

**FACULTY OF ENGINEERING****B.E. 2/4 (Civil) I-Semester (Suppl.) Examination, May / June 2017****Subject : Strength of Materials – I****Time : 3 hours****Max. Marks : 75**

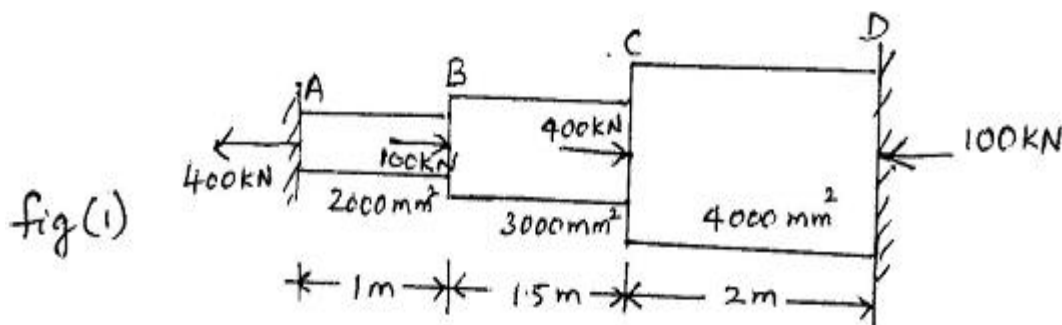
**Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B. Missing data, if any, may suitably be assumed.**

**PART – A (2.5 x 10 = 25 Marks)**

- 1 Deformation of a bar due to its own weight is \_\_\_\_\_ the deformation caused if the bar is subjected to a direct load equal to the weight of the bar.  
i) double      ii) half      iii) one-fourth      iv) same as
- 2 A bronze specimen has a modulus of elasticity of  $120 \text{ kN/mm}^2$  and a modulus of rigidity of  $47 \text{ kN/mm}^2$ . Determine the Poisson's ratio of the material.
- 3 Compute the section modulus required for a 3m high vertical pole fixed at its base, subjected to a horizontal load of 7kN at its top. The permissible bending stress of the material of the pole is  $12 \text{ N/mm}^2$ .
- 4 Sketch shear force diagram for a simply supported beam of span 'l' subjected to a uniformly distributed load of w/unit length over the right half of the span.
- 5 A simply supported rectangular timber beam of span 3m and cross sectional area  $2 \times 10^4 \text{ mm}^2$  carries a point load w at mid span. If permissible shear stress is  $2 \text{ N/mm}^2$ , compute the safe load the beam can carry.
- 6 Sketch the core of a circular section of diameter 25cm.
- 7 Differentiate between thin and thick cylindrical shells.
- 8 How do you ensure the required shrinkage pressure at the junction of the two tubes in a compound cylinder?
- 9 List out any two assumptions involved in the derivation of torsion equation.
- 10 Compute the power transmitted by a shaft at 160 rpm, if it is subjected to a mean torque of 50000Nm.

**PART – B (5 x 10 = 50 Marks)**

- 11 A circular bar ABCD is rigidly fixed at A and D and is subjected to axial forces as in figure (i) determine the displacements of points B and C. Take  $E = 200 \text{ kN/mm}^2$ .



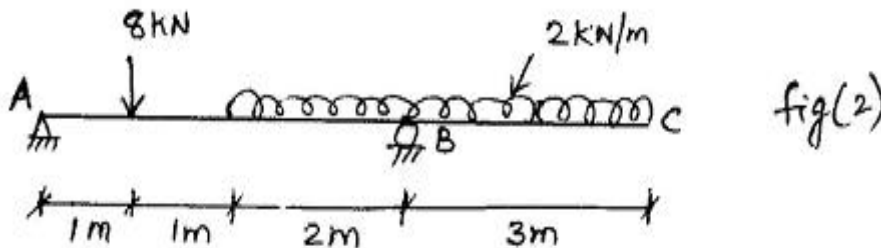
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- 12 A steel tube 45 mm external diameter and 3mm thick encloses centrally a solid copper bar of 30 mm diameter. The bar and the tube are rigidly connected together at the ends at a temperature of  $30^{\circ}\text{C}$ . Find the stress in each metal when heated to  $180^{\circ}\text{C}$ . Also find the increase in length if the original length of the assembly is 300 mm.

