

Code: 13CE2006**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, July- 2016****STRENGTH OF MATERIALS-II
(CIVIL ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10M]**

1. a) Differentiate between thin cylinders and thick cylinders.
b) Write assumptions in Lamé's theory.
c) Define principal stresses and principal planes.
d) What is meant by pure Torsion?
e) Determine the crippling load (i) both ends fixed (ii) one end fixed and other end hinged.
f) Define slenderness ratio.
g) Explain stress variation in Thick cylinders.
h) Write Perry's formula.
i) What is Hoop Stress and longitudinal stress?
j) Define strut.

PART-B**Answer one question from each unit****[5 X 12=60M]****UNIT-I**

2. A Cylindrical shell is 3m long and is having 1m internal diameter and 15mm thickness. Calculate the minimum intensity of shear stress induced and also the changes in the dimensions of the shell, if it is subjected to an internal fluid pressure of 1.5 N/mm^2 . Take $E=2 \times 10^5 \text{ N/mm}^2$ and $\mu=0.3$. [12M]

(OR)

3. (a) Derive the equations for Hoop stress and longitudinal stress of thin cylinders. [6M]
(b) A Spherical shell of diameter 600mm and metal thickness 100mm is completely filled with a fluid at atmospheric pressure. Find the maximum pressure that can be permitted if the efficiency of the joint is 75% and the permissible stress is 80 N/mm^2 . [6M]

UNIT-II

4. (a) Derive Lamé's formulae. [6M]
(b) A Pipe of 400mm internal diameter and 100mm thickness contains a fluid at a pressure 80 N/mm^2 . Find the maximum and minimum hoop stress across the section. Also sketch the radial and hoop stress distribution across the section. [6M]

Code: 13CE2006**(OR)**

5. A thick spherical shell of 80mm internal diameter is subjected to an internal fluid pressure of 24 N/mm^2 . If the permissible tensile stress is 120 N/mm^2 . Find the thickness of the shell. [12 M]

UNIT-III

6. (a) Derive normal and tangential stresses for member subjected to tensile principal stresses. [6M]
(b) At a point in a stressed body are principal stresses are 100 N/mm^2 (Tensile) and 60 N/mm^2 (compressive). Determine the normal stress and the shear stress on a plane inclined at 50° to the axis of major principal stress. Also calculate the maximum shear stress at the point. [6M]

(OR)

7. (a) What is Mohr's circle and derive principal stresses, obliquity and radius of Mohr's circle. [6M]
(b) An element in a stressed material has tensile stress of 500 N/mm^2 , and a compressive stress of 350 N/mm^2 acting on two mutually perpendicular planes and equal shear stress of 100 N/mm^2 on these planes. Find principal stresses and position of the principal planes. Find also maximum shearing stress. [6M]

UNIT-IV

8. (a) What are the assumptions made in the theory of pure torsion? [4M]
(b) Derive the relation $T/J = f_s/r = C\theta/l$. [8 M]

(OR)

9. A hollow shaft is transmit 300 KN at 80 r.p.m of the shear stress is not to exceed 60 N/mm^2 and internal diameter is 0.6 of the external diameter. Find the external and internal diameters assuming that the maximum torque is 1.4 times of mean. [12 M]

UNIT-V

10. Derive euler's theory for long column when both ends are fixed and mention the limitations of Euler's Theory. [12 M]

(OR)

11. A Hollow cast iron column whose outside diameter is 200mm and has a thickness of 20mm is 4.5m long and is fixed at both ends. Calculate the safe load by Rankine's formulae using a factor of safety of 2.5. Find the ratio of Euler's to Rankine's loads. Take $E=1 \times 10^5 \text{ N/mm}^2$ and Rankine's constant = $1/1600$ for both ends pinned case and $f_c = 550 \text{ N/mm}^2$. [12 M]

CODE: 13BS2007**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, July- 2016****COMPLEX VARIABLES AND STATISTICAL METHODS
(ELECTRICAL AND ELECTRONICS ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10 M]**

1. a) Define analytic function.
- b) Find the value of k so that $u(x, y) = x^3 - kxy^2$ is harmonic.
- c) Define essential singularity.
- d) Find the poles of $f(z) = \frac{1}{(z-1)^2(z+2)}$
- e) Define critical point of the conformal transformation.
- f) Find the invariant points of the transformation $w = (z - 1) / (z + 1)$.
- g) State multiplication law of probability.
- h) For a normally distributed variate X with mean 30 and S.D. 5, find $P(X \geq 45)$.
- i) Define type-I and type-II errors.
- j) Define population.

