

FACULTY OF ENGINEERING

B.E. (Civil) IV-Semester (AICTE) (Main) Examination, December 2020

Subject : Mechanics of Materials and Structures

Time : 2 hours

Max. Marks:70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 Explain the concept of double integration method to obtain deflections in beam.
- 2 State the theorems of conjugate beam method in finding deflections in beams.
- 3 Explain the buckling or crippling phenomenon in a column.
- 4 What is equivalent length of a column? Explain its significance.
- 5 A cantilever of length L is propped at the free end and it carries a uniformly distributed load of ' W ' per meter length. Find the reaction of the prop.
- 6 Draw the bending moment diagram for a fixed beam of length L and carrying a point load W at its mid-span. Assume constant EI throughout the cross section.
- 7 State & explain Unit Load method.
- 8 State the Maxwell's theorem of reciprocal deflections. Explain with illustrations.
- 9 Define an arch how does it differ from a beam.
- 10 What is a cable? How is it used in structural applications?

PART – B

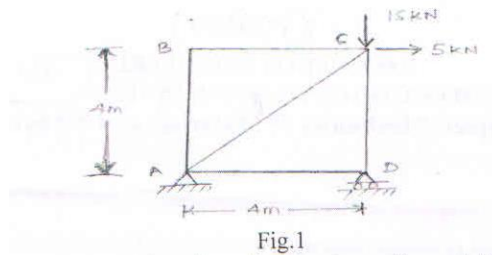
Answer any four questions.

(4 x 15 = 60 Marks)

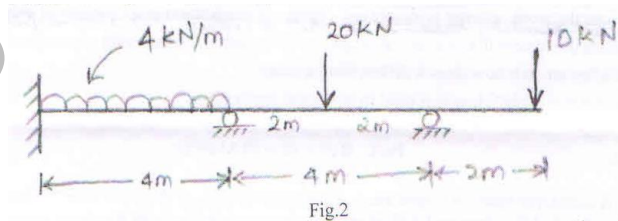
- 11 A cantilever beam of length 8m is subjected to a UDL of 20 kN/m over the entire span. Find the slope and deflection of the beam at 4m from the fixed end and at the free end.
- 12 A solid circular steel bar 5m long and 6cm in diameter is used as a column with both ends hinged. Determine the buckling load for the bar. Also find the safe load on the column, if the factor of safety taken as 4.0. Take $E=200$ GPa.

.....2

- 13 A propped cantilever of span 10m carries a u.d.l of 20kN/m over a length of 5m starting from the fixed end. Construct the shear force and bending moment diagrams for the beam.
- 14 a) Calculate the strain energy stored in a simply supported beam 5m long and carrying a u.d.l of 30kN/m over its entire length.
- b) Determine the vertical displacement of joint B in the pin-jointed plane frame as shown in the figure (Fig.1) using Castigliano's second theorem. Take $E=200$ GPa and cross section of all members of the truss= 250mm^2 .



- 15 The span and rise of a three hinged parabolic arch are 40m and 10m respectively. The equation of the arch is $y = x - (x^2/40)$, where the origin is at the left abutment, x-axis directed towards right and y-axis upwards. A u.d.l of 15kN/m is applied on the left half of the arch. Find the reactions at the abutments. Draw the bending moment diagram. Determine the locations of maximum bending moments.
- 16 Construct the shear force diagram and bending moment diagram of the continuous beam shown in figure (Fig.2). Analyse using Clapeyron's three moment theorem.



- 17 A suspension cable has a span of 250 m and its central dip is 25 m. it is subjected to UDL of 3 kN per metre horizontally. Determine the maximum and minimum tensions in the cable. Calculate the horizontal and vertical forces in each tower assuming the cable passes over frictionless rollers on the top of tower. The anchor cable also called the back stay is inclined at 30° to the vertical.

FACULTY OF ENGINEERING

B. E. IV – Semester (AICTE) (EEE) (Main) Examination, December 2020

Subject: Electrical Machines - I

Time: 2 hours

Max. Marks: 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

1. Explain Faradays law and Lenz's law.
2. Define MMF, inductance.
3. Explain about linear commutation.
4. A 4 pole 1200 rpm generator with lap winding armature has 65 slots and 12 conductors per slot and flux per pole is 0.02 webers. Calculate the emf induced in the armature.
5. Define critical field resistance of a self excited DC machine.
6. Explain how voltage is build up in DC shunt generator.
7. What are the limitations of Field's test?
8. Define efficiency of dc machine and give its losses.
9. Will the transformer draw any current from the source when secondary is open?
Draw the phasor diagram for actual transformer on no-load?
10. Give merits & demerits of star-star connections.