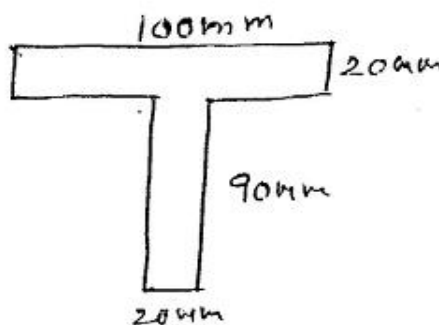
$$\alpha_s = 1.08 \times 10^{-5} /^{\circ}\text{C} \text{ and } \alpha_c = 1.7 \times 10^{-5} /^{\circ}\text{C},$$

$$E_s = 2.1 \times 10^5 \text{ N/mm}^2 \text{ and } E_c = 1.1 \times 10^5 \text{ N/mm}^2.$$

- 13 An overhanging beam is supported and loaded as in figure (2). Draw SFD and BMD.



- 14 A cantilever beam of T-section having flange 300 mm wide, 50mm thick, web thickness 60mm and overall depth 300 mm is 5m long. It carries a uniformly distributed load of  $w$ /unit run. If the allowable bending stresses in tension and compression are  $40 \text{ N/mm}^2$  and  $60 \text{ N/mm}^2$  respectively. Compute the safe value of  $w$ .
- 15 A hollow circular shaft of internal diameter 100 mm and external diameter 200 mm is subjected to a torque  $T$ . Find the maximum value of  $T$  if the allowable shear stress is  $85 \text{ N/mm}^2$ . What is the angle of twist with this torque over a length of 1m. Take  $N = 8 \times 10^4 \text{ N/mm}^2$ .
- 16 A closed cylinder having internal and external diameters of 400 mm and 500 mm respectively is subjected to an internal pressure of  $2 \text{ N/mm}^2$ . Determine the maximum and minimum circumferential stresses in the cylinder. Find radial pressure at a radius of 220 mm. Also determine the percentage error if maximum circumferential stress is calculated from thin cylinder formula.
- 17 Draw the shear stress distribution diagram for T section as shown below for a shear force of 10 kN.



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**FACULTY OF ENGINEERING****B.E. 2/4 (EEE) I - Semester (Suppl.) Examination, May / June 2017****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 Name some reversible and irreversible thermodynamic processes.
- 2 What are the different modes of heat transfer?
- 3 Name important properties of Black body.
- 4 Classify Heat Exchangers.
- 5 Define ton of refrigeration.
- 6 Name the types of Compressor and which one is better.
- 7 Define mechanical efficiency of an IC engine. Write its expression.
- 8 What are the essential functions of a Boiler and why it is not much in use now a days?
- 9 How do you compute length of a Belt?
- 10 What is the significance of Bernoulli's Equation?

**PART- B (5x10=50 Marks)**

- 11 (a) Derive a steady flow energy equation with a suitable illustration.  
(b) Describe a reversible and irreversible thermodynamic processes with suitable examples and p-v diagrams.
- 12 (a) Briefly bring out the concept of heat transfer through conduction ,convection and radiation-which one is preferred and under what conditions?  
(b) Describe industry applications of Heat Exchanger.
- 13 (a) Define c.o.p and describe simple vapour compression system of refrigeration with suitable illustration.  
(b) What do you understand by Psychrometric processes?
- 14 (a) Which is more efficient-2-stroke or 4-stroke engine? Substantiate your claim with illustration.  
(b) Classify different Gas Turbines and briefly describe the functioning of any one of them.
- 15 (a) Briefly describe with illustrations, simple, compound and inverted gear trains.  
(b) What do you understand by ratio of tension in Belt drive? Bring out its significance with mathematical expression,
- 16 (a) Compute the length of a cross Belt in a Belt drive system with neat sketch.  
(b) Bring out the differences between Venturi meter and Orifice meter.
- 17 Write short notes on:
  - (a) Centrifugal pump.
  - (b) Draft tube.
  - (c) Epicyclic Gear train.

