FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I-Semester (Main) Examination, Nov. / Dec. 2016

Subject : Strength of Materials – I

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Define Bulk modulus and volumetric strain.   3
2 The young's modulus of material is 100 GPa and shear modulus in 40GPa. Find its
   Poisson's ratio.   2
3 Find the maximum bending moment of a simply supported bean of span 6m
   subjected to a point load of 15 KN at 2m from left support.   2
4 State any two assumptions of the theory of Simple Bending.   2
5 Derive formula for the section modulus of a circular section of diameter 'd'.   2
6 Differentiate between 'Flexural Rigidity' and 'Torsional Rigidity''.   3
7 Define core of a section. Sketch the core of a rectangular section.   3
8 A thin cylinder of internal diameter 800mm and 1m long is subjected to an internal
   pressure of 4N/mm^2. Calculate the change in diameter if E = 2 x 10^5 N/mm^2 and
   1/m = 0.3.   3
9 What is meant by Bow's notation?   2
10 Obtain expression for hoop stress in a thin spherical shell due to internal pressure.   3

PART – B (5 x 10 = 50 Marks)

11 A steel tube of 30mm external diameter and 20mm internal diameter encloses a
   copper rod of 15mm diameter which is rigidly connected to the tube at ends. If the
   composite bar is free of stresses at 50^{0}C, calculate the stresses in the rod and tube,
   when the temperature is raised to 150^{0}C. Take E$_s$ = 2 x 10^5 N/mm^2, E$_c$ = 1 x 10^5
   N/mm^2, α_s = 12 x 10^{-6} / ^{0}c and α_c = 18 x 10^{-6} / ^{0}c.

12 Draw shear force and bending moment diagrams for the simply supported bean
   shown in fig1.

fig1.
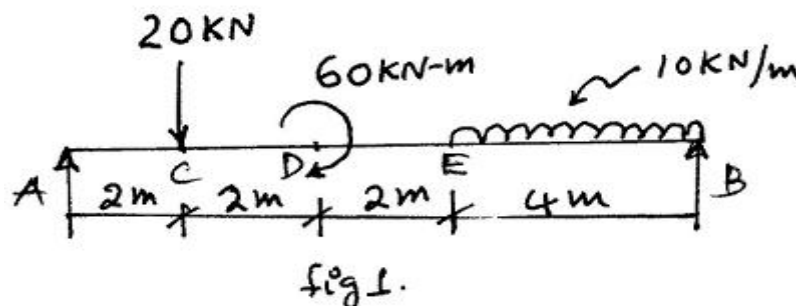
13 Sketch the shear stress distribution across the T-section whose flange is 80 mm x 10 mm and web 120 mm x 10 mm, subjected to a shear force of 150 kN.

14 A thick cylinder of internal diameter 200mm is required to with stand a pressure of 40 N/mm^2. Calculate the required thickness of the cylindrical shell, if the permissible hoop stress in the section is 150 N/mm^2. Sketch the radial pressure and hoop stress distribution across the section.

15 Find the diameter of a solid circular shaft which has to transmit 80 kW at 150 r.p.m, if the maximum torque exceeds the mean by 30% for a permissible shear stress of 60 N/mm^2. Also, find the angle of twist for a length of 2m. Take C = 80 GPa.

16 A point in a strained material is subjected to stresses of 90 N/mm^2 (tensile) and 30 N/mm^2 (Compression) in two mutually perpendicular directions and accompanied by a simple shear stress of 10 N/mm^2. Calculate principal stresses and position of principal planes. Also, calculate the normal and tangential stresses on a plane making 30^0 with the axis of compressive stress.

17 Find the forces in all the members of truss shown in fig.2.

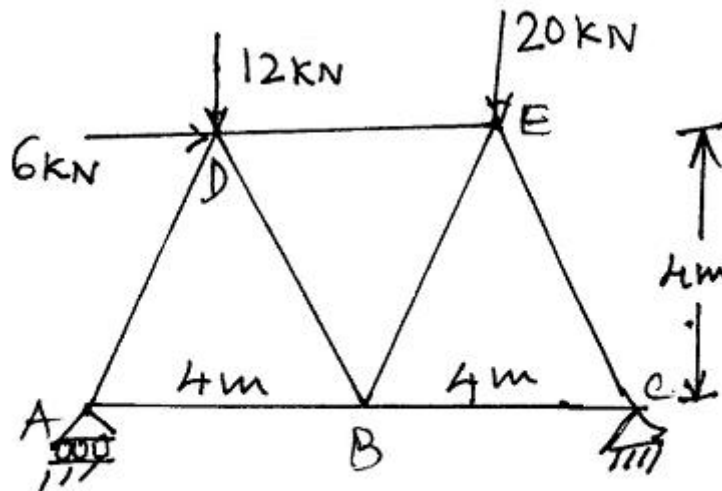fig 2.