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

- 2) a) If $f(z)$ is an analytic function with constant modulus, show that $f(z)$ is constant. **[6M]**
- b) Find the analytic function $f(z)$, whose real part is $\sin 2x / (\cosh 2y - \cos 2x)$. **[6M]**

(OR)

- 3) a) State and prove Cauchy's integral formula. **[6M]**
- b) Evaluate $\int_c \frac{\log z}{(z-1)^3} dz$, where c is $|z-1| = \frac{1}{2}$. **[6M]**

UNIT-II

- 4) a) Evaluate $\int_c \frac{dz}{(z^2 + 4)^2}$, where c is the circle $|z-i| = 2$, using residue theorem. **[6M]**
- b) Evaluate $\int_0^{2\pi} \frac{1}{17 - 8\cos \theta} d\theta$. **[6M]**

(OR)

5) a) Evaluate $\int_c \tan z \, dz$, where c is $|z| = 2$. [6M]

b) Prove that $\int_0^\infty \frac{1}{x^6 + 1} \, dx = \frac{\pi}{3}$. [6M]

UNIT-III

6) a) Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $w = i, 0, -i$. [6M]

b) Determine the region of the w -plane into which the circle $|z - 1| = 2$ is mapped by the transformation $w = z^2$. [6M]

(OR)

7) Discuss the transformation $w = e^z$ and show that it transforms the region between the real axis and a line parallel to real axis at $y = \pi$, into the upper half of the w -plane. [12M]

UNIT-IV

8) a) State and prove Baye's theorem. [6M]

b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution. [6M]

(OR)

9) a) In 256 sets of 12 tosses of a coin, in how many cases one can expect 8 heads and 4 tails.

[6M]

b) In a bolt factory, machines A, B and C manufactures 25%, 35% and 40% of the total. Of their output 5%, 4%, and 2% are defective bolts. A bolt is drawn at random from the product and found defective. What are the probabilities that it was manufactured by machines A, B or C. [6M]

UNIT-V

10) a) The means of simple samples of sizes 1000 and 2000 are 67.5 and 68.0 cm respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5 cm. [6M]

b) A sample of 400 items is taken from a normal population whose mean is 4 and variance 4. If the sample mean is 4.45, can the sample be regarded as from the population given. [6M]

(OR)

11) A random sample of 10 boys has the following I.Q: 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q of 100. [12M]

AR13

CODE: 13ME2008

SET-1

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

II B.Tech II Semester Supplementary Examinations, July- 2016

**FLUID MECHANICS AND HYDRAULIC MACHINERY
(MECHANICAL ENGINEERING)**

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) State and prove Pascal's law.
b) Distinguish between gauge pressure, absolute pressure and vacuum pressure.
c) Define condition for irrotational flow
d) Differentiate between uniform flow and steady flow
e) Write an expression for Euler's equation of motion
f) Define hydraulic gradient line
g) Define cavitation in pumps
h) Write any 2 major differences between impulse and reaction turbines
i) Write about specific quantities
j) What is water hammer

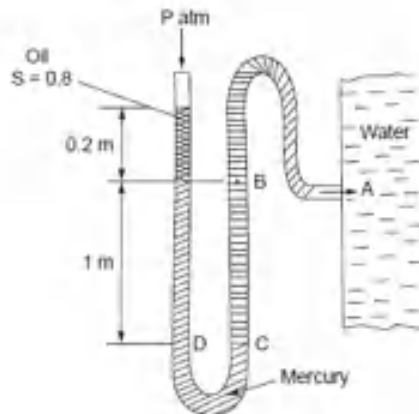
PART-B

Answer one question from each unit

[5x12=60M]

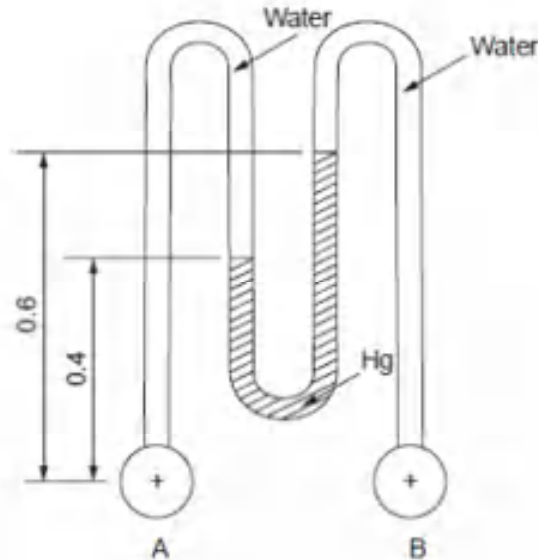
UNIT-I

2. a) Define hydrostatic law **4 M**
b) Determine the pressure at A above the atmosphere for the manometer set up shown **8 M**
in following Figure



