

This question paper contains 4 printed pages.]

Your Roll No.

1235

B.Sc. (Hons.)/III A

PHYSICS – Paper XXIII & XXIV

(Physics Lab. – III & IV)

• **Time : 1 Hour** **Maximum Marks : 20**

• *(Write your Roll No. on the top immediately on receipt of this question paper.)*

Attempt 10 questions from each section and 20 questions in all. All questions carry equal marks.

SECTION – A

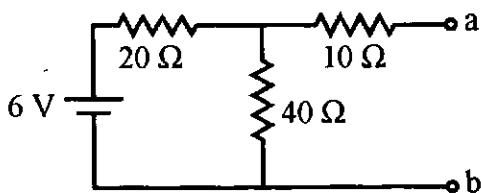
1. What is the effect of introducing a core of magnetic material in a solenoid on the measurement of \vec{B} and $d\vec{B}/dx$?
2. What is the utility of drawing the hysteresis loop ?
3. How does the magnetisation of a paramagnetic substance change with
 - (i) temperatures
 - (ii) intensity of magnetising field

4. Differentiate between plane polarised and circularly polarised light.
5. What is the Brewster angle for glass given that its refractive index in air = 1.5 ?
6. How does the specific rotation of cane sugar vary with temperature ?
7. State Stefan's Law for a black body.
8. In $\frac{e}{m}$ by Magnetic focussing expt., what should be the maximum value of the focal length in terms of the length of the tube ?
9. Why don't Si and Ge emit light ?
10. Why is it useful to have pressure contacts for passing current and measuring voltage across a semiconductor in the four-probe method ?
11. On what factors does the sign of Hall's coefficient depend ?
12. What are the requisites of a sample used for the determination of Hall coefficient ?
13. Give expressions for Hall electric field (E_H). How is it related to the electric field across the sample length (E) ?
14. Explain what is meant by Rydberg constant.
15. What is the ratio of the short wavelength limits of Lyman and Balmer series ?

SECTION – B

1. Give a comparison of any two parameters of full wave bridge rectifier circuit and a centre-tapped one.
2. What is the role of a filter in a rectifier circuit ?
3. Why is the voltage divider biasing the most commonly used in R-C coupled amplifier ?
4. Draw frequency response curves for a CE amplifier for load resistance R_L and $2R_L$.
5. List the differences between n-channel and p-channel FET.
6. Draw the shape of the output of an integrator circuit for a sinusoidal input $E_0 \sin \omega t$, given that the Op-Amp has a gain of 1000, $V_{CC} = \pm 12 \text{ V}$ and $E_0 = 50 \text{ mV}$.
7. What is modulation ? Name the types of modulation.
8. Draw amplitude modulated waves having modulation index greater than, less than and equal to 1.
9. Draw the static emitter characteristics of an UJT and label the important features.

10. Define duty cycle. How is the duty cycle in an astable multivibrator varied ?
11. What is the effect on frequency of a piezoelectric crystal when its thickness is decreased by 1% ?
12. Mention important differences between solar cells and photo diodes.
13. In a circuit maximum power is transferred to a resistive load of 200Ω . What is the value of Thevnin resistance of the circuit ? Why ?
14. Draw a circuit for an astable multivibrator.
15. Draw the Norton equivalent circuit for the given circuit.



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