



Regulation 18

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 2P6BB

B.Tech VI Semester Supplementary Examinations, January 2023

ELECTRICAL MEASUREMENTS & INSTRUMENTATION

(EEE)

Maximum Marks: 70

10-01-2023

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Compare between the spring control and gravity control
- 2 Why is damping required for an electromechanical measuring instrument?
- 3 Why is scale of MI instrument calibrated non-linearly?
- 4 What are the steps to be taken for minimizing errors in PT?
- 5 Define the principle of C.T.
- 6 Write Short notes on LPF and UPF wattmeters.
- 7 Write the classification of AC bridge measurement.
- 8 Which instrument is used for measurement of frequency.
- 9 What are active and passive transducers? Give examples.
- 10 What is piezoelectric effect.

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) With a neat diagram explain in detail the construction of PMMC instrument. 6
b) Write the advantages of using PMMC instrument. 4
- 12 Explain about the Electro static Instruments. 10
- 13 For a current transformer with bar primary has 300 turns in its secondary winding. The resistance and reactance of the secondary circuit are 1.5Ω and 1.0Ω respectively including the transformer winding. With 5A flowing in the secondary winding, the magnetizing mmf is 100AT and the core loss is 1.2 W. Determine the ratio and phase angle errors 10

OR

- 14 Evaluate expression for actual transformation ratio, ratio error and phasor angle error of a C.T. 10

- 15 A dynamometer- type watt meter has a field system which may be considered long compared with its moving coils. The flux density is 0.012T . The mean diameter of the moving coil is 5cm and the moving coil turns are 600 . The current through the coil is 0.06A and the power factor of the circuit of which the power is measured is 0.866 . Estimate the torque when the axis of the field and moving coil is 600 . 10
- OR
- 16 Discuss with block diagram, the principle of operation of single phase energy meter. 10
- 17 Evaluate the equation of balance for Anderson bridge and also draw the phasor diagram. 10
- OR
- 18 a) An ac bridge has in arm AB a pure capacitance of $0.2\mu\text{F}$; in arm BC, a pure resistance of 500Ω ; in arm CD, a series combination of $R=50\Omega$ and $L=0.1\text{H}$. Arm DA consists of capacitor $C=0.4\mu\text{F}$ in series with a variable resistor R_x , $\omega=5,000\text{ rad/s}$. Find the value of R_x to obtain bridge balance. 5
- b) Explain the principle of Owen's bridge. 5
- 19 a) Explain the force transducer with neat block diagram. 5
- b) A transducer that measures force has a normal resistance of 300Ω , forms a four arm strain gauge bridge and is excited by 7.5V DC . When the force of 0.1N is applied, all the four strain gauge resistances are changed by 5.2Ω . Find the output voltage and determine its sensitivity. 5
- OR
- 20 a) Explain LVDT with neat diagram. 5
- b) An LVDT with a secondary voltage of 5V has a range of $\pm 25\text{mm}$. 5
- i) Find the output voltage when the core is -18.75mm from centre,
- ii) Plot the output voltage versus core position for a core movement going from $+18.75\text{mm}$ to -10mm .