(OR)

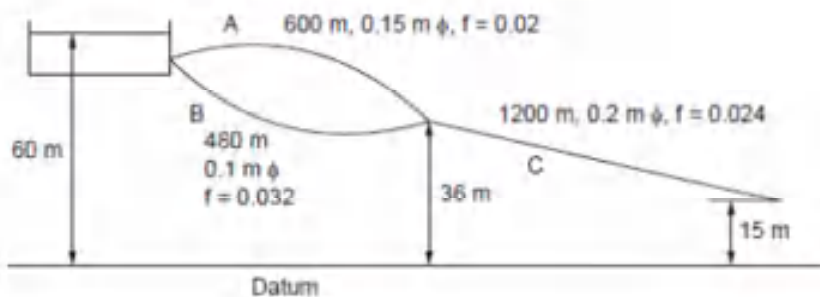
3. a) Write briefly about different types of Pressure measuring devices **6 M**
 b) Determine the pressure difference between A and B for the following manometer **6 M**

**UNIT-II**

4. a) Derive Bernoulli's equation **4 M**
 b) A 45° reducing bend is connected to a pipe line, the diameters at the inlet and outlet of the bend being 40 cm and 20 cm respectively. Find the force exerted by the water on the bend if the intensity of pressure at inlet of the bend is 21.58 N/m^2 and the flow rate of water is $0.5 \text{ m}^3/\text{s}$. **8 M**
- (OR)
5. a) Derive an equation for pressure drop between two parallel stationary plates **6 M**
 b) Check whether the following velocity relations satisfy the requirements for steady irrotational flow. **6 M**
 (i) $u = x + y$, $v = x - y$ (ii) $u = xt^2 + 2y$, $v = x^2 - yt^2$ (iii) $u = xt^2$, $v = xyt + y^2$

UNIT-III

6. Pipe lines as shown in the following figure provide water supply from a reservoir. Determine the flow rates in lines C, A and B. **12 M**



(OR)

7. a) Define minor losses in pipes and write expression for them **6 M**
b) The difference in mercury level of a pitot static tube connected to a submarine is 20 cm. Determine the speed of the submarine. The density of sea water is 1019 kg/m³. Assume $C_v = 0.98$ **6 M**

UNIT-IV

8. a) Draw the velocity diagram and derive an expression for power developed in a pelton wheel **4 M**
b) A Francis turbine runs at 268 rpm. The outer diameter is 1.2 m. The blade angle at inlet is 90°. If the flow rate is 1 kg/s, determine the power developed. If the head is 30 m determine the hydraulic efficiency. If the guide blade outlet angle is 15° and if the flow velocity is constant, determine the runner outlet angle. Whirl at exit is zero. **8 M**

(OR)

9. a) Write briefly about draft tube and write the advantages of using different shapes **6 M**
b) A Pelton turbine delivers 14.25 MW when running at 600 rpm under a head of 900 m. Assuming an overall efficiency of 89.2%. Determine the jet diameter and the wheel diameter. Assume $C_v = 0.98$ and speed ratio as 0.46. **6 M**

UNIT-V

10. a) With the aid of neat sketch describe the working of a centrifugal pump **4 M**
b) The following details refer to a centrifugal pump. Outer diameter : 30 cm. Eye diameter: 15 cm. Blade angle at inlet : 30°. Blade angle at outlet : 25°. Speed 1450 rpm. The flow velocity remains constant. Determine the work done per kg. If the manometric efficiency is 82%, determine the working head. If width at outlet is 2 cm, determine the power $\eta_o = 76\%$. (The whirl at inlet is zero) **8 M**

(OR)

11. a) Write briefly about the effect acceleration head on the indicator diagram of a reciprocating pump **6 M**
b) A single acting reciprocating pump of 200 mm bore and 300 mm stroke runs at 30 rpm. The suction head is 4 m and the delivery head is 15 m. Considering acceleration determine the pressure in the cylinder at the beginning and end of suction and delivery strokes. Take the value of atmospheric pressure as 10.3 m of water head. The length of suction pipe is 8 m and that of delivery pipe is 20 m. The pipe diameters are 120 mm each. **6 M**