**FACULTY OF ENGINEERING**

**B.E. 2/4 (Inst.) I - Semester (Suppl.) Examination, May / June 2017**

**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 the manufacturing processes under the broad and sub-classifications.
2. Bring out different parts of a mould and its brief use.
3. In a gas welding flame ,what different temperatures are obtained at different flame points.
4. Differentiate resistance, butt and spot weldings.
5. How Lathe can be specified?
6. Define indexing in a milling machine.
7. Name the needs for a non-conventional machining.
8. Differentiate between LBM and EDM processes.
9. Classify the forming processes.
10. Where do you use deep drawing process and why.

**PART- B (5 x 10 = 50 Marks)**

- 11 (a) Justify the limitations of manufacturing processes?  
(b) What are the merits and demerits of sand casting and die casting processes?
- 12 (a) Define Arc welding process. What are the different arc welding processes?  
Describe briefly with illustration ,the Submerged Arc Welding process.  
(b) Differentiate between welding, brazing and soldering.
- 13 (a) Explain the working principle of a horizontal milling machine with a neat sketch.  
(b) Explain the FMS process and its salient advantages.
- 14 (a) Explain Quick Return Mechanism with a neat sketch.  
(b) Describe the working principle of Ultrasonic Machining.
- 15 (a) What is the concept of forging. Differentiate Hand Forging and Machine Forging processes?  
(b) Is there any difference between Extrusion and Wire drawing? Explain with a neat sketch any extrusion process.
- 16 (a) Explain briefly the concept of Powder Metallurgy.  
(b) Differentiate between Conventional and Non-conventional machining.
- 17 Write short notes on :
  - (a) Rolling.
  - (b) Cores.
  - (c) Flux

**FACULTY OF ENGINEERING**

B.E. 2/4 (ECE) I - Semester (Suppl.) Examination, May / June 2017

**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 Explain various thermodynamic systems with an example in each case.
- 2 Draw port timing diagram and valve timing diagram of I.C.Engine
- 3 State conduction equation and mention its importance.
- 4 Write practical applications of heat exchangers.
- 5 List various refrigeration systems.
- 6 Sketch humidification and sensible cooling process on Psychrometry chart.
- 7 List various applications of Metal forming process.
- 8 Sketch various types of Patterns used in sand casting.
- 9 Sketch inverted gear train and mention its applications
- 10 Define mechanism and machine.

**Part-B (50 Marks)**

- 11 (a) Derive the expression for the volumetric efficiency of reciprocating air compressor. (5)
- (b) A single cylinder oil engine has a compression ratio of 11 to 1. The specific fuel consumption is 0.7kg/kW-hr. The calorific value of the fuel oil is 44200 kJ/kg. Calculate i)Thermal efficiency ii)Relative efficiency, assume engine operates on constant volume cycle. Take  $\gamma = 1.41$ . (5)
- 12 (a) Derive the expression for the LMTD of counter flow heat exchangers. (4)
- (b) A composite wall is made of two slabs with outside surface temperatures maintained at 1500°C and 120°C. The first slab has a thickness of 500mm and thermal conductivity of 1.45W/mK the thickness and thermal conductivity of the second slab are 165mm and 0.40W/mK respectively. Determine the conduction heat transfer through this composite wall per square metre area. (6)
- 13 (a) Describe the working of vapour compression refrigeration system with a neat sketch. (5)
- (b) List various advantages of air refrigeration system and derive the expression for the COP of bell coleman cycle. (5)
- 14 (a) Sketch a typical lathe machine and describe the function of important components on it. (5)
- (b) Describe the working of Extrusion process. (5)
- 15 (a) Two pulleys 60 cm and 40 cm diameters are connected by a belt. Central distance between the pulleys is 5 m. Find the length of belt for i)Open belt drive ii) Cross belt drive. (5)
- (b) Sketch compound gear train and derive the expression for the Velocity ratio. (5)