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

11. (a) Obtain the expression for force as a partial derivative of stored energy with respect to position of a moving element.
(b) Define Magnetic flux, flux density. Summarize the properties of magnetic materials.
12. (a) Briefly explain different methods to improve commutation in DC generators.
(b) Derive the output equation of a DC machine. Mention on what factors the length of air gap in DC machine depends.
13. (a) Explain with relevant diagrams, the different methods of excitation of DC machines.
(b) Explain open circuit characteristics of Dc generator and also explain how to find Critical field resistance-critical speed of DC generator.

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Code No. 2924/AICTE

14. (a) Explain torque-speed characteristics of DC shunt, series and compound motors.
- (b) Explain the Swinburne's test to determine no-load losses of DC machine. What are the limitations of this test?
15. (a) Explain principle of operation of DC motor and write the significance of back EMF in DC motors.
- (b) A 6-pole DC motor has a wave connected armature with 87 slots, each slot containing 6 conductors. The flux per pole is 20 m.wb and the armature has a resistance of 0.13 ohm when the motor is connected to 240V supply and the armature draws a current of 80A driving a load of 15KW. Calculate (i) Speed (ii) Armature Torque and (iii) Shaft Torque.
16. (a) What is Scott connection? Explain in detail.
- (b) The OC and SC test data of 4kVA, 200/400V, single phase transformer when supplying full load at 0.8 lagging p.f is given below:
- OC test: 200V, 0.8A, 70W (HV open circuit)
- SC test: 20V, 10A, 60W (LV short circuit)
- Calculate efficiency at (a) full load, (b) $\frac{1}{2}$ Full load and (c) voltage regulation at Full Load.
17. Write short notes on the following:
- (a) Autotransformer.
- (b) Parallel operation of single phase transformers.

FACULTY OF ENGINEERING
B.E. IV – Semester (AICTE)(Inst.) (Main) Examination December 2020

Subject : Transducers Engineering

Time : 2 hours

Max. Marks : 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

1. What is meant by an active and passive transducer? Give examples.
2. Define Repeatability and Reliability.
3. Discuss an application of strain gauge.
4. For measuring minute displacement, which type of transducer is preferred and why?
5. List out the various differences between LVDT & RVDT.
6. What are the different types of temperature measuring devices?
7. What do you mean by transduction element. Explain with examples.
8. Mention various non-electrical type of measurements?
9. List out the various requirements of transducers?
10. How is humidity measured using resistive principle?

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

11. Derive and compare the step and impulse response of zero and first order systems with relevant figures.
12. Define Gauge factor. Obtain the expression for the gauge factor of a strain gauge.
13. a) With relevant figure, explain the working principle of capacitive proximity transducer?
b) Discuss the principle of operation of LVDT as a displacement transducer
14. a) State law of thermocouples.
b) Briefly, explain the operational principle of RTB and also mention the characteristics of material used for its construction.
15. Describe in detail the construction & operating principle of the potentiometer for measuring devices with examples?
16. a) List out the basic requirements of transducer in detail.
b) Explain the various static characteristics of measuring system.
17. Write short notes on;
a) pyrometers
b) Capacitive hygrometer
c) Ionization gauge

Code No: 2933/AICTE

FACULTY OF ENGINEERING

B.E. IV - Semester (AICTE) (ECE) (Main) Examination, December 2020

Subject : Analog Electronics Circuits

Time: 2 Hours

Max. Marks: 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

1. Draw the high frequency equivalent circuit of BJT. Define all the parameters.
2. Differentiate the different coupling techniques used in cascading amplifiers.
3. What is the effect of negative feedback on bandwidth and stability?
4. An amplifier has an open loop voltage gain of 300, distortion of 30 before negative feedback is applied. Determine its voltage gain and distortion if 5% of negative feedback is introduced.
5. Explain what factors decide the frequency stability of an oscillator?
6. Draw the equivalent circuit of crystal and write the relation between its series & parallel resonant frequency.
7. For a power amplifier $D_2=0.2$, $D_3=0.05$, $D_4=0.02$, $I_1=3A$, $R_L=50\Omega$, find distortion, fundamental component of power, total output power.
8. Explain why the power transistors are provided with heat sinks.
9. Discuss the effect of Q on Band width of tuned Amplifier.
10. What is neutralization? Draw any one circuit to achieve neutralization.

