

CODE: 13ME2008**ADITYA INSTITUTE OF TECHNOLOGY & MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B. Tech I Semester Supplementary Examinations, Jan / Feb-2016****FLUID MECHANICS & HYDRAULIC MACHINES****(Electrical and Electronics Engineering)****Time: 3 Hours****Max Marks: 70****PART – A****Answer all questions****[1X10=10M]**

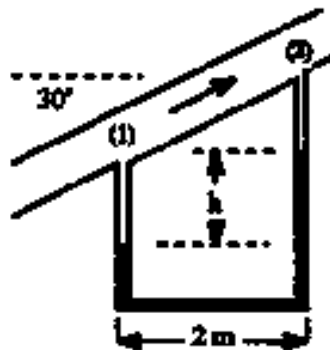
- 1.a) Define pascal's law
- b) Write the Bernoulli's equation.
- c) What is the function of the differential manometers?
- d) Differentiate between dynamic viscosity and kinematic viscosity.
- e) Distinguish between compressible flow and incompressible flow.
- f) Distinguish between laminar and turbulent flow.
- g) List out the major and minor losses in flow through pipes.
- h) What are the uses of a draft tube?
- i) Define Reynolds number.
- j) What is priming? Why it is necessary?

PART-B**Answer one question from each unit****[5 X12 = 60M]****UNIT-I**

2. Define surface tension and derive an expression for surface tension on liquid droplet, hollow bubble and liquid jet. [12M]

(OR)

3. Water flows upward in a pipe slanted at 30° , as in Fig. 1. The mercury manometer reads $h = 12$ cm. What is the pressure difference between points (1) and (2) in the pipe? [12M]

**Fig. 1**

UNIT – II

4.What is Euler’s equation of motion? How will you obtain Bernoulli's equation from it? [12M]

(OR)

5.Show that velocity components represents a possible case of an irrotational flow The velocity components in a two dimensional flow are

$$u= y^3/3+2x-x^2y \text{ and } v= xy^2-2y-x^3/3 \quad [12M]$$

UNIT – III

6.Derive an expression for the discharge through a venturimeter. The length of the divergent outlet part in a venturimeter is usually made longer compared with that of the converging inlet part. Why? [10+2M]

(OR)

7.The rate of flow of water through a horizontal pipe is $0.25\text{m}^3/\text{s}$. The diameter of the pipe is 200 mm which suddenly enlarged to 400 mm. the pressure intensity in the smaller pipe is 11.772 N/cm^2 . Determine: i) loss of head due to sudden enlargement, ii)pressure intensity in large pipe and iii)power lost due to enlargement [12M]

UNIT – IV

8.Define the term governing of a turbine. Describe the working of an oil pressure governor. [12M]

(OR)

9.A Pelton wheel is having a mean bucket diameter of 1 m and running at 1000 rpm.The net head on the pelton wheel is 700 m.If the side clearance angle is 15° and discharge through nozzle is $0.1\text{m}^3/\text{s}$, find i) Power available at the nozzle and ii) Hydraulic efficiency of the turbine. [12M]

UNIT – V

10. A centrifugal pump rotating at 1000 rpm delivers 160 litres/s of water against a head of 30 m. the pump is installed at a place where atmospheric pressure is $1 \times 10^5\text{ Pa}$ (abs) and vapour pressure of water is 3kpa (abs).The head loss in suction pipe is equivalent to 0.2m of water. Calculate i) Minimum NPSH ii) Maximum allowable height of the pump from free surface of water in sump. [12M]

(OR)

11. Compare centrifugal pumps and reciprocating pumps. Derive the expression for power required to drive the reciprocating pump. [12M]

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B. Tech I Semester Supplementary Examinations, Jan / Feb-2016

**CLASSICAL MECHANICS
(MECHANICAL ENGINEERING)**

Time: 3 hours

Max Marks: 70

PART- A

Answer all questions

[10 x 1=10M]

1. a) What should be angle between two forces to make their resultant a minimum and maximum?
- b) Differentiate between coplanar concurrent and coplanar non-concurrent forces.
- c) Numbers of component of reaction at hinge support are.....
- d) What are the necessary conditions required to keep the body in equilibrium.
- e) Centroid of quarter circular area of radius R is given.
- f) Define the term radius of gyration.
- g) Over rigid truss is also calledtruss.
- h) Slope of velocity-time curve is.....
- i) Maximum height of projectile from a point of projection is given by the relation.
- j) For a perfectly plastic impact, value of e is equal to.

PART-B

Answer one question from each unit

[5X12=60M]

UNIT- I

2. a) Find the resultant of given force system as shown in fig 1.

[8M]

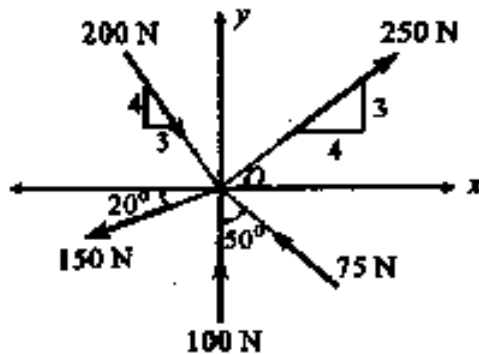


Fig.1

- b) Find the magnitude of forces F_1 and F_2 if they act at right angle, their resultant is $\sqrt{34}k^N$. if they act at an angle 60° ; their resultant is 7kN.

