Sub Code: KEE302

Paper Id: 120322 Roll No: | | | | | | | | | | | | | |

B.TECH
(SEM-III) THEORY EXAMINATION 2019-20
ELECTRICAL MEASUREMENTS & INSTRUMENTATION

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

Qno.	Question	Marks	CO
a.	Two resistance R_1 and R_2 are connected in parallel with R_1=10k ohm ± 5% and R_2=5k ohm ± 10%.Calculate the percentage error.	2	1
b.	Give specific difference between 'accuracy 'and 'precision'?	2	1
c.	What is meant by Q factor of coil?	2	2
d.	Enlist the advantages of Kelvin's double bridge over whetstone bridge?	2	2
e.	Give specific use of Instrument Transformers.	2	3
f.	Give specific difference between load and burden of transformer?	2	3
g.	Find the amplitude of waveform if vertical amplifier is set to 5 V/div and waveform takes 2.5 divisions for peak voltage.	2	4
h.	Draw basic circuit (block diagram) of digital counter.	2	4
i.	Compare Temperature Sensor - Thermistor with Thermocouple.	2	5
j.	Give two examples of smart sensor in day to day life.	2	5

SECTION B

2. Attempt any *three* of the following: 10x3=30

Qno.	Question	Marks	CO
a.	Explain the following term- Drift, Sensitivity and Resolution An instrument that indicate 100 A at FSD has a specified accuracy of 1% .calculate the upper and lower limits of measured current and percentage error in measurement for i. FSD ii. 0.5 FSD	10	1
b.	An AC bridge of 100 Hz has following constant arm AB R=1000Ω, in parallel with C= 0.5 μF: BC R=1000 Ω in series with C=0.5 μF: CD R=200 Ω in series with L=30mH find out constant of arm DA to balance the bridge.	10	2
c.	A current transformer with a bar primary has 200 turns in its secondary winding. The resistance and reactance of secondary circuit are 2.5 Ω and 1 Ω respectively including transformer winding with 4 Amp flowing in secondary winding. The magnetizing MMF is 10Amp turn and iron loss is 1.2 Watt. Find transformation ratio R and phase angel error ω.	10	3
d.	What are the types of digital voltmeters? Explain integrating type of digital voltmeter with neat sketch. What are its specific advantages?	10	4
e.	Discuss working of strain gauge transducer and derive the expression of gauge factor G.	10	5

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SECTION C

3. Attempt any *one* part of the following: 10x1=10

Qno.	Question	Marks	CO
a.	Sketch the basic construction of a typical PMMC instrument & show how a PMMC instrument can be used as DC voltmeter, explain the circuit operation in detail.	10	1
b.	Explain the circuit diagram for multi range voltmeter using individual multimeter resistors and series connected multiplier resistors.	10	1

4. Attempt any *one* part of the following: 10x1=10

Qno.	Question	Marks	CO
a.	Describe the method of inductance measurement using Maxwell's bridge .An Maxwell inductance bridge uses a standard capacitor C_3= 0.1μF balance is achieved when R_1=1.26 KΩ , R_3= 470Ω , R_4= 500Ω find out inductance of measured inductor and Q factor. Supply frequency=100Hz	10	2
b.	Drive the equation of balance for Schering bridge. Draw the phasor diagram for balance condition. Discuss how the dissipation factor of a capacitor can be measured by it.	10	2

5. Attempt any *one* part of the following: 10x1=10

Qno.	Question	Marks	CO
a.	Explain the construction, principle of operation and working of a potential transformer with the help of a phasor diagram.	10	3
b.	Explain in detail use of Silsbee deflection method for testing of current transformer. What are the advantages and disadvantages of instrument transformer?	10	3

6. Attempt any *one* part of the following: 10x1=10

Qno.	Question	Marks	CO
a.	What are major components of CRT explain in detail with diagram? Why the operating voltage in CRT is arranged such that deflection plates are nearly at ground potential?	10	4
b.	Describe the basic circuit of Spectrum analyzer also explain different types of distortion caused by amplifier.	10	4

7. Attempt any *one* part of the following: 10x1=10

Qno.	Question	Marks	CO
a.	Describe construction and working of L.V.D.T with advantages and disadvantages.	10	5
b.	What do you mean by signal conditioning? Describe data acquisition system using proper diagram?	10	5

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