AR13

CODE: 13EC2008

SET-1

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

II B.Tech II Semester Supplementary Examinations, July- 2016

**ELECTRONIC CIRCUITS – II
(ELECTRONICS AND COMMUNICATION ENGINEERING)**

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is the need of multistage of amplifier?
b) What are the advantages of two stage RC coupled amplifier?
c) What are the uses of negative feedback amplifier
d) What is the open loop gain of feedback amplifier.
e) How is better amplitude stability achieve in a wein bridge oscillator?
f) What is an oscillator? how does differ from an amplifier.
g) What is second harmonic distortion?
h) How to minimize cross over distortion in power amplifier.
i) Define load regulation in voltage regulator?
j) What is the effect of cascading single tuned amplifiers on bandwidth?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Explain RC coupled amplifier and obtain the expression for bandwidth. 6M
b) Explain the transformer coupled amplifier and obtain the expression for gain. 6M
- (OR)
3. a) Draw the circuit diagram of two stage CE amplifier and obtain the expression for mid band gain. 6M
b) Derive expression for voltage gain (A_v) and output impedance (R_o) for darlington connected emitter follower. 6M

UNIT-II

4. a) What is the relationship between the transfer gain with feedback and without feedback. 6M
b) Describe the method of complete analysis of feedback amplifiers 6M
- (OR)
5. a) Explain qualitatively the effect of the topology of a feedback amplifier upon the output resistance. 7M
b) Explain current shunt feedback amplifier with discrete components and their analysis. 5M

UNIT-III

6. a) Explain two Barkhausen conditions required for sinusoidal oscillations to be sustained. 4M
b) Draw the electrical model of a piezoelectric crystal. Derive the expression for frequency of oscillation and also explain its operation. 8M
- (OR)**
7. a) Derive the expression for the frequency of oscillation and the minimum gain required for sustained oscillations of phase shift oscillator using an JFET. 8M
b) A Colpitts oscillator is designed with $C_1 = 7500\text{pF}$ and $C_2 = 100\text{pF}$. The inductance is variable. determine the range of inductance values, if the oscillator frequency is to vary between 950 and 2050 kHz. 4M

UNIT-IV

8. a) Derive an expression for the efficiency of class B power amplifier. 6M
b) Explain how harmonic distortion is reduced in push pull amplifier. 6M
- (OR)**
9. a) Determine the i/p power(P_i), output power & circuit efficiency of a class B power amplifier providing 22V peak signal to an 80Ω load and power supply of 25V. 6M
b) Explain the salient features and applications of MOSFET based Class D and Class S power amplifiers. 6M

UNIT-V

10. a) What is stagger tuning? Derive the expression for gain and bandwidth. 6M
b) What are the various types of tuned amplifiers? compare their performance with suitable diagrams. 6M
- (OR)**
11. a) Draw and explain the overload protection circuit and its operation. 6M
b) A zener diode shunt regulator circuit is to be designed to maintain a constant load current of 400 mA and voltage of 40V. The input voltage is $90\pm 5\text{ V}$. The zener diode voltage is 40 V and its dynamic resistance is 2.5Ω . Find the following quantities for the regulator. i) The series dropping resistance. ii) Zener power dissipation. 6M

Code: 13CS2006**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, July- 2016****OBJECT ORIENTED PROGRAMMING
(COMMON TO CSE & IT)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10M]**

1.
 - a) Why Java is architecture neutral?
 - b) What is an Object?
 - c) What is type casting?
 - d) What is an interface?
 - e) Write the use of polymorphism?
 - f) List various access modifiers
 - g) Write about Final Key word?
 - h) Define Inheritance?
 - i) Specify the need of exception handling
 - j) Write the difference between Applet and Application.

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

2.
 - a) Explain about Object Oriented Principles [8M]
 - b) Explain about various Bitwise operators [4M]
- (OR)
3. Explain various control statements available in Java with examples [12M]

UNIT-II

4. What is the difference between method overriding and method overloading? Explain with example. [12M]
- (OR)
5.
 - a) Explain creating and accessing class members using object with an example. [8M]
 - b) Explain the difference between an object and a class? [4M]

UNIT-III

6. How to create and import a package? Explain with an example. [12M]
- (OR)
7.
 - a) Why should you use the keyword *super* in your java program? Explain with example [8M]
 - b) Is it possible to partially implement an interface? Justify your answer with example. [4M]

UNIT-IV

8. Write a java program to implement the following exception class. i) Arithmetic Exception [12M]
ii) Number Format Exception
iii) Array Index Out of Bounds Exception

(OR)

9. What is a Thread? Explain about Thread Life Cycle with Suitable example [12M]

UNIT-V

10. a) What is Applet? Explain about Applet Life Cycle. [6M]
b) Explain how to pass parameters to the Applet. [6M]

(OR)

11. a) Write and Explain about AWT Controls. [6M]
b) Write a java program for creating tables using swings. [6M]