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

11. Draw the circuit of transformer coupled amplifier & derive expression for its gain at low, mid & high frequencies. Also discuss about its Frequency response.
12. For a single stage voltage shunt feedback amplifier $R_c=4K\Omega$, $R_f=40K\Omega$, $R_s=10K\Omega$, and $h_{fe}=50$, $h_{ie}=1.1K\Omega$, $h_{re}=h_{oe}=0$ calculate A_f , R_{if} and R_{of} .
13. (a) Draw the circuit diagram of Colpitts Oscillator & explain its working. Derive expression for frequency & condition for oscillations.
(b) What are the limitations of zener voltage regulator?
14. (a) Prove that the efficiency of transformer coupled class-A Power Amplifier is 50%
(b) Briefly explain the operation of Class-D Power amplifier and mention its applications.
15. What is single tuned amplifier? Derive expression for gain at resonance & BW for single tuned RF voltage amplifier.
16. (a) Explain Complementary Symmetry push pull amplifier with neat circuit diagram and derive the expression for its efficiency.
(b) For a class B amplifier providing 20 V peak signal to 16Ω load and power supply $V_{cc}=30V$ find input power, output power and circuit efficiency.
17. Write short notes on the following.
(a) Transistorized Shunt regulators
(b) Staggered Tuned Amplifiers

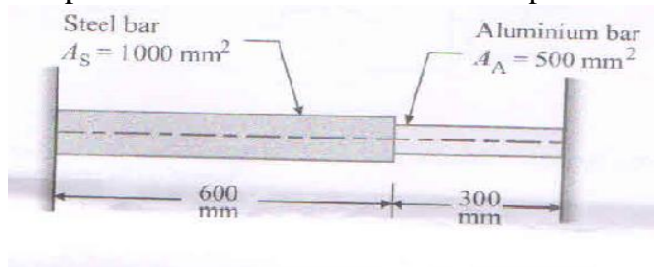
FACULTY OF ENGINEERING**B.E. IV – Semester (AICTE)(M/P/AE)(Main) Examination, December 2020****Subject: Mechanics of Materials****Time: 2 hours****Max. Marks: 70***Note: (Missing data if, any can be assumed suitable).***PART – A****Answer any five questions.****(5 x 2 = 10 Marks)**

1. Distinguish between longitudinal and lateral Stains.
2. Define Proof Resilience and Modulus of Resilience.
3. Differentiate between a cantilever and a simply supported beam with neat diagram.
4. Explain circumferential stress and longitudinal stress.
5. Explain the parameters involved in bending equation.
6. Sketch the distribution of shear stress for Rectangular Section.
7. A Solid Shaft of 150mm diameter is used to transmit torque. Solve for the maximum torque transmitted by the shaft if the maximum shear stress induced in the shaft is 45 N/mm².
8. Define helical spring? Name the two important types of helical spring.
9. Define slope and deflection.
10. List the methods used for determining slope and deflection at a section in loaded beam.

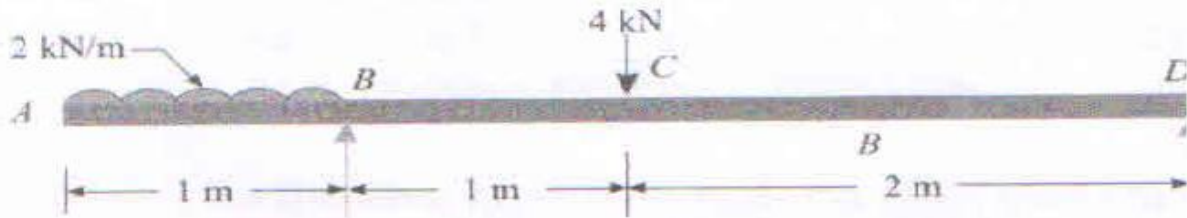
PART – B**Answer any four questions.****(4 x 15 = 60 Marks)**

11. A composite bar made up of aluminum and steel, is held between two supports as shown in below figure. The bars are stress-free at a temperature of 38°C, Solve for the stresses in the two bars, When the temperature is 21°C, if

(a) the supports are unyielding, b) the supports come nearer to each other by 0.1mm? it can be assumed that the change of temperature is uniform all along the length of the bar. Take E for steel as 200GPa; E for aluminum as 75 GPa and coefficient of expansion for steel as 11.7×10^{-6} per °C and Coefficient of thermal expansion for aluminum as 23.4×10^{-6} per °C.



