Code No. D-3014/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (CIVIL) I - Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Strength of Materials - I

Time: 3 Hours **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions. **(25 Marks)**

1 Define lateral and longitudinal strain.
2 Mention assumptions made in torsion equation.
3 Explain flitched beam.
4 Sketch the bending stress and shear stress distributions for a rectangular.
5 Explain with an example the meaning of point of contra flexure.
6 What is the core of hollow circular section of external and internal diameter 'D' and 'd' respectively?
7 Draw stress strain curve for mild steel.
8 Define equivalent BM and equivalent torque.
9 A bar of circular cross section is fixed at one end and free at the other end. What is the ratio of deformation due to an axial tensile force at the free end and due its own weight?
10 What are compound cylinders?

PART – B

Note: Answer any five questions. **(5 x 10 = 50 Marks)**

11 A gun metal rod 20 mm diameter, screwed at the ends, passes through a steel tube 25 mm and 30 mm internal and external diameters respectively. The nuts on the rod are screwed tightly home on the ends of the tube. Find the intensity of stress in each metal, when the common temperature rises by 20˚ C. Take Young's modulus of elasticity for steel and gun metal as 200 GPa and 100 GPa respectively. Take the coefficient of expansion for steel and gun metal as 6×10^{-6} and 10×10^{-6}/°C.

12 Construct S.F. and B.M. diagrams for the simply supported beam as shown in the Figure 1.

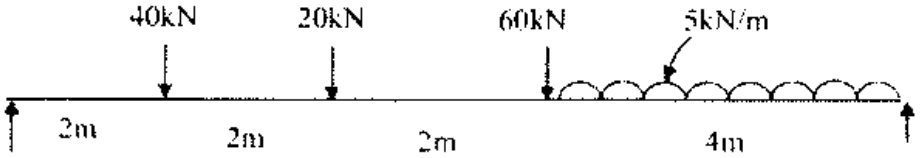

Figure 1

13 The cross section of a beam is a T-section having flange 120mm x 10mm and web 10mm x 150mm. Calculate the shearing stresses induced in the beam section due to a shear force of 90kN. Also sketch the shear stress distribution across the section of beam.

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14 Derive the flexure equation and state the various assumptions made in it.

15 A point in a strained material are subjected to stresses of 100 N/mm^2 (tensile) and 40 N/mm^2 (compressive) in two mutually perpendicular directions and accompanied by a simple shear stress of 20 N/mm^2. Calculate principal stresses and position of principal planes. Also, calculate the normal and tangential stresses on a plane making 300 with the axis of compressive stress.

16 A compound cylinder is made by shrinking a tube of 160 mm internal diameter and 20 mm thick over another tube of 160 mm external diameter and 20 mm thick. The radial pressure at the common surface, after shrinking is 8 MPa. Find the final stresses set up across the section, when the compound cylinder is subjected to an internal fluid pressure of 60 MPa. Sketch the variation of stresses.

17 (a) Briefly explain the essense of any two theories of failure.
(b) A solid shaft of 120 mm dia. transmits 200 kW power running at 100 rpm. If the angle of twist is not to exceed 2°, find the length of shaft taking its modulus of rigidity as 90 GPa.

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Code No: D-3019/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (EEE) I – Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Principles of Mechanical Engineering

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

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**. **(25 Marks)**

1. Define reversible and irreversible processes.
2. Give the modes of heat transfer with example each
3. Define COP in refrigeration
4. Give the advantages of petrol engine
5. List out types of compressors
6. Define zeroth law of the modyranicy
7. Which gears are used for low speed applications?
8. Define slip and creep in belt drives
9. Write down the hagen s formula
10. Write the importance of characteristic curves.

PART – B

Note: **Answer any five questions**. **(5 x 10 = 50 Marks)**

11 a) Explain the working of 4 stroke petrol engine with a neat sketch and draw the P-V Diagrams for the same.
   b) With a neat sketch explain the working of brayton cycle in gas turbine.

12 a) Derive the one dimensional steady state conduction equation heat transfer through plane wall without heat generation.
   b) Derive the expression of LMTD in parallel flow heat exchangers.

13 With a neat sketch explain the working principle of the following
   a) Reciprocating pump
   b) Centrifugal pump

14 a) Describe the working of a epi cyclic gear train with neat sketch and give its applications.
   b) Derive the expression for the length of open belt drive

15 a) Describe the working of venture meter and orifice meter with neat sketch.
   b) Give the significance of Reynolds number

16 a) Explain the working principle of pelton wheel hydraulic turbine
   b) Explain the unit quantities of hydraulic rurbines.

