AR13

CODE: 13ME2008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March-2017

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 briefly
   a) Surface tension
   b) Pressure gauges
   c) Fluid path line
   d) Applications of momentum equation
   e) Total energy line
   f) Applications of Flow nozzle
   g) Functions of hydraulic turbines
   h) Cavitation
   i) Specific speed of pumps
   j) Discharge in reciprocating pumps

PART-B

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

UNIT-I

2. Explain U-tube and inverted U-tube differential manometers with sketches. State their applications — 12 M

(OR)

3. Discuss the following in detail. Draw sketches suitably. — 12 M
   i. Physical properties of fluids
   ii. Differential and Micro manometers

UNIT-II

4. Distinguish between: (i) Steady flow and un steady flow, (ii) Uniform and non-uniform flow, (iii) Compressible and incompressible flow, (iv) Rotational and irrotational flow. — 12 M

(OR)

5. Derive the Euler's and Bernauli's equations for flow along a 3 D stream line — 12 M

UNIT-III

6. Distinguish between piers in series and pipes in parallel. Also discuss the effects of minor losses in pipes — 12 M

(OR)

7. Sketch and explain the working of the following 12 M
i. Flow nozzle ii. Turbulent flow meter

UNIT-IV

8. a) Explain the working of a Pelton wheel with a neat sketch 6 M
b) A 150 mm diameter jet of water strikes the bucket of a Pelton wheel and is deflected through an angle of 165degrees by the buckets. Head available at the nozzle is 350 m. Taking coefficient of velocity as 0.96, speed ratio as 0.46 and loss of velocity of jet due to friction, while passing through the buckets as 12%, find the power developed by the machine 6 M

(OR)

9. a) Derive an expression for Specific speed of a turbine. What is its practical application? 6 M
b) A Francis turbine operates under a head of 8 m at 250 rpm and develops 90 kW, when the discharge is 2.5 cumec. The runner diameter is 1 m. If the head on this turbine is increased to 20 m. Determine its speed, discharge and power under revised conditions 6 M

UNIT-V

10. a) Discuss the comparison of centrifugal and reciprocating pumps 6 M
b) A single acting reciprocating pump has a plunger of 80 mm diameter and a stroke of 150 mm. It takes water from a sump 3 m below the pump through a pipe 4.5 m long and 30 mm diameter. It delivers water to a tank 12 m above the pump through a pipe of 25 mm diameter and 15 m long. If separation occurs at 78.48 kPa below atmosphere pressure. Find the maximum speed at which the pump may be operated without separation. Assume the plunger to have simple harmonic motion 6 M

(OR)

11. a) Explain the phenomenon of separation in reciprocating pumps 6 M
b) A double acting reciprocating pump running at 40 rpm, has a cylinder 200 mm diameter, stroke 400 mm and delivers water through a 150 mm diameter pipe 36 m long to a height of 30 m. Calculate the pressure in the cylinder at the beginning of the delivery stroke when: i) There is a large air vessel on the delivery side, at the same level as the pump and 3 m from the cylinder ii) There is no air vessel.
assume the data required for the above 6 M

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AR13

CODE: 13EE2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2017
ELECTRICAL TECHNOLOGY
(Electronics and Communication Engineering)

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

PART-A

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

1. a) What for brushes are employed in a dc machines
   b) State the applications of series motor
   c) What are the different losses in a transformer
   d) What is the conditions for maximum starting torque in induction motor
   e) Define regulation of an alternator
   f) Define coil span factor
   g) Define controlling torque in an moving coil instrument
   h) Define regulation of a transformer
   i) List out the different types of starters in an induction motor
   j) State whether single phase induction motor is a self-starting are not

PART-B

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

UNIT-I

2. a Derive the torque equation of a dc motor **6M**
   b i. A 4pole generator, with wave wound armature has 51 slots, each having 24 conductors. The flux per pole is 0.01wb. At what speed must the armature rotate to give an induced emf of 220V? **6M**
   ii. What will be the voltage developed, if the winding is lap and the armature rotates at the same speed?

(OR)

3. a Explain the construction of a dc machine with neat sketch **6M**
   b A shunt generator has a full load current of 195A at 250V. The stray losses are 720W. And the shunt field coil have resistance of 50Ω. It has a full load efficiency of 90% .find the armature resistance. Also find the current corresponding to maximum efficiency **6M**

UNIT-II

4. a Derive emf equation of a single phase transformer **6M**
   b A 40- KVA, 3,300/240V, 50HZ 1-phase transformer has 660 turns on the primary. **6M**
   Determine (i) The number of turns on the secondary
   (ii) The maximum value of flux in the core
   (iii) The approximate value of primary and secondary full-load current
   Internal drops in the winding are to be ignored.

(OR)

5.		Obtain the approximate equivalent circuit of a given 200/2000V single-phase 30 KVA transformer having the following test results; O.C test: 200V , 6.2A, 360W on LV side S.C test: 75V, 18A, 600W on HV side and also find full load efficiency and regulation at 0.8 power factor	**12M**

UNIT-III

6.	a	Explain the principle operation of a three phase induction motor	**6M**
	b	Compare squirrel cage induction motor & slip ring induction motor	**6M**
		(OR)	
7.	a	Derive the running torque equation of An induction motor	**6M**
	b	**A** 3-phase ,50HZ induction motor with its rotor star connected gives 500V (r.m.s)At stand still between the slip rings on open circuit. Calculate the current and power factor at stand still when the rotor winding is joined to a star connected external circuit, each phase of which has a resistance of 10Ω and an inductance of 0.04H.the resistance per phase of the rotor winding is 0.2Ω and its inductance is 0.04H. Also, calculate the current and power factor when the slip rings are short circuited and the motor is running with a slip of 5%. Assume the flux to remain constant.	**6M**

UNIT-IV

8.	a	Derive emf equation of an alternator	**6M**
	b	A 3 phase, 4 pole, 50Hz, star connected alternator has flux per pole of 0.12wb. It has 4 slots/pole/phase and 4 conductors/slot if coil span is 150^0. Find emf induced/phase.	**6M**
		(OR)	
9.	a	Pre-determine the regulation of an alternator by synchronous impedance method	**6M**
	b	A 3 phase star connected 1000KVA, 11KValternator has rated current of 52.5AThe resistance of stator/phase =0.45Ω.test results are given below OC test : I_f =12.5A voltage between lines=422V SC test : I_f = 12.5A line current = 52.5ADetermine full load voltage regulation of alternator (i) at 0.8 pf lag (ii) 0.8 pf lead.	**6M**

UNIT-V

10.		Describe the construction &working of PMMC instruments and also list out Advantages and dis advantages	**12M**
		(OR)	
11.		Explain the principle operation of moving iron attraction type instruments & Repulsion type instruments	**12M**

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13ME1002

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2017
CLASSICAL MECHANICS
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

PART- A

Answer all questions **[10 x 1=10M]**

1. a) Classify the system of forces?
   b) State converse of the law of Triangle of forces.
   c) Define moment.
   d) State the assumptions that considered in solving a truss problem?
   e) Define virtual work?
   f) State pappu's theorems.
   g) Define polar moment of inertia.
   h) Differentiate kinematics and kinetics.
   i) A rigid body rotates about fixed axis. Write the expression for angular velocity when the rotation is uniformly accelerated.
   j) Define Impulse and Momentum?

PART- B

Answer one question from each unit **[5X12=60M]**

UNIT - I

2. a) The Resultant of two forces, when they act at an angle of 60^0 is 14 N if the same forces are acting at right angles; their resultant is $\sqrt{136}$ N. Determine the magnitude of the two forces. [6M]
   b) A system of four forces acting on a body is as shown in figure1 below. Determine the resultant. [6M]

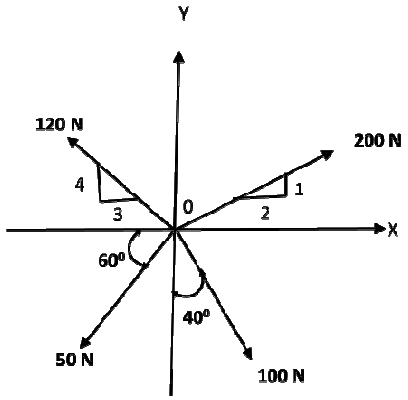

figure1

(OR)

3. a) Explain the Concept of Couple . [2 M]
   b) Two smooth spheres each of radius 100 mm and weighing 100 N, rest in a horizontal channel having vertical walls, the distance which is 360 mm. Find the reactions at the points of contacts A,B,C and D shown in figure 2. [10 M]

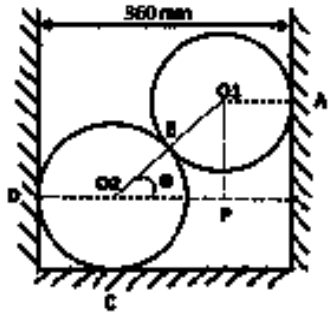

figure2

UNIT-II

4. Determine the axial forces induced in all the members of a plane truss as shown in figure3. [12 M]

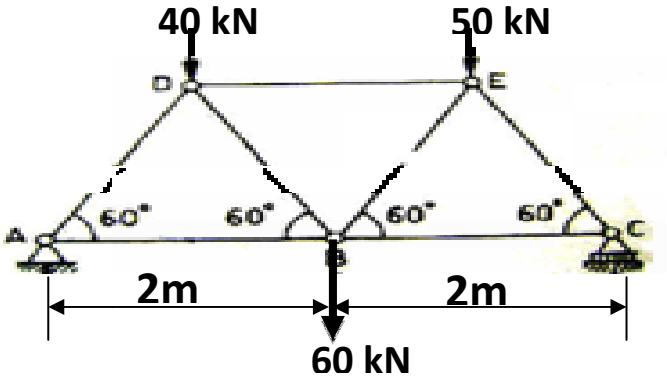

figure3

(OR)

5.a)Determine the forces in all the members of a cantilever truss shown in figure4. [6M]

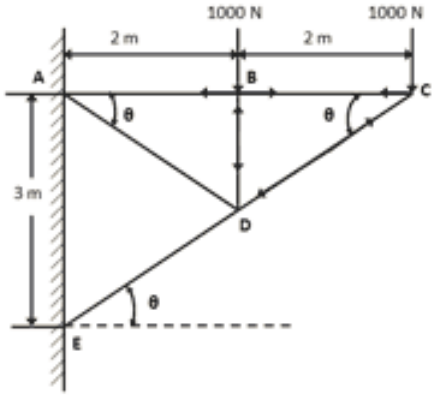

figure 4

b) Two uniform rods each of length L and weight w are connected as shown in figure5 . Using the method of virtual work determine θ_1 and θ_2 corresponding to the equilibrium of the bars. [6M]

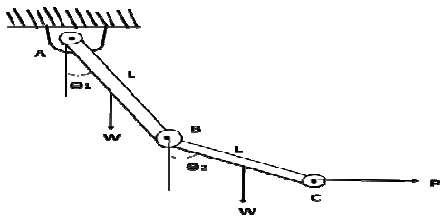

figure 5

UNIT-III

6. a) Determine the centroid of a Triangle ABC as shown in figure6 from its base having dimensions as width b and height h. [6M]

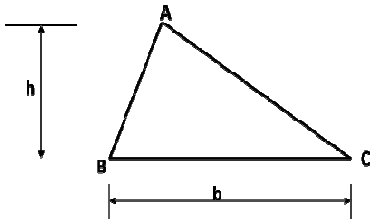

figure 6

b) Locate the centriod of the shaded area as shown in figure7 below. [6M]

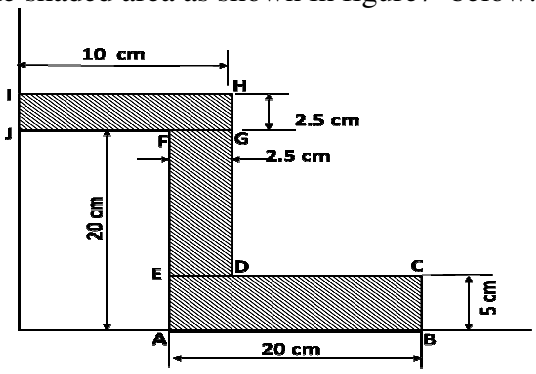

figure 7

(OR)

7. Find the moment of inertia of the section shown in Figure 8 about the centroidal axes. (Dimensions in mm) [12M]

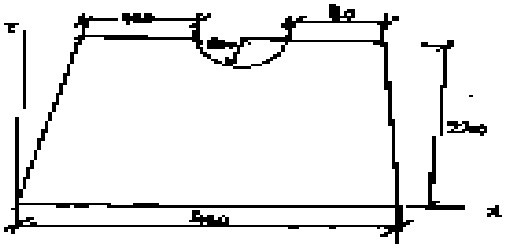

figure 8

UNIT-IV

8. a) A ball is dropped from the top of the tower 30m high. At the same instant a second ball is thrown upward from the ground with an initial velocity of 15m/sec.when and where do they cross and with what relative velocity ? [6M]

b) Two bodies weighing 300 N and 450 N are hung to the ends of a rope passing over ideal pulley as shown in figure9.with what acceleration the heavier body comes down? What is the tension in the string? [6M]

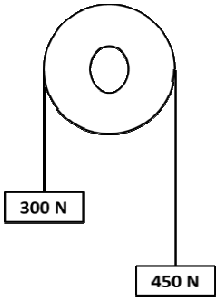

figure 9

(OR)

9.a) The acceleration of a particle along a straight line is given by the equation, $a = 4-t^2/9$ If the particle starts with zero velocity from a position x=0, find

i. Its velocity after 6 seconds ii.Distance travelled in 6 seconds [6M]

b) A 750 crate rests on a 500 N cart. The coefficient of friction between the crate and the cart is 0.3 and between cart and the road is 0.2.if the cart is to be pulled by a force P as shown in figure10 such that the crate does not slip, determine:

i. the maximum allowable magnitude of P

ii. the corresponding acceleration of the cart. [6M]

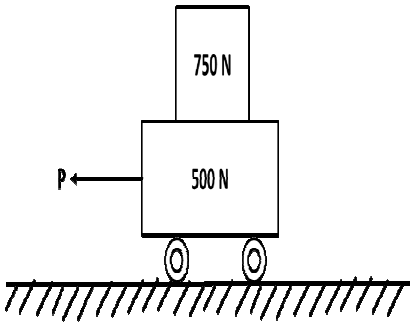

figure10

UNIT-V

10.a) A projectile is fired with velocity of 300 m/sec at an upward angle of 60^0 to horizontal neglecting air resistance. Determine time of flight and velocity after 35seconds. [4M]

b) A wagon weighing 500 kN as shown in figure11 starts from rest, runs 30 meterdown one percent grade and strikes the bumper post.if the rolling resistance of the track is 5N/kN, find the velocity of the wagon when it strikes the post. If the bumper spring which compresses 1 mm for every 15 kN. Determine by how much the spring will be compressed. [8M]

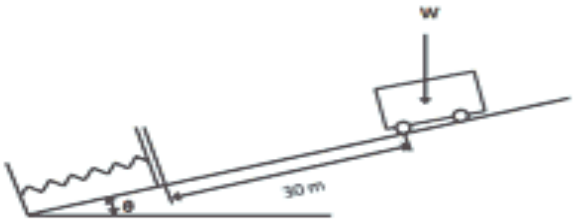

figure 11

(OR)

11.a) Explain the concept of Kinetics of Rotation of rigid body . [4M]

b) A bullet weighing 0.3N is fired horizontally in to a body weighing 100N as shown in figure 12. which is suspended by a string 0.8m long. Due to this impact the body swings through an angle of 30^0 .Find the velocity of the bullet and loss in the energy of the system. [8M]

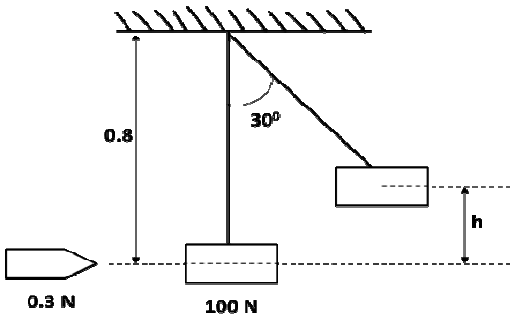

figure 12

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