Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EI2041** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MEASUREMENTS AND INSTRUMENTATION** | **Max. marks :** | **100** |

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| Q. No. | Questions | | | | | | Course outcome | Marks |
| **PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)** | | | | | | | | |
| 1. | The moving system attains a steady state position when the opposing torque equals the \_\_\_\_\_\_\_\_\_\_\_torque | | | | | | CO1 |  |
|  | a. Inertia | b. Deflection | | c. Control | | d. Spring |  | (1) |
| 2. | PMMC instrument can be used for | | | | | | CO1 |  |
|  | a. D.C measurements only | b. both D.C and A.C measurements | | c. Three phase A.C measurements | | d. Single phase A.C measurements |  | (1) |
| 3. | At steady state or under equilibrium is \_\_\_\_\_\_\_\_\_\_ | | | | | | CO1 |  |
|  | a. Td = Tc | b.Td = 0 | | c. Tc = 0 | | d. none of the answer |  | (1) |
| 4. | An 0-10A ammeter has a guaranteed accuracy of 1% of full scale deflection. The limiting error while reading 2.5A is: | | | | | | CO1 |  |
|  | a. 1% | b. 2% | | c. 4% | | d. 7% |  | (1) |
| 5. | What is sensitivity? | | | | | | CO1 |  |
|  | a.output/input | b.change in output/change in input | | c.S=R/V | | d.ohms per volt reading |  | (1) |
| 6. | Which one of the following is not a systematic error? | | | | | | CO1 |  |
|  | a. Instrumental error | b.Environmental error | | c.Observational error | | d.Random error |  | (1) |
| 7. | Which of the following can act as an inverse transducer? | | | | | | CO1 |  |
|  | a.Potentiometer | b.L.V.D.T | | c.capacitive transducer | | d.Piezo electric crystals |  | (1) |
| 8. | Induction wattmeter can be used in | | | | | | CO1 |  |
|  | a. AC circuit only | b. DC circuit only | | c. both AC and DC circuit | | d. 3 phase AC only |  | (1) |
| 9. | An example for null type instrument \_\_\_\_\_\_\_\_\_\_\_. | | | | | | CO1 |  |
|  | a. Wheatstone bridge | b. Potentiometer | | c. a & b | | d. none of the answer |  | (1) |
| 10. | Calculate the value of the unknown resistance of a Wheatstone bridge, assuming the bridge to be in balance condition | | | | | | CO2 |  |
|  | a.21 | b. 26 | | c.31 | | d. 25 |  | (1) |
| 11. | Write the equation of inductance measurement using Maxwell bridge | | | | | | CO2 |  |
|  | a. LX = R2 R3 C1 | | b. LX = R2 R3/ R4 | | c. LX = Z1 Z2 / Z3 | d. none of the answer |  | (1) |
| 12. | The quality factor of an inductor is given as. | | | | | | CO2 |  |
|  | a. Q=ωL/R | b. Q=ωR/L | | c. Q=ωCLR | | d. Q=ωLR |  | (1) |
| 13. | Mention the bridge used for measurement of inductance having low Q factor. | | | | | | CO2 |  |
|  | a.Schering | b. Maxwell Bridge | | c. Hays | | d. Desauty |  | (1) |
| 14. | In figure, Z1 = 200∠60° Ω, Z2 = 400∠ - 90° Ω, Z3 = 300∠0°. Find Z4 for AC bridges to be balanced.  http://sub.allaboutcircuits.com/images/02241.png | | | | | | CO2 |  |
|  | a. Z4 = 600∠-150° | b. Z4 = 200∠60° | | c. Z4 = 300∠0° | | d. Z4 = 900∠150° |  | (1) |
| 15. | Which one of the following is not an AC bridge? | | | | | | CO2 |  |
|  | a.Maxwell bridge | b.Desauty’s bridge | | c.Schering bridge | | d.Wheatstone bridge |  | (1) |
| 16. | Which of the following is used as detector in audio frequency ac bridges? | | | | | | CO2 |  |
|  | a. ac voltmeter | b. CRO | | c. Head phones | | d. Vibration galvanometer |  | (1) |
| 17. | Thermocouples | | | | | | CO2 |  |
|  | a. are most commonly used temperature transducers | b. require reference junction compensation | | c. have a low output voltage level | | d. all the above |  | (1) |
| 18. | The most effective material used in RTD for temperature measurement is | | | | | | CO2 |  |