17 Write short notes on the following:
   a) Modes of wheat transfer
   b) Use of steam tables
   c) Critical radius of insulation

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Code No. D-3021/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (EIE) I Semester (NON-CBCS) (Backlog) Examination,
March / April 2022

Subject: Elements of Production Techniques

Time: 3 Hours **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**. **(25 Marks)**

1 Write the functions of pattern in casting process.
2 Explain the importance in welding.
3 What are the applications of gas welding?
4 State the concepts of FMS.
5 Write different operations carried out in lathe machine.
6 Differentiate between LBM and EBM.
7 What are the applications of Abrasive Jet machines?
8 Write about power metallurgy processes.
9 Define extrusion processes.
10 Write the concept of deep drawing.

PART – B

Note: **Answer any five questions**. **(5 x 10 = 50 Marks)**

11 (a) Sketch and explain the sand casting process.
(b) Explain the criteria for selection of process for manufacturing a product.

12 (a) State and explain gas welding process.
(b) Distinguish between welding and brazing.

13 (a) Explain the working of milling machine with neat sketch.
(b) Differentiate between NC, CNC and DNC.

14 (a) Sketch and explain EDM with neat diagram.
(b) List out the advantages and disadvantages and applications of USM.

15 (a) Define forging. What are the advantages of the forging metals?
(b) What is Extrusion? Explain different processes with neat sketches.

16 (a) What is the use of filler material in welding and its importance?
(b) Write the applications of casting.

17 Write short note on the following:
(a) Deep drawing
(b) Resistance welding.

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Code No.D-3027/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (ECE) I - Semester (NON-CBCS) (Backlog) Examination,

March / April 2022

Subject: Elements of Mechanical Engineering

Time: 3 Hours **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**. **(25 Marks)**

1 State Zeorth law of thermodynamics. What is its significance?
2 Distinguish between S.I and C.I engine.
3 Explain Newton's Law of cooling.
4 Write classification of heat exchangers
5 Write a note on eco-friendly refrigerants.
6 Define COP of a Refrigerator. And what are the units of refrigeration.
7 List the different parts of Lathe machine
8 What are the different types of patterns used in casting?
9 Differentiate between machine and mechanism
10 Define slip and creep of a belt?

PART – B

Note: **Answer any five questions**. **(5 x 10 = 50 Marks)**

11 a) Write classification of air compressors.
b) With neat sketches explain working of four stroke diesel engine.

12 a) Explain Fourier's Law.
b) Water is heated in a double pipe heat exchanger from 50^0C to 220^0C by hot gases that cools from 450^0C to 150^0C. Determine the LMTD. Show the variation of temperature along the length of heat exchanger and name the heat exchanger.

13 a) Explain with neat sketch explain the working of VCR system?
b) List the properties of good refrigerant and explain any three

14 a) Differentiate between welding, brazing and soldering?
b) Explain rod/wire drawing process.

15 a) Derive an expression for length of open belt drive.
b) Explain with neat sketch compound and reverted gear train.

16 a) Derive an expression for LMTD of parallel flow heat exchanger
b) Apply steady flow energy equation to
i) nozzle ii) turbine iii) boiler iv) Compressor

17 Write short notes on the following
a) Clausius inequality
b) Types of flames used in gas welding
c) Condition for maximum power transmission of flat belt.
d) Epi-cycle gear train.

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Code No.D-3031/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (MECH/PROD/AE) I - Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Managerial Economics and Accountancy

Time: 3 Hours **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**. **(25 Marks)**

1. Define opportunity cost principle.
2. Explain Incremental Cost principle.
3. What is demand?
4. Discuss imperfect market.
5. Risk and uncertainty are related. Justify how?
6. List out two techniques of demand forecasting
7. Explain explicit cost and implicit cost.
8. Tell about petty cash book?
9. Write about the rules of accounting.
10. State different types of discounted cash flow methods.

PART – B

Note: **Answer any five questions**. **(5 x 10 = 50 Marks)**

11. What is managerial economics? How it is useful to engineers?

12. What are the techniques to forecast the demand in a business organization?

13. What is capital management? Write about its significance.

14. a) Describe the conventions of accounts.
    b) Write journal entries for the following transactions.

1-2-2018	Vijay commenced business with capital Rs. 60,000
2-2-2018	Cash Withdrawn from Bank Rs. 10,000
3-2-2018	Purchased goods from Rakesh Rs. 5,000
4-2-2018	Sold goods for cash Rs. 2,000.

15. a) What are the managerial uses of Break-even analysis?
    b) Find out the Break-even point and sales value to earn a profit of Rs.60,000. Selling Price per unit Rs.15 variable price per unit Rs.10 Fixed cost Rs.1,50,000/-.

16. Examine following two projects proposals and evaluate them based on
    a) pay backperiod b) ARR.

Year	1	2	3	4
Machine-1	10,00,000	5,00,000	5,00,000	2,00,000
Machine-2	10,00,000	6,00,000	2,00,000	2,00,000

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17. From the following balances of Gupta, prepare the Trading and Profit and loss A/c as on 31.0.2004.

