UG/2nd Sem/PHYS/G/19(Pr)

2019

B.Sc. (General)

2nd Semester Examination

PHYSICS

Paper - DSC 1BP

[Practical]

Full Marks : 20 Time : 3 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Answer any *one* question : 1×5=15

1. Determine an unknown low resistance by using a Carey-Foster's fridge.

   (a) Theory. 2

   (b) Circuit diagram and its implementation. 2

   (c) Table for the determination of resistance per unit length (ρ) of the bridge wire for at least three *sets.* 4

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(d) Table for the determination of the unknown resistance (R) for at least three sets. 4

(e) Calculation. 2

(f) Accuracy. 1

2. Verify the Thevenin and Norton theorems.

(a) Statement of the theorems. 2

(b) Circuit diagram and its implementation. 2

(c) Data for load voltage (V_L) and load current (I_L) for at least six different loads. 6

(d) Drawing of two separate graphs for two theorems. 2+2

(e) Verification summary table. 1

3. Verify the Superposition theorem.

(a) Theory. 3

(b) Circuit diagram and its implementation. 2

(c) Data for voltage (V) and current (I) when one source is switched on alternatively and both sources are switched on. 6

(d) Calculation. 2

(e) Verification table. 2

4. Verify the Maximum power transfer theorem.

   (a) Theory. 3

   (b) Circuit diagram and its implementation. 2

   (c) Data for load voltage (V_L) and load current (I_L) (or, load resistance (R_L)) (use at least 10 different loads) 5

   (d) Drawing of $P_L - R_L$ graph. 3

   (e) Calculation. 2

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

   (a) Theory. 3

   (b) Circuit diagram and its implementation. 2

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

   (d) Drawing of Vc – I curve. 3

   (e) Determination of capacitance from graph. 1

   (f) Accuracy. 1

6. *Study the response curve of a series LCR circuit.*

   (a) Theory. 3

(b) Circuit diagram and its implementation. 2

(c) Data for current (I) vs. frequency (f) graph (for at least 10 frequencies). 5

(d) Drawing of I vs. f graph. 3

(e) Determination of resonance frequency and quality factor. 2

7. Study the response curve of a parallel LCR circuit and determine the anti-resonance frequency.

(a) Theory. 3

(b) Circuit diagram and its implementation. 2

(c) Data for impedance (Z) vs. frequency (f) graph (for at least 10 frequencies). 5

(d) Drawing of Z vs. f graph. 3

(e) Determination of anti-resonance frequency and quality factor. 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) Measurements of B along the axis of the given

solenoid for a fixed current (for at least 10 positions). 5

(d) Plot of the variation of B along the axis (x). 3

(e) Determination of $\frac{dB}{dx}$ at two end points and at the mid point on the axis. 2

9. Determine an unknown high resistance by the method of leakage of charge of a condenser by using a ballistic galvanometer. (The natural leakage resistance of the condenser will be supplied by the examiner).

(a) Theory. 3

(b) Circuit diagram and its implementation. 2

(c) Measurement of first throw (d_0) of the spot of light when the fully charged capacitor is discharged through the galvanometer. 2

(d) Data for effective resistance (Re). 3

(e) Log $\log\frac{do}{d}$ vs. t graph. 3

(Here d is the first throw when a residual charge is passed through the galvanometer). 3

(f) Calculation and accuracy. 2

[Turn Over]

10.	Laboratory Note Book.	2
11.	Viva-Voce.	3