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FACULTY OF ENGINEERING

B.E. 2/4 (EEE) I - Semester (Main) Examination, November / December 2016

Subject : Principles of Mechanical Engineering

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 What is meant by steady state conduction?
2 Why reversible process is also known as quasi-static process?
3 Define Parallel flow Heat Exchanger.
4 Define Psychrometric process.
5 Why carburetors are not needed in Diesel engine?
6 How an Air conditioner is specified?
7 Define LMTD.
8 How load characteristics of an IC Engines are depicted?
9 What parameters are required to compute the length of Belt?
10 Define Draft Tube and its applications.

PART – B (50 Marks)

11 A Reactor's wall 320 mm thick. Is made up of an inner layer of the brick (k=0.84 w/m^{o}c) covered with a layer of insulation (k=0.16w/m^{o}c). The Reactor operates at a temperature of 1325°c and the ambient temperature is 25°c.
    (a) Determine the thickness of fire brick and insulation which gives minimum heat loss.
    (b) Calculate the heat loss, presuming that a insulating material has a Maximum temperature of 1200°c.

12 (a) Briefly classify the Heat Exchangers highlighting their salient parameters.
    (b) Briefly describe the vapour compression refrigeration system.

13 (a) Why 2-stroke engines have been replaced by 4-stroke engines? Support your answer.
    (b) Define Indicated, Brake Thermal efficiencies and Mechanical efficiency of 4-stroke multi cylinder Diesel engine.

14 (a) Describe an open cycle Gas Turbine with suitable line diagram as well as T-S diagram.
    (b) In a Compound Great train, bring out the relationship between speeds and teeth.

15 (a) Compute Bernoulli's Equation and bring out its significance.
    (b) Describe different types of flow through pipes and its indications through Reynold's number.

16 (a) Bring out the salient differences between Hagen's formula and Darcy's formula.
    (b) Derive the work done in a Kaplan Turbine and its power output.

17   Write short notes on the following:
    (a) Cavitation
    (b) Velocity Triangle
    (c) Orifice meter

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FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) I-Semester (Main & Backlog) Examination, November / December 2016

Subject : Elements of Production Techniques

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Classify manufacturing process.
2 List out the criteria for selection of a process for a unique product.
3 How to select a suitable welding process for fabrication?
4 What do you understand by Consummable and Non-consummable electrodes.
5 Differentiate Horizontal and Vertical Milling machine.
6 Differentiate NC and CNC machines.
7 Differentiate between LBM and EBM.
8 What are the principle behind Non-conventional machining.
9 Differentiate Wire drawing and Extrusion.
10 Why Rolling process is required?

PART- B(5x10=50)

11 (a) How do you select a material and the most appropriate manufacturing process.
   (b) Bring out the merits and demerits of Casting and Forging.

12 (a) Name one most useful advantage of choosing casting. What are the major factors involved in casting processes?
   (b) Explain briefly with a neat sketch the working principle of Gas welding process.

13 (a) Explain with a neat sketch the resistance welding process.
   (b) Classify Lathe machines and with a neat sketch ,explain a simple Lathe machine.

14 (a) Explain the concept of a DNC machine with its salient features.
   (b) Explain the significance of indexing in a Milling machine.

15 (a) Define the concept of Non-conventional machining .
   (b) Explain with a neat sketch EBM process.

16 (a) Explain LBM process with a neat sketch.
   (b) Differentiate Forging and Casting.

17 Write short notes on:
   (a) Metal forming equipments.
   (b) Sand preparation for Moulds.
   (c) Butt welding.

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FACULTY OF ENGINEERING
B.E. 2/4 (ECE) I - Semester (Main) Examination, November / December 2016

Subject : Elements of Mechanical Engineering

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

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Define Entropy and Enthalpy.
2 Define BSFC,ISFC of I.C. Engine
3 State Newton's law of cooling and write its importance
4 Write one dimensional heat conduction equation in plane walls and explain it.
5 Define COP of Air refrigeration cycle
6 Write applications of refrigeration in Electronic Industry.
7 Explain various rolling processes.
8 What is the principle involved in gas welding process?
9 Write the applications and classification of gears.
10 Derive the expression of length of cross belt.