[4M]

(OR)

3. a) Block P=5kg and block Q of mass m kg is suspended through the chord is in equilibrium position as shown in fig.2. Determine the tensions in each cord and mass of block Q.

[8M]

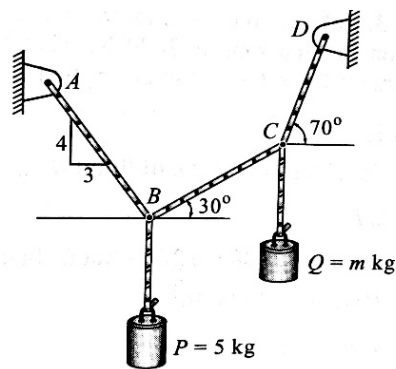


Fig 2.

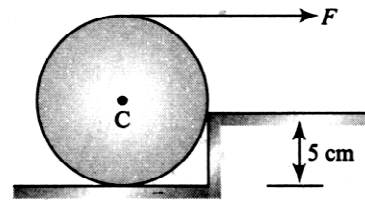


Fig 3.

- b) A heavy cylinder of mass 100N is to be pulled over a rectangular block of height 5cm by a horizontal force F applied by means of a rope wound around the cylinder. Determine the magnitude of pull for impending motion over the curb, while the radius of cylinder 30cm as shown in fig 3. [4M]

UNIT- II

4. a) Find the forces in the members DF, DE, CE and EF by method of joints only [9M]
for the pin jointed frame shown in fig 4

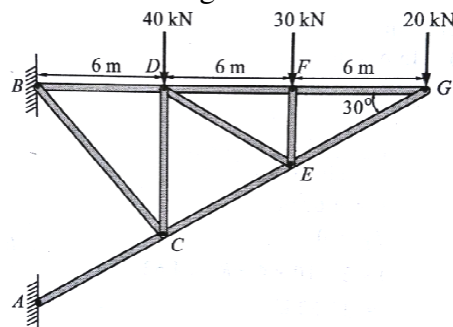


Fig 4.

- b) What are the assumption of a perfect truss? [3M]

(OR)

5. a) Using the principal of virtual work determine the value of mass M of the body for equilibrium $AB=2m$ and $BC=1m$ as shown in fig 5. [5M]

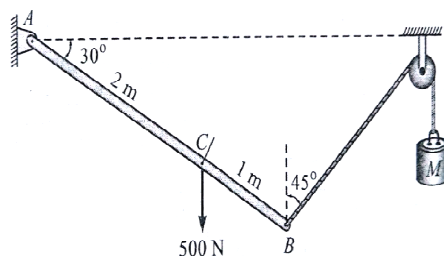


Fig 5.

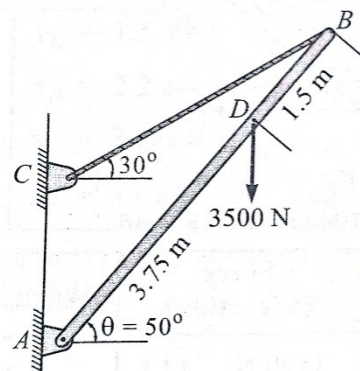


Fig 6

- b) Define principle of virtual work. [5M]
c) Determine the tension in a cable BC shown in fig 6 by virtual work method. [2M]

UNIT- III

6. Three plates ABC and BCDE and DEF are welded together as shown in fig 7. A Circle of diameter 1.5m is cut from the composite plate. Determine the centroid of the remaining area. [12M]

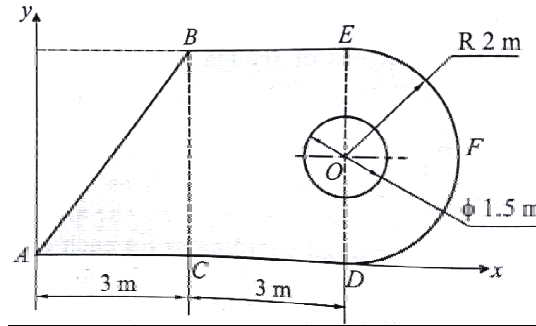


Fig.7
(OR)

7. a) State and prove parallel axis theorem. [6M]
b) Determine the mass moment of inertia of rectangular lamina of length l and height h [6M]

UNIT- IV

8. a) The motion of the particle along a straight line is governed by the relation $a = t^3 - 2t^2 + 7$, where a is the acceleration in m/s^2 and t is the time in seconds. At time $t=1$ sec. the velocity of the particle is 3.58m/sec and the displacement is 9.39m . calculate the displacement, velocity and acceleration at time $t=2\text{sec}$ [6M]
b) Two blocks A (mass 10kg), B (mass 28kg) are separated by 12m as shown in fig.8. If the block starts moving, find the time ' t ' when the blocks collide. Assume $\mu=0.25$ for block A and plane and $\mu=0.10$ for block B and plane [6M]

