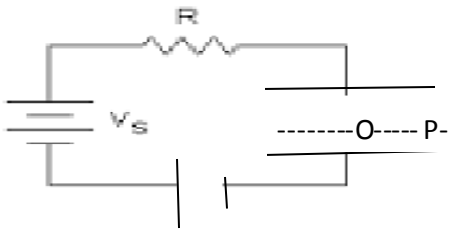
# ELECTROMAGNETIC WAVES

## Test Paper-I

**MAX MARKS: 30** **TIME: 90Mts**

| Sl. No. | QUESTION | ANSWER PAGE | MARKS |
|---|---|---|---|
| **1** | Which effect explains the existence electromagnetic waves? | **Page:270** | 1 |
| **2** | Give the Maxwell's equations of Electromagnetic waves. | **Page:273** | 2 |
| 3 | Give the length of Electromagnetic spectrum. | **Page:270** | 1 |
| 4 | What is meant by conduction current? | **Page:271** | 1 |
| 5 | What is displacement current? Give the formula to find the displacement current. | **Page:271** | 2 |
| 6 | Explain how Gauss's law gets modified when applied to the region between the plates of a capacitor. What is Ampere-Maxwell law? | **Page:271** | 3 |
| 7 | State Faraday's law of electromagnetic induction in terms of changing magnetic field. What is the consequence of displacement current as a source of magnetic field? How can you get existence of electromagnetic waves? (Or) Give the importance of Ampere-Maxwell law. | **Page:272** | 3 |
| 8 | A parallel plate capacitor with circular plates of radius 1m has a capacitance of 1nF. At t=0, it is connected for charging in series with a resistor R=1MΩ across