Part-B(50 Marks)

11 (a) Derive the expression for the work done of air compressor with clearance
    volume.   (5)
   (b) During the testing of an engine the following readings were observed;
       Speed=1600 rpm, net load on the brake drum=1200N, brake drum
       radius=0.65m. Find the torque and brake power developed by the engine.   (5)

12 (a) One face of a copper plate 4cm thickness is maintained at 500°C and the other
       face is maintained at 125°C.Calculate the heat loss through the plate per
       square metre area, take thermal conductivity of the plate as 370W/m K.   (5)
   (b) Water is heated in double pipe heat exchanger from 138°C to 305°C by gases
       that cools from 525°C to 250°C, determine the LMTD i)Parallel flow mode
       ii) Counter flow mode.   (5)

13 (a) Explain the working of Vapour absorption refrigeration system with a neat
       sketch.   (5)
   (b) Compare thermo electric refrigeration system with vapour compression
       refrigeration system.   (5)

14 (a) Describe the working of ARC Welding process with the help of neat sketch.   (5)
   (b) Explain the wire drawing process with a neat sketch.   (5)

15 (a) The diameter of the pulley on the driving shaft running at 250 rpm is
       0.55m. a counter shaft is to be driven at 300 rpm by an open belt drive,
       having a coefficient of friction 0.25. The distance between the shafts is
       3.5 m. Determine the width of the belt to transmit 6 kW power, if the safe
       permissible tension is 22N/mm width of the belt.   (5)
   (b) Explain slider crank mechanism with a diagram.   (5)

16 (a) Compare two stage air compressors with Internal combustion engines.   (5)
   (b) Explain classification and applications of heat exchangers.   (5)

17. Write short notes on any **two** of the following   (2x5)
    (a) Vapour compression refrigeration systems
    (b) various machining operations on Lathe machine.
    (c) Epi cyclic gear trains

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FACULTY OF ENGINEERING

B.E. 2/4 (M / P / A.E.) I – Semester (Main & Backlog) Examination, Nov. / Dec. 2016

Subject: Managerial Economics & Accountancy

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

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1	Define Pay back.	2
2	Define Risk and uncertainty.	3
3	What is law of supply?	2
4	Direct demand and indirect demand.	3
5	Write about the concept of equi-marginalism.	2
6	Permanent and temporary working capital.	3
7	Cobb-Douglas production function.	2
8	Short-run cost and long run cost.	3
9	What is Contra entry? Give one example.	3
10	Define Liquidity ratio.	2

PART – B (5x10 = 50 Marks)

11 Explain the usefulness of managerial economics in business organization.

12 What is income elasticity of demand? Explain the factors influencing it.

13 Explain the short-run production function. Explain.

14 What is meant by working capital management? What are the determinants of working capital needs of an enterprise?

15 What are subsidiary books? Explain the various subsidiary books in accountancy.

16 The initial cash outlay of a project is Rs. 10,000 and it can generate cash inflow of Rs. 4,000; Rs. 3,000; Rs. 5,000 and Rs. 2,000 in year 1 through 4. Assume a 10% discount rate. Calculate Payback, NPV and profitability index from the following details.

17 From the following balances of Gupta, prepare the Trading and Profit and Loss a/c as on 31-03-2004.

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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FACULTY OF ENGINEERING
B.E. 2/4 (CSE) I - Semester (Main & Backlog) Examination, November/December 2016

Subject : Basic Electronics

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

Note: Answer all questions from Part-A and answer any five questions from Part-B.
PART – A (25 Marks)

1 What is Hall effect ?   (2)
2 A Silicon diode has a reverse saturation current of 2.5 μA at 300°k. Find forward
   voltage for a forward current of 10 mA   (3)
3 Differentiate between JFET and BJT.   (3)
4 A transistor has α = 0.98. If the emitter current of transistor is 1 mA,
   determine base current and β.   (2)
5 Write the advantages of negative feedback.   (3)
6 Write Barkhausen criteria.   (2)
7 Mention the Ideal characteristic of operational amplifier.   (3)
8 What are Universal gates ? Give their truth tables.   (2)
9 Define guage factor for a strain guage.   (2)
10 Draw the symbols of LED, SCR, UJT and photo transistor.   (3)

