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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY-2025** |
| **Date:** 11 – 01- 2025 **Time:** 09:30 am – 12:30 pm |

|  |  |  |
| --- | --- | --- |
| **School:** SOE | **Program:** B. Tech – Mechanical Engineering (MCM) | |
| **Course Code:** MEC3050 | **Course Name:** Experimental stress Analysis | |
| **Semester**: VII | **Max Marks**: 100 | **Weightage**:50% |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** |
| **Marks** | **26** | **24** | **26** | **24** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 2Mx10Q=20M** | | | | |
| **1** | What is slow and fast axis in photo elasticity? | **2 Marks** | **L1** | **CO1** |
| **2** | What is isochromatic and isoclinic condition? | **2 Marks** | **L1** | **CO1** |
| **3** | Define birefringence | **2 Marks** | **L1** | **CO1** |
| **4** | Write stress optic law relation | **2 Marks** | **L1** | **CO2** |
| **5** | List the 3 calibration method in photoelasticity | **2 Marks** | **L1** | **CO2** |
| **6** | What is polarized Light? | **2 Marks** | **L1** | **CO3** |
| **7** | What is Photo elasticity? | **2 Marks** | **L1** | **CO3** |
| **8** | What is Calibration? | **2 Marks** | **L1** | **CO3** |
| **9** | What is Electrical resistance strain gauge? | **2 Marks** | **L1** | **CO4** |
| **10** | Write any 4 sensitivity values for strain materials | **2 Marks** | **L1** | **CO4** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer ALL Questions. Each question carries 20 marks. 4QX20M=80M** | | | | | |
| **11** | **11a** | Explain load relaxation for compressive stress in coatings | **10 Marks** | **L2** | **CO1** |
| **11b** | Write the characteristics of ideal strain gauge construction of electrical strain gauge | **10Marks** | **L2** | **CO1** |
| **Or** | | | | | |
| **12** | **12a** | What is scattered light method in photo elasticity | **10 Marks** | **L2** | **CO1** |
| **12b** | With a neat sketch explain beam under pure bending calibration method in Photoelesticity | **10Marks** | **L2** | **CO1** |
|  |  |  |  |  |  |
| **13** | **13a** | Define Gauge factor and derive an expression for it | **10Marks** | **L2** | **CO2** |
| **13b** | With a neat sketch explain foil strain gauge and weld able strain gauge | **10Marks** | **L2** | **CO2** |
| **Or** | | | | | |
| **14** | **14a** | With a neat sketch explain any one crack detection technique in brittle coating method | **10Marks** | **L2** | **CO2** |
| **14b** | Write the characteristics of Adhesives explain any two | **10Marks** | **L2** | **CO2** |
|  |  |  |  |  |  |
| **15** | **15a** | Write the characteristics of Adhesives explain any two | **10 Marks** | **L2** | **CO3** |
|  | **15b** | Explain the Analogy of stress locking in stress freezing method | **10Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **16** | **16a** | With a neat sketch explain circular disc under diametrical compression calibration method in Photoelesticity | **10 Marks** | **L2** | **CO3** |
| **16b** | Write a note on brittle coatings | **10Marks** | **L2** | **CO3** |
|  |  |  |  |  |  |
| **17** | **17a** | a.)What is strain rosette? Write any 3 arrangements. | **05Marks** | **L3** | **CO4** |
| **17b** | b) A Δ-rosette yields the following strain indications ɛa =-640µm/m,ɛb =3110µm/m and ɛc=710µm/m. Calculate the maximum principal strain direction, the principal stresses and shear stress Take E = 200 GPa, poison’s ratio (µ= 0.28) | **15Marks** | **L2** | **CO4** |
| **or** | | | | | |
| **18** |  | The following readings of strain were obtained on a rectangular strain rosette mounted on aluminum for which E = 69 GPa, μ=0.30, ɛa=385μm/m,ɛb = 75μm/m ,ɛc =202μm/m. Determine the Principal strain, Principal strain direction, Principal stresses and maximum shear stress. | **20Marks** | **L3** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***