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Code No. : 14348 AS

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. (E.E.E.) IV-Semester Advanced Supplementary Examinations, September-2022.****Electrical Measurements and Instrumentation**

Time: 3 hours

Max. Marks: 60

*Note: Answer all questions from Part-A and any FIVE from Part-B***Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	Describe the static characteristics of measuring instruments?	2	1	1	1,2,3
2.	Find the multiplying power of a shunt of 200Ω resistance used with a galvanometer of 1000Ω resistance. Determine the value of shunt resistance to give a multiplying power of 50?	2	4	1	1,2,3
3.	Define energy? What are errors occur in energy meter?	2	1	2	1,2,3
4.	Explain about Lissajous Patterns?	2	3	2	1,2,3
5.	What are the advantages and disadvantages of wheat stone bridge?	2	2	3	1,2,3
6.	Draw the Anderson's bridge circuit and its phasor diagram?	2	1	3	1,2,3
7.	What is meaning of standardization? List out the applications of DC potentiometers?	2	2	4	1,2,3
8.	Distinguish between CT and PT?	2	2	4	1,2,3
9.	What is transducer? List out the classification of electrical transducers?	2	1	5	1,2,3
10.	What is LVDT? Write its applications?	2	1	5	1,2,3
Part-B (5×8 = 40 Marks)					
11. a)	Explain the measurement of reactive power in balanced 3-Ø system with neat sketch?	4	2	1	1,2,3
b)	The coil of a PMMC instrument has 60 turns on a former, that is 18mm wide and 25mm length of the conductor. It moves in a uniform field of flux density is 0.5 Tesla. The control spring constant is 1.5×10^{-6} N-m/degree. Calculate the required to produce a deflection of 100 degree?	4	4	1	1,2,3
12. a)	Derive the expressions for deflecting and braking torques for 1-Ø induction type energy meter?	4	4	2	1,2,3
b)	Explain the construction and working principle of electro dynamo type of power factor meters?	4	1	2	1,2,3

Contd... 2

13. a)	Describe about to measure the unknown capacitance value using schering bridge with its phasor diagram?	4	2	3	1,2,3
b)	A 4-terminal resistor was measured with the help of a Kelvin's double bridge having the following components: Standard resistor = $98.02n\Omega$, inner ratio arms = 98.022Ω , and 202Ω , outer ratio arms = 98.025Ω and 201.96Ω , Resistance of the link connecting the standard resistance and the unknown resistance = $600n\Omega$. Calculate the value of the unknown resistance.	4	4	3	1,2,3
14. a)	What are the differences between a potential transformer and a regular power transformer? Explain why secondary of CT cannot be kept in open circuit condition?	4	2	4	1,2,3
b)	A bar type CT has 400 turns in the secondary winding. The impedance of the secondary circuit is $(2+j1.5)\Omega$, with 4A flowing in the secondary and the magnetizing mmf is 80AT and the iron loss is 1 watt. Determine the ratio and phase angle errors?	4	4	4	1,2,3
15. a)	Describe about measurement of angular velocity with neat sketch?	4	1	5	1,2,3
b)	Describe with suitable diagrams the working principle of strain gauges. Describe the terms Poisson's ratio and gauge factor?	4	2	5	1,2,3
16. a)	Derive the torque expression for dynamometer instrument?	4	3	1	1,2,3
b)	A 220V, 5A energy meter on full-load unity power factor meter test makes 60 revolutions in 360 seconds. If the designed speed of the disc is 550 revolutions per kWh, determine the percentage error?	4	4	2	1,2,3
17.	Answer any <i>two</i> of the following:				
a)	Derive the expression for the unknown inductance value using Maxwell's inductance bridge with its phasor diagram?	4	4	3	1,2,3
b)	Explain the working principle of a DC Crompton potentiometer with a suitable diagram?	4	2	4	1,2,3
c)	Write short notes on inductive transducers and capacitive transducers?	4	2	5	1,2,3

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%