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- 16 (a) Air at 1 bar pressure, 300K temperature flows steadily at the rate of 12kg/min into a reciprocating air compressor to a pressure of 10 bar find the power required When i) compression process is isentropic ii) Isothermal compression process compare the results. (5)
- (b) Air at 20°C blows over a hot plate of area 50cm X 75cm maintained at 300°C. The convective heat transfer coefficient is 25w/m<sup>2</sup>. Calculate the heat transfer and compare the heat transfer rate with a hot plate area of 75cmX 100cm. (5)
- 17 Write short notes any **two** of the following : (2x5)
- (a) Eco friendly refrigerants
  - (b) Arc welding
  - (c) Compound belt drives

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## FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I - Semester (Suppl.) Examination, May / June 2017

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 Define Fermi level. (2)
- 2 Draw the block diagram of Op. Amp and explain. (3)
- 3 What are the advantages of LED and LCD? (2)
- 4 Define transition capacitance  $C_T$  and diffusion capacitance  $C_D$  of a PN diode. (3)
- 5 Derive the relation between  $\alpha$ ,  $\beta$  and  $\gamma$  of a transistor. (3)
- 6 Differentiate between positive and negative feedback. (2)
- 7 What is a ripple in rectifiers? How can it be reduced? (2)
- 8 Draw the truth table of a Half Subtractor and implement with gates. (3)
- 9 Define  $g_m$ ,  $r_d$  and  $\mu$  of a JFET and derive the expression for  $g_m$ . (3)
- 10 State and explain the Barkhausen criterion for oscillations. (2)

## PART – B (50 Marks)

- 11 (a) Explain how a Zener diode acts as a voltage regulator. (5)
- (b) Draw the circuit diagram of a center tapped full wave rectifier circuit and explain its working. (5)
- 12 (a) Draw a CE amplifier circuit and explain its frequency response. (5)
- (b) The reverse saturation current in a transistor is  $8\mu\text{A}$ . If the transistor common base current gain is 0.979, calculate the collector and emitter current for  $40\mu\text{A}$  base current. (5)
- 13 (a) Draw the block diagram of a voltage series feedback amplifier and derive for  $A_{vf}$ ,  $R_{if}$  and  $R_{of}$ . (5)
- (b) Draw the Wein bridge oscillator circuit and derive for its operating frequency. (5)
- 14 (a) Explain how an Op-Amp works as an integrator. (5)
- (b) What are Universal gates? (5)
- 15 (a) Draw the block diagram of CRO and explain. (5)
- (b) Draw and explain V-I characteristics of UJT. (5)
- 16 (a) Explain V-I characteristics of p-n junction diode. (5)
- (b) Explain instrumentation amplifier. (5)
- 17 Write short notes on the following: (10)
  - (a) LVDT
  - (b) Silicon Controlled Rectifier
  - (c) Photo Transistor

## FACULTY OF INFORMATICS

B.E. 2/4 (I.T) I - Semester (Suppl.) Examination, May / June 2017

Subject : Data Structures

Time : 3 Hours

Max. Marks: 75

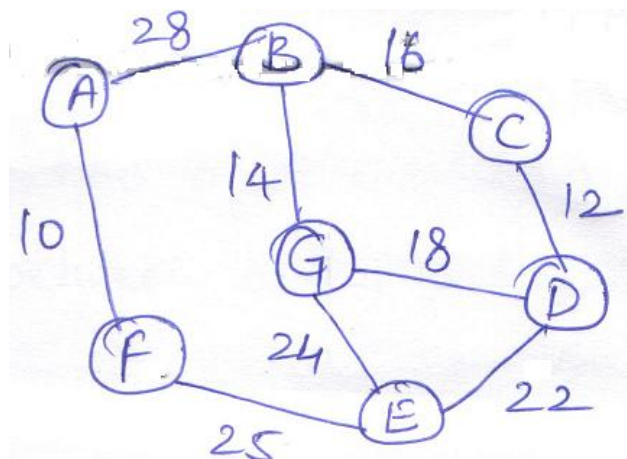
**Note: Answer all questions from Part-A and answer any five questions from Part-B.**