|  | a. Nickel | b. Platinum | | c. Copper | | d. Semiconductor |  | (1) |
| 19. | Commutator type tachometers can be used for | | | | | | CO2 |  |
|  | a. AC supply | b. DC supply | | c. Both AC and DC supply | | d. None of these |  | (1) |
| 20. | The induction type single-phase enegy meters uses | | | | | | CO2 |  |
|  | a. Control spring | b. Pointer | | c. Brake magnet | | d. All of these |  | (1) |

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| 21. | Which of the following are integrating instruments | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. ammeters | | | b. voltmeter | | | | | | c.wattmeter | | | | | d.Energy Meter | | | |  | (1) |
| 22. | Which one is free running multivibrator? | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. monostable | | | b. bistable | | | | | | c. astable | | | | | d. none of the answer | | | |  | (1) |
| 23. | Give example for astable multivibrator | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a.Oscillators | | | b. square wave generators | | | | | | c. both (a) & (b) | | | | | d. timer | | | |  | (1) |
| 24. | Application for bistable multivibrator? | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. Flip flop circuits | | | b. square wave generators | | | | | | c. voltage controlled oscilator | | | | | | | | d. all the answer |  | (1) |
| 25. | The duty cycle for square wave generator \_\_\_\_\_\_\_\_\_\_ | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. 0.5 | | | b. 2.5 | | | | | | c.3.5 | | | | | | d.none | | |  | (1) |
| 26. | In a phase shift oscillator, the frequency determining elements are \_\_\_\_\_\_\_\_\_. | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. L and C | | | b. R, L and C | | | | | | c. R and C | | | | | d. None of the above | | | |  | (1) |
| 27. | A Wien bridge oscillator uses \_\_\_\_\_\_\_ feedback | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. Only positive | | | | | b.Only negative | | | | c.Both positive and negative | | | | | d.None of the above | | | |  | (1) |
| 28. | Multivibrators belong to the category of \_\_\_\_\_\_\_\_\_\_\_\_\_. | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. Square wave oscillators | | | | | b. Triangular wave oscillators | | | | c. Ramp wave oscillators | | | | | d. Sinusoidal oscillators | | | |  | (1) |
| 29. | Barkhausen criterion for sustained oscillation gives \_\_\_\_\_\_\_\_ | | | | | | | | | | | | | | | | | | CO2 |  |
|  | a. Aß = 1 | | | | | b. Aß = 0 | | | | c. A = ß | | | | | d. A = 1/ß | | | |  | (1) |
| 30. | Which of these signal analysers can be used for AF applications. | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Hormonic distortion analyser | | | | | b. frequency selective wave analyser | | | | c. Power Analyser | | | | | d. Hetrodyne Wave analyser | | | |  | (1) |
| 31. | A spectrum analyzer displays received signals in the frequency domain. | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. True | | b. False | | | | | c. none | | | | d. not applicable | | | | | | |  | (1) |
| 32. | Types of LCD | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Dynamic scattering LCD | | | | | | b. field effect LCD | | | | | | c. both | | | | d. none | |  | (1) |
| 33. | transmittive type cell is an example of | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. LCD | b. LED | | | | | c. Seven segment display | | | | | | | | d. none | | | |  | (1) |
| 34. | Give an example of optical diode | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. zener diode | | | | | b. LED | | | | c. LCD | | | | | d. none | | | |  | (1) |
| 35. | What are the types of seven segment LED? | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Common anode type | | | | | b. common cathode type | | | | c. both | | | | | d. none | | | |  | (1) |