Particulars	Amount (Rs.)
Opening Stock	20,000
Salaries	25,000
General expenses	2,000
Rent and Taxes	3,000
Purchases	90,000
Freight Inward	2,500
Advertising	1,500
Sales	1,85,000
Discount allowed	1,800
Discount received	1,000

Adjustments:
1. Closing stock Rs.18,000

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Code No. D-3038/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (CSE) I - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022

Subject: Basic Electronics

Time: 3 Hours **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**. **(25 Marks)**

1. What is the purpose of filter?
2. A transistor has α = 0.98. If the emitter current of the transistor is 1mA. Find base current and β.
3. Why transistor cannot be replaced by back to back diode connection?
4. Explain simple inverter circuit.
5. Define negative feedback and mention its applications.
6. What is meant by Barkhausen criteria?
7. Draw symbol and give truth table for NAND & NOR gates.
8. What is thermocouple and how does it work?
9. Draw integrator circuit.
10. Draw the symbols of LED, SCR & UJT.

PART – B

Note: **Answer any five questions**. **(5 x 10 = 50 Marks)**

11. a) Draw the circuit diagram of centre tapped full wave rectifier and explain its working. Also define and derive the expression for (i) ripple factor (ii) conversion efficiency (iii) TUF (iv) regulation.
    b) Define Hall effect and mention its applications.

12. Explain in detail the input and output characteristics of CE, CB & CC configuration.

13. a) Explain in detail about LC type Oscilltor.
    b) What is the frequency of RC Phase shift Oscillator using BJT.

14. Explain the working & applications of Op-Amp with its proper equations.

15. a) Explain the working of UJT with its characteristics.
    b) Explain the working of CRO with neat diagram.

16. a) The reverse saturation current of silicon PN junction diode is 15 μA. calculate the diode current for the forward bias voltage of 0.55 volts at 25^0C.
    b) Draw the complete logic diagram of half adder using universal gate and with the help of truth table.

17. a) Draw h parameter equivalent circuit of CE configuration. Determine h parameters from VI Characteristics.
    b) How Avalanche and Zener breakdown occur in PN junction diode. Explain in detail.

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Code No. D-3043/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (IT) I - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022

Subject: Data Structure

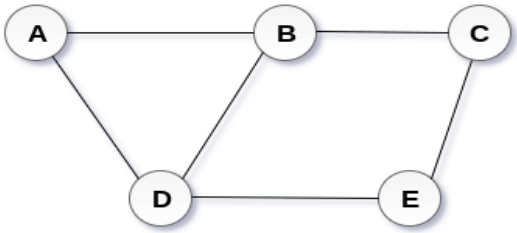
Time: 3 Hours **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**. **(25 Marks)**

1. Define the terms Space and Time complexity.
2. What is a Sparse Matrix? Explain the sparse matrix representation.
3. Define Abstract data type. Write ADT for Stack.
4. Convert (a+b*(c/d)-e) to prefix and postfix expressions.
5. Explain differences between linear and linked representation of a stack.
6. What is the advantage of Hashing over arrays?
7. Write BFS and DFS for the given graph.



8. What are m-way search trees?
9. Explain the Representation of Graphs with example.
10. What is a thread in threaded binary tree?

PART – B

Note: **Answer any five questions**. **(5 x 10 = 50 Marks)**

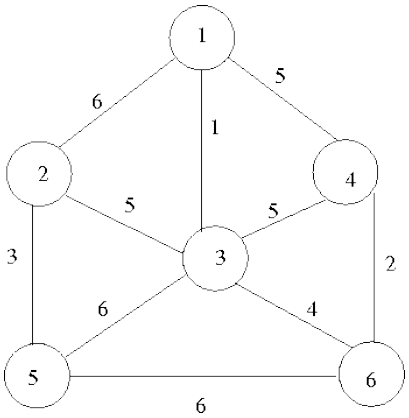
11. (a) Explain Various Asymptotic Notations with examples.
    (b) Write a C++ program for the implementation of Array ADT.

12. (a) Write a function to evaluate postfix expression.
    (b) Evaluate the postfix expression 231*+9- step by step using stack.

13. (a) Explain about Linked queue and its operations.
    (b) Explain about static hashing and Hash Functions.

14. (a) Construct a binary search tree for the given numbers
    12, 45, 65, 89, 30, 25, 10, 32, 55.
    Write inorder, preorder and postorder for the same.
    (b) Explain the rotations used in AVL Trees

15. (a) What is Red black tree? Write its properties.
    (b) What is Minimum cost spanning tree. Use Kruskal's Algorithm to find minimum cost spanning tree for the following graph.



16. (a) What is Max Heap? Construct a max heap with the given numbers 1, 3, 5, 4, 6, 13, 10, 9, 8, 15,17.
    (b) Write C++ function for quick sort.
    Trace the algorithm for the elements 32, 65, 92, 24, 48, 81, 13, 55

17. Write short notes on
    (a) Templates in C++
    (b) Splay trees
    (c) Polynomial representation

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