PART – B (50 Marks)

11 (a) Explain V-I characteristic of a P-N junction diode and write the applications
       of diode.   (4)
   (b) Explain the operation of a Capacitor filter with full wave rectifier and derive
       an expression for ripple factor.   (6)

12 (a) Draw the circuit of CE transistor configuration. Explain its input and output
       characteristics.   (5)
   (b) Explain the working of JFET. Describe its drain and transfer characteristics.   (5)

13 (a) Prove that negative feedback increases the bandwidth of an amplifier.   (4)
   (b) Draw the Circuit diagram of RC-phase shift Oscillator and explain its working.
       Derive the equation for frequency of Oscillations.   (6)

14 (a) Draw the Circuit of an integrator using Operational amplifier and explain its
       working. Derive an expression for its output voltage.   (5)
   (b) Give the truth tables for half and full subtractors. Realize half subtractor and full
       subtractor using basic logic gates.   (5)

15 (a) Draw the block diagram of CRO and explain the function of each block.   (6)
   (b) With a neat diagram explain the working of LVDT.   (4)

16 (a) Explain the working and V-I characteristics of UJT.   (5)
   (b) Write the advantages of h-parameters and draw the h-parameter equivalent
       circuit of CB transistor configuration?   (5)

17 (a) Explain about Crystal Oscillator.   (3)
   (b) Differentiate between Avalanche and Zener breakdown mechanisms   (3)
   (c) Draw the block diagram of operational amplifier and write the function of
       each block.   (4)

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FACULTY OF INFORMATICS

B.E. 2/4 (I/T) I - Semester (Main) Examination, November / December 2016

Subject : Data Structures

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

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Define the term Data structure. Differentiate linear and non-linear Data structure.   (3)
2 Define 'Big Oh Notation.   (2)
3 Write an ADT for an Array.   (2)
4 Write the prefix and postfix expression for A∗B∗(C – D)/ (E – F).   (3)
5 Discuss the advantages of circular queue with an example.   (3)
6 List the applications of stack.   (2)
7 Differentiate between singly and doubly linked lists.   (3)
8 Define Heap given an example.   (2)
9 State the difference between Complete Binary Tree and Full Binary Tree.   (3)
10 Compare and contrast DFS and BFS.   (2)

PART – B (50 Marks)

11 (a) Explain various Asymptotic Notations with examples.   (5)
   (b) Write a C++ program for implementing string ADT.   (5)

12 Write a C++ function for evaluating a postfix expression. Evaluate the expression

   4 5 2 ∗ + using the function. Show all steps of evaluation.   (5+5)

13 Write a C++ code to implement following operations on queue.   (10)
   (a) insert   (b) delete   (c) display   (d) Rear   (e) front

14 Define BST. Create a binary search tree with the following keys and perform inorder,
   preorder, post order traversals on it
       30, 20, 25, 40, 35, 36, 32, 45, 42   (1+3+2+2+2)

15 Explain prim's algorithm and find minimum cost spanning tree for the following
   graph.   (5+5)
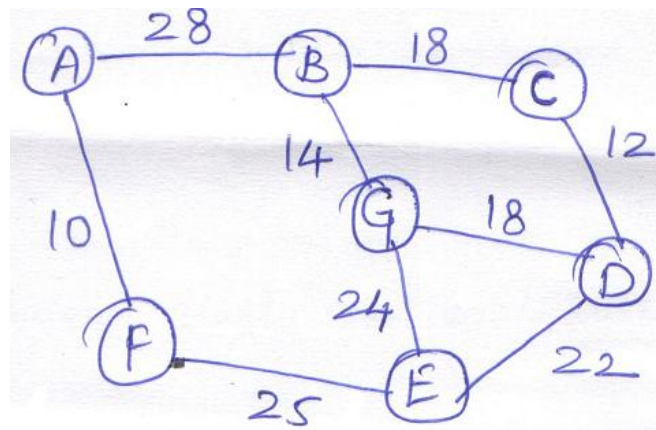
16 Write and explain heap sort algorithm. And construct a min heap for the following elements.

    125, 145, 42, 55, 88, 72, 62, 95, 25, 100   (10)

17 Write short notes on any **two** of the following: (5+5)
    (a) AVL Trees
    (b) M-way search Trees
    (c) Quick sort

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