**PART – A (25 Marks)**

- 1 Define Data Structure. Write the characteristics of Data structures. (3)
- 2 Write an ADT for stack and Queue. (3)
- 3 Write the prefix and postfix expression for  $A\$B * C - D + E / F / (G + H)$ . (3)
- 4 Write the difference between linear queue and circular queue. (2)
- 5 Write about Thread Binary Trees with an example. (3)
- 6 List the applications of Queue. (2)
- 7 Differentiate between array and linked lists. (2)
- 8 What is minimum cost spanning Tree? (2)
- 9 Discuss the various forms of graph representations with example. (3)
- 10 Evaluate the expression  $6 4 9 3 - * +$ . (2)

**PART – B (50 Marks)**

- 11 (a) Explain the term space complexity and Time complexity. Find the Time complexity for matrix addition of size  $m * n$ . (2+3)
- (b) Write a C++ function to extract a given string. (5)
- 12 Write an algorithm for conversion of an infix expression to postfix expression and trace the algorithm for the expression  $((((A/B)*C)*D)+E)$  and get the resultant postfix expression. (5+5)
- 13 Write a procedure for insertion and deletion of an element from a Doubly Linked List with an example. (10)
- 14 Define AVL. Tree Construct AVL tree for the following input sequence  
8, 10, 15, 5, 9, 7, 2, 23, 17 (10)
- 15 Explain Kruskal's algorithm and find minimum cost spanning tree for the following graph (5+5)





..2..

16 Give the following list of numbers

16, 12, 2, 6, 80, 20, 9, 15, 5, 79, 6

Use quick sort algorithm to sort them. Show different passes (trace) indicating the pivot and the partitions formed. Specify its time complexity. (10)

17 Write short notes on any **two** of the following: (5+5)

(a) Red Black Trees

(b) Splay Trees

(c) Merge sort

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**FACULTY OF ENGINEERING****B.E. 2/4 (M / P / AE) I – Semester (Suppl.) Examination, May / June 2017****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 ARR method.                             | 2 |
| 2 What is meant by working capital?              | 3 |
| 3 What is imprest system?                        | 2 |
| 4 What is capital receipt?                       | 3 |
| 5 Incremental costs and sunk costs.              | 3 |
| 6 Write about profitability index.               | 2 |
| 7 Define concept of Equilibrium.                 | 2 |
| 8 Total market demand and market segment demand. | 3 |
| 9 Discounting principle.                         | 3 |
| 10 Scarcity definition of economics.             | 2 |

**PART – B (5x10 = 50 Marks)**

- 11 Explain the Fundamental concepts of Managerial economics.
- 12 What are the factors influencing demand for a commodity by consumer? Explain.
- 13 Write about the Law of returns in detail.
- 14 Explain various determinants of working capital of a concern.
- 15 Calculate NPV from the following details of two machines each costing Rs. 50,000.

Year	Machine A (Rs)	Machine B (Rs)
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000

- 16 Calculate:
- P/v ratio
  - Break-even point
  - Profit/loss when the sales amount to Rs. 40,000 and
  - Sales required to earn a profit of Rs. 20,000 from the following details:
    - 1<sup>st</sup> Year: Sales Rs. 75,000, Profit Rs. 10,000
    - 2<sup>nd</sup> Year: Sales Rs. 80,000, Profit Rs. 15,000

17 From the following details prepare a Bank Reconciliation Statement showing the balance as per cash book as on 31<sup>st</sup> March, 2004.

- 1 Cheques of Rs. 10,000 paid into bank on 25<sup>th</sup> March, out of which Rs. 4000 appears to have been credited in the pass book in the month of April, 2004.
- 2 Cheques had been issued for 15,000 out of which only 7,000 have been encashed before the date.
- 3 Banker's have given a wrong credit to the firm's account Rs. 2,000.
- 4 Bank charges entered in Passbook, but no entry appears in Cash book Rs. 500.
- 5 Passbook shows a credit of Rs. 1,500 towards interest on investments collected by bank.
- 6 The bank balance as per pass book showed Rs. 18,000.

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