| 36. | The \_\_\_\_\_\_\_\_\_ of a recording system is the magnitude of input voltage required to produce a standard deflection in a recorded trace. | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Accuracy | | | | | b. Linearity | | | | c. Sensitivity | | | | | d. Resolution | | | |  | (1) |
| 37. | A recorder is said to have good frequency response when the sensitivity of the system is \_\_\_\_\_\_\_\_\_ for all frequencies present in the signal | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Unity | | | | | b. Zero | | | | c. Infinity | | | | | d. Constant | | | |  | (1) |
| 38. | A chopper amplifier | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Converts AC signal from low frequency to high frequency | | | | | b. Converts DC signal from low AC frequency to high frequency | | | | c. Converts AC signal from low frequency to DC high frequency | | | | | d. Converts DC signal from low frequency to high frequency | | | |  | (1) |
| 39. | Stress and strain curves are plotted using | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. Magnetic tape recording | | | | b. X-Y recording | | | | c. Galvanometric | | | | | d. PMMC writing systems | | | | |  | (1) |
| 40. | Data acquisition is the process in which, physical variables from the real world are\_\_\_\_\_ | | | | | | | | | | | | | | | | | | CO3 |  |
|  | a. converted into electrical signals | | | | | b. modified and converted into a digital format for processing | | | | | c. both a & b | | | | d. analog signal processing | | | |  | (1) |
| **PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)** | | | | | | | | | | | | | | | | | | | | |
| 41. | Why is Damping Torque necessary in indicating instruments? Sketch the curves showing the different damping conditions. | | | | | | | | | | | | | | | | | | CO1 | (5) |
| 42. | Draw the circuit of a Wheatstone bridge and derive the condition for balance. Mention the limitations of Wheatstone bridge. | | | | | | | | | | | | | | | | | | CO1 | (5) |
| 43. | Describe how an unknown capacitance is measured with the help of D’Sauty’s bridge. | | | | | | | | | | | | | | | | | | CO1 | (5) |
| 44. | How is LVDT used in the measurement of pressure? Explain with a neat diagram. | | | | | | | | | | | | | | | | | | CO1 | (5) |
| 45. | Portray the constructional diagram of Electrodynamometer type instrument used for power measurement. | | | | | | | | | | | | | | | | | | CO1 | (5) |
| 46. | Describe the construction and working principle of Thermo Instruments. | | | | | | | | | | | | | | | | | | CO2 | (5) |
| 47. | Draw and explain the diagram for Mono-Stable Multivibrator. | | | | | | | | | | | | | | | | | | CO2 | (5) |
| 48. | Draw and explain the principle of Harmonic distortion analyser. | | | | | | | | | | | | | | | | | | CO3 | (5) |
| 49. | Explain the principle and construction of Light Emitting Diode. | | | | | | | | | | | | | | | | | | CO3 | (5) |
| 50. | with the block diagram explain the generalized Data Acquisition System. | | | | | | | | | | | | | | | | | | CO3 | (5) |
| **PART C( 2 X 10 = 20 MARKS) (ANSWER ANY TWO)** | | | | | | | | | | | | | | | | | | | | |
| 51. | Describe the construction and working of PMMI instrument. Derive its torque equation. | | | | | | | | | | | | | | | | | | CO1 | (10) |
| 52. | Discuss the principle of operation and construction of Single-Phase Induction Type Energy Meter with neat diagram. Discuss its advantages and disadvantages. | | | | | | | | | | | | | | | | | | CO2 | (10) |
| 53. | Describe the functioning of a basic type of strip chart recorder. Explain the different types of marking mechanisms used in it. | | | | | | | | | | | | | | | | | | CO3 | (10) |

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