



**Shree H. N. Shukla College of Science Rajkot**  
**B.Sc. (Sem. - III) (CBCS)**  
**[301-PHYSICS]**  
**PRELIMS EXAM (2018-19)**

[Time: 2:30 Hour]  
[ / / 2018]

[Total Marks: 70]

**Q-1 (A) Give the following answer [04]**

- 1) Define vectors quantity.
- 2) Wrote formula for vector operator.
- 3) State the fundamental theorem for divergence.
- 4) Write an equation for curl of vector.

**Q-1 (B) Give the following answer (Any One) [02]**

- 1) Explain the scalar product of two vectors.
- 2) Discuss the term divergence.

**Q-1 (C) Give the following answer (Any One) [03]**

- 1) Discuss, scalar triple product.
- 2) Explain the curl of vector and its geometrical interpretation.

**Q-1 (D) Give the following answer (Any One) [05]**

- 1) Explain the vector transform for two and three dimensional case.
- 2) State and prove the product rules for gradients.

**Q-2 (A) Give the following answer [04]**

- 1) State the coulomb's law
- 2) What is the unit of electric field intensity?
- 3) Give the statement of Gauss's law.
- 4) Define equi potential.

**Q-2 (B) Give the following answer (Any One) [02]**

- 1) Explain electric field.
- 2) Discuss line charge distribution.

**Q-2 (C) Give the following answer (Any One) [03]**

- 1) Explain the field line.
- 2) Find the electric field around a infinite line of charge.

**Q-2 (D) Give the following answer (Any One) [05]**

- 1) Derive the Gauss's theorem.
- 2) Explain work done to move charge.

**Q-3 (A) Give the following answer [04]**

- 1) What is Biot-Savart's law?
- 2) What is call steady current?

**Q-3 (B) Give the following answer (Any One) [02]**

- 1) Explain cyclotron motion.

2) What is the equation for steady currents?

**Q-3 (C) Give the following answer (Any One) [03]**

- 1) Explain Lorentz force law.
- 2) Derive equation of continuity.

**Q-3 (D) Give the following answer (Any One) [05]**

- 1) Give the quantitative explanation of cycloid motion.
- 2) Explain straight field line currents.

**Q-4 (A) Give the following answer [04]**

- 1) What are the nonpolar molecules?
- 2) Define macroscopic electric field.
- 3) Define: paramagnets.
- 4) Define: magnetization  $M$ .

**Q-4 (B) Give the following answer (Any One) [02]**

- 1) Give the mechanism responsible for paramagnetism.
- 2) Define linear media.

**Q-4 (C) Give the following answer (Any One) [03]**

- 1) Explain the magnetization of material.
- 2) Explain the polarization of matter.

**Q-4 (D) Give the following answer (Any One) [05]**

- 1) Give the physical interpretation of bound charges.
- 2) Obtain expression of Ampere's law in magnetized material.

**Q-5 (A) Give the following answer [04]**

- 1) How many possible ways of transistor connection in a circuit? Give its name.
- 2) What is cut off point of transistor?
- 3) A CE amplifier is also known as \_\_\_\_\_ circuit.
- 4) What is the function of bypass capacitor?

**Q-5 (B) Give the following answer (Any One) [02]**

- 1) What is meant by a single stage transistor amplifier?
- 2) Define frequency response and band width.

**Q-5 (C) Give the following answer (Any One) [03]**

- 1) Find the voltage gain of an amplifier having  $R_c = 3k \text{ ohm}$ ,  $R_e = 3k \text{ ohm}$ ,  $R_1 = 6K \text{ ohm}$ ,  $R_{in} = 1k \text{ ohm}$  and  $\beta = 100$ .
- 2) For the voltage divider circuit, calculate emitter current and collector emitter voltage. Given that  $R_1 = 10K \text{ ohm}$ ,  $R_2 = 5k \text{ ohm}$ ,  $R_c = 1K \text{ ohm}$ ,  $R_E = 2k \text{ ohm}$ ,  $V_{cc} = 15V$ ,  $\beta = 50$  and  $V_{BE} = 0.7V$ .

**Q-5 (D) Give the following answer (Any One) [05]**

- 1) Explain frequency response and bandwidth.
- 2) Explain basic conditions of faithful amplification in detail.