

Enrollment No.

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**B. TECH. (CE)**  
**II YEAR, III SEMESTER EXAMINATION**  
**ENGINEERING MECHANICS**

[Max. Marks : 70]

[Time : 3:00 Hours]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.

QUESTION NO.-1: ATTEMPT ANY FOUR PARTS.

(4\*3=12)

- Discuss in about Moment, Torque, Couple, Torsion with units
- Discuss about principal stress and principal strain , principal plane
- Discuss about the rules of drawing of SFD and BMD
- Discuss about various types of Friction
- Discuss about classification of trusses
- Explain the various forces in a force system
- Discuss lami's theorem and varignon theorem

QUESTION NO.-2: ATTEMPT ANY THREE PARTS.

(3\*4=12)

- Draw the SFD and BMD of a simply supported beam subjected to UDL over entire length
- A body of weight 70N placed on a rough horizontal plane. To move the body on horizontal plane a push of 20N inclined at angle of 20 to the horizontal plane is required Find coeff of friction
- Calculate poisson ratio and Young modulus if Bulk modulus is 80KN/m<sup>2</sup> and rigidity modulus is 48KN/m<sup>2</sup>
- Explain the assumptions used in simple bending

QUESTION NO.-3: ATTEMPT ANY THREE PARTS.

(3\*6=18)

- Explain the stress strain curve for mild steel in detail along with all necessary points
- A body of weight 500N is pulled up on inclined plane ,by a force of 350N. The inclination of plane is 30 to the horizontal and the force is applied parallel to plane. Determine the coeff of friction
- Calculate section Modulus for rectangular section ,Hollow rectangular section ,Circular section and Hollow circular section
- Explain in detail the assumptions of Torsion equation and Explain Torsional Rigidity and power transmitted by the shaft

QUESTION NO.-4: ATTEMPT ANY TWO PARTS.

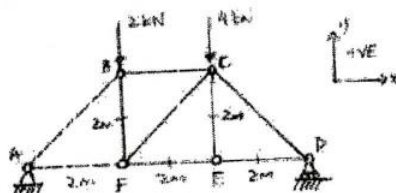
(2\*7=14)

- A simply supported beam of length 5m carries a UVL of 800N/m at one end to 1600N/m at other end calculate the reactions at both supports
- Explain the assumptions of Torsion equation, Why is Torsion in the Axis Perpendicular to the Plane of Torque applied
- A bar having diameter d=30mm subjected to a load 54KN and length 300mm and extension produced is 0.112mm longitudinal strain=0.112mm and lateral strain=0.00366mm. Calculate poisson ratio and value of all three modulus

QUESTION NO.-5: ATTEMPT ANY TWO PARTS.

(2\*7=14)

- What must be the length of a 5mm diameter wire so that it can be twisted through one complete revolution without exceeding a shear stress of 42MN/m<sup>2</sup> Take G=27GN/m<sup>2</sup>
- An effort of 200N is required just to move a certain body up on an inclined plane of angle 15°, the force acting parallel to the plane. If the angle of inclination of the plane is made 20°, the effort required again applied parallel to the plane is found to be 230 N. Find the weight of the body and coeff of friction
- Find the member forces and reaction in the following truss



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(B) (SVSU): 2022-2023/R

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**B. TECH. (ECE/CE)**  
**II YEAR, III SEMESTER EXAMINATION**  
**BASIC ELECTRONICS**

[Time : 3:00 Hours ]

[Max. Marks : 70]

Note: Attempt all the questions. Distributions of marks are mentioned along with the questions.

**Ques.1:** Select the correct options of the followings

(1 X 10 = 10)

- (a) Electronic Filters are used within the place-
  - (i) Before a rectifier
  - (ii) After a rectifier
  - (iii) With a rectifier
  - (iv) None
- (b) Which of the following is correct in term of  $h_{21}$ 
  - (i) Reverse voltage ratio, with output open,  $h_r$ , Unit Less.
  - (ii) Output admittance, with input open,  $h_o$ , mho.
  - (iii) Input impedance, with output shorted,  $h_i$ , ohm.
  - (iv) Forward current ratio, with output shorted  $h_f$ , Unit less.
- (c) What is the Radix of Hexa decimal number
  - (i) 2
  - (ii) 8
  - (iii) 10
  - (iv) 16
- (d) Leakage current in case of BJT is because of-
  - (i) Majority carriers
  - (ii) Minority carriers
  - (iii) Both
- (e) None In N-type Semi conductor-
  - (i) Majority carrier are electron
  - (ii) Minority carriers are hole
  - (iii) Both
  - (iv) None
- (f) The direction of arrow in the symbol of FET represents-
  - (i) Drain current
  - (ii) Gate current
  - (iii) Source Current
  - (iv) None
- (g) Gate voltage applied to start P-MOSFET
  - (i) Positive
  - (ii) Negative
  - (iii) both
  - (iv) None
- (h) Efficiency of Half wave rectifier
  - (i) 40.6%
  - (ii) 36%
  - (iii) 81.2%
  - (iv) 42%

[P.T.O.]

- (i) Center-tapping used in
- (i) Half wave rectifier
  - (ii) Full wave rectifier
  - (iii) Bridge rectifier
  - (iv) None
- (j) Which of the following is not an ideal characteristic of Op-Amp
- (i) Infinite Input Resistance
  - (ii) Infinite CMRR
  - (iii) Infinite Slew rate
  - (iv) Op-Amp Draws zero current.

**Ques.2:** Answer *any Four* of the following questions.

(4 X 5 = 20)

- (a) Give the difference between BJT and FET.
- (b) Show that percentage efficiency of half wave rectifier is 40.6.
- (c) Explain JFET.
- (d) What do you mean by Breakdown of Diode? Explain
  - i) Avalanche Breakdown.
  - ii) Zener Breakdown.
- (e) Drive an expression for collector current for BJT.

**Ques.3:** Answer *any two* of the following questions.

(10 X 2 = 20)

- (a) In a CB arrangement the current gain is 0.97. If the emitter current is 1mA. Find the value of base current.
- (b) Explain P-N Junction Diode.
- (c) Give the mathematical analysis of Half Wave Rectifier.

**Ques.4:** Answer *any one* of the following questions.

(10 X 1 = 10)

- (a) Give the mathematical analysis of Full Wave Rectifier.
- (b) What is MOSFET? Explain different type of MOSFETs.

**Ques.5:** Answer *any one* of the following questions.

(10 X 1 = 10)

- (a) Explain Operational Amplifier. Give Characteristic of Ideal Op-Amp and also explain Integrator and differentiator.
- (b) Define the h-parameters of the circuit.

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