2018

2nd Semester

PHYSICS

(Honours)

PAPER—C3P

(Practical)

Full Marks : 20

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer *one* questions.

1. Determine the capacitance of a given capacitor using an ac source of low frequency (~ 50 Hz)

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Table for V_R, V_C data for fixed R and a fixed frequency (at least five voltages). 5

(d) Drawing of $V_C \sim I$ curve. 3

(e) Determination of capacitance from graph. 1

(f) Accuracy 1

2. Determine an unknown low resistance using potentiometer.

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Table for null points for at least three different wires. 2×3

(d) Calculation of r 2

(e) Accuracy 1

(f) Discussion 1

3. Determine unknown low resistance using Carey Foster's Bridge.

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Table for determining resistance per unit length (ρ) for at least four sets. 4

(d) Table for determining unknown resistance (R) for at least four sets. 4

(e) Calculation 1

(f) Accuracy 1

4. Verify the Thvenin and Norton theorems

(a) Statement of the theorems 2

(b) Circuit diagram and its implementation 2

(c) $V_L \sim I_L$ (load voltage and load current) data for at least six loads. 6

(d) Draw two separate graphs for two theorems 2+2

(e) Verification summary table 1

5. Verify the Superposition theorem

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Date for voltage (v) and current (I) when one source is switched on alternatively and both sources are switched on (Two times each) 2×3

(d) Calculation 2

(e) Verification table and accuracy 2

6. Verify Maximum power transfer theorem

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Data for $V_L \sim I_L$ or $V_L \sim R_L$ at least for 10 different loads. 5

(d) Draw of $P_L \sim R_L$ graph 3

(e) Conclusion and accuracy 2

7. Determine the resistance of a given galvanometer following Thomson's method.

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Table for the value of the P, Q and R resistance variation and null point detection. 8

(d) Calculation and accuracy 2

8. Study the variation of magnetic field strength (B) along the axis of a solenoid.

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Measure B along the axis of the given solenoid for a fixed current (at least 10 positions) 5

(d) Plot variation of B along the axis 3

(e) Determine $\frac{dB}{dx}$ at two ending points and two mid points. 2

9. Determine self-inductance of a coil by Anderson's bridge (DC balance to be made by the examiner)

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Data for variation of 'r' with at least five different capacitors. 5

(d) Drawing graph $\frac{1}{c} \sim r$

(e) Calculation of 'L' from graph. 3

10. Study the response curve of a series LCR circuit.

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Data for current Vs. frequency graph (at least 10 frequencies) 5

(d) Draw graph ($I \sim f$) to show resonance point and band width 2

(e) Determination of impedance at resonance, quality factor and Band width. 3

11. Study the response curve of a parallel LCR circuit and determine its antiresonance frequency

(a) Theory 3

(b) Circuit diagram and its implementation 2

(c) Data for frequency Vs. impedance graph (at least 10 frequencies) 5

(d) Drawing of frequency Vs. impedance graph 3

(e) Determine antiresonance frequency and quality factor. 2

LNB—02, Viba-Voce—03

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