12. Sketch shear force and Bending Moment diagrams for the loaded beam as shown in below figure. And also locate the point of contraflexure.



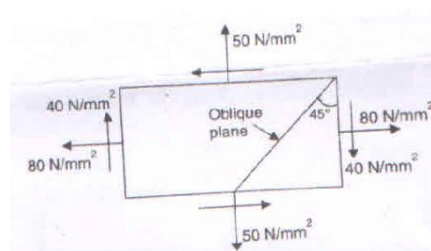
13. A timber beam of rectangular section of length 8m is simply supported. The beam carries a U.D.L of 12kN/m run over the entire length and a point load of 10 kN at 3m from left support. If the depth is two times the width and the stress in the timber is not to exceed 8 N/mm², Solve for the suitable dimensions of the section.

14. A solid cylindrical shaft is to transmit 300kW power at 100r.p.m if the shear stress is not to exceed 80 N/mm², find its diameter. Solve for percent saving in weight would be obtained if this shaft is replaced by a hollow one whose internal diameter equals to 0.6 of the external diameter, the length, the material and maximum shear stress being the same?

15. Derive the formula for deflection at the centre of a simply supported beam carrying a point load at the centre.

16. Derive stress and deflection equations of an open coiled Helical spring.

- 17.a) A point in a strained material is subjected to stresses as shown in below figure. Using Mohr's circle method, Relate the normal, tangential and resultant stresses across the oblique plane.



- b) Solve for the power transmitted by a 75mm diameter shaft at 140 rpm at a maximum shear stress of 60 N/mm².

FACULTY OF ENGINEERING
B.E. (CSE)(AICTE) IV-Semester (Main) Examination, December 2020

Subject : OOP Using JAVA

Time : 2 Hours

Max. Marks: 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

1. What is the purpose of a constructor?
2. Compare String with String Buffer.
3. Write the two uses of super keyword in java.
4. What is the use of inheritance?
5. Write a program to create a user defined exception.
6. What is thread? Give an example.
7. What is the use of wrapper class?
8. What is Enum? Give an example.
9. Write the limitations of AWT.
10. Give the significance of the keyword this in the below statement.
addMouseListener(this).

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

11. (a) Demonstrate the 2-D array with an example program.
(b) Give reasons why a string object is immutable. Differentiate between String, String Buffer and String Builder class.
12. (a) Explain about the various forms of interface implementation.
(b) Explain about method overriding with an example.
13. (a) Differentiate between Multithreading and Multitasking.
(b) Explain about exception hierarchy with an example.
14. (a) Explain about the wrapper class in detail.
(b) Explain about Internationalization.
15. (a) Explain about mouse and keyboard events.
(b) Write a Java program to handle Key Events in a JFrame.
16. (a) Write a simple Java program to throw an exception when the minimum balance in the account is less than 2000.
(b) Write a simple java program to read contents from one file and write to another using Character stream classes.
17. (a) Explain the hierarchy of Byte and Character stream classes and interfaces.
(b) Explain about java.util package.

FACULTY OF ENGINEERING

B.E. (I.T) (AICTE) IV – Semester (Main) Examination, December 2020

Subject: Java Programming

Time: 2 Hours

Max.Marks: 70

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions.

(5 x 2 = 10 Marks)

- 1 What is Inner Class?
- 2 Write difference between throw and throws in exception handling.
- 3 Write Enumeration Interface.
- 4 Define Applet. Write about its usage.
- 5 Sketch Servlet Life Cycle.
- 6 What are different types of inheritance? Give example of any one.
- 7 What is Synchronization in Multi-threading?
- 8 What is the difference between List and Set Interface?
- 9 Write about Adapter Classes.
- 10 What is Swing and write about JComboBox.

PART – B

Answer any four questions.

(4 x 15 = 60 Marks)

- 11 a) Why is Java, strongly types language. Justify.
b) Write about constructor and constructor overloading with example programs.
- 12 a) What is Runnable Interface? How can you use this to create thread?
b) Write about Alive () and join () with example programs.
- 13 a) Write in detail about Collection framework?
b) Write a program to cycle through contents of array list collection using iterator.
- 14 Illustrate about Delegation Event Model and write a program to demonstrate keyboard Event Handling.
- 15 Write about JDBC, JDBC Drivers and Architecture with an example.
- 16 What are Legacy collection classes and Interfaces? Write in detail about Vector class with example program?
- 17 Write about:
 - a) Dynamic method dispatch
 - b) Thread priorities
 - c) MVC Architecture.