & Moving Coils instruments	**6M**
	b	Explain different types of torques required for an indicating instruments	**6M**

(OR)

11.		Describe the construction and working of PMMC instruments and also list out advantages and disadvantages.	**12M**

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