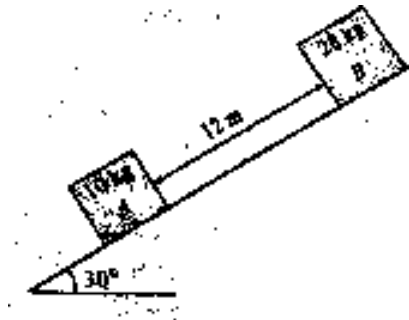


Fig.8
(OR)

9. a) The pendulum bob has a mass m and is released from rest when $\theta = 0^\circ$ as shown in fig.9 for any position B of the pendulum, determine the tangential component of acceleration a_t and obtain its velocity v by integration method. [6M]

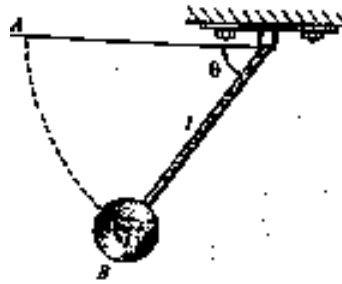


Fig.9

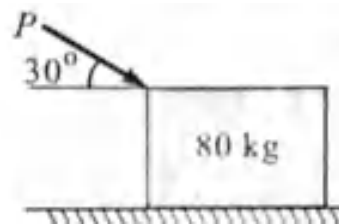


Fig.10

- b) A 80kg block shown in fig.10 Rest on a horizontal plane. Find the magnitude of force P required to give the block an acceleration of 2.5m/s^2 to the right take $\mu_k = 0.25$. [6M]

UNIT- V

10. a) Block A has mass 2kg and has a velocity of 5m/s up the plane as shown in fig.11 use the principal of work energy ; locate the rest position of block. [6M]

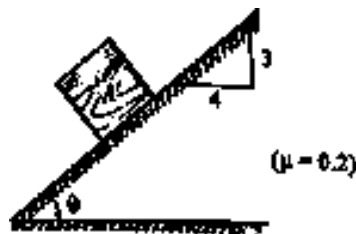


Fig.11

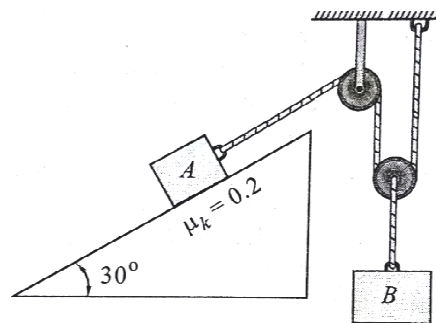


Fig.12

- b) State and prove work energy principle [6M]

(OR)

11. a) Derive the impulse momentum principle. [3M]
- b) Block A of mass 400kg is being pulled up the inclined plane by using another block B of mass 800kg as shown in fig.12. Determine the acceleration of block B and tension in rope pulling the block A. take $\mu_k = 0.2$. Assume ropes are inextensible and pulleys are small, frictional less and massless, [9M]

CODE: 13EE2008**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B. Tech I Semester Supplementary Examinations, Jan / Feb-2016****ELECTRICAL TECHNOLOGY****(Electronics and Communication Engineering)****Time: 3 Hours****Max. Marks: 70****PART – A****Answer all questions****[1X10=10M]**

1. Describe the following
 - a) Significance of the back EMF in DC motors.
 - b) Fleming's Right hand rule.
 - c) Transformer regulation
 - d) No Load primary current in Transformer
 - e) Why single phase Induction motor is not self starting motor.
 - f) Advantages of slip ring IM over squirrel cage IM.
 - g) EMF induced in an Alternator
 - h) Distribution and coil span factors.
 - i) Controlling torque.
 - j) Damping torque.

PART-B**Answer one question from each unit****[5 X12 = 60M]****UNIT-I**

2. Draw a neat sketch of a DC generator and explain the function of each part.
(OR)
3. Why starter is necessary for an operation of dc motor? Also explain the different protective devices used in 3 - point starter.

UNIT-II

4. Describe the operation of a single-phase transformer, explaining clearly the function of the different parts, why are the cores laminated?
(OR)
5. The maximum flux density in the core of 240/2400V, 50Hz, single phase transformer is 1.0Wb/sq.m. If the emf per turn is 8 Volts, determine:
 - i. the primary and secondary turns and
 - ii. Area of the core.

UNIT-III

6. Explain the principle of operation of single phase induction motors
(OR)
7. Compare and contrast between squirrel-cage and slip-ring motors with respect to construction, operation and performance.

UNIT-IV

8. A 4-pole, 50Hz star-connected alternator has a flux per pole of 0.12Wb. It has 4 slots per pole per phase, conductors per slot being 4. If the winding coil span is 150°, find the induced emf.
(OR)
9. Explain the synchronous impedance method of regulation with vector diagram.

UNIT-V

10. What are the basic requirements of indicating instruments? Briefly discuss them.
(OR)
11. Describe the construction and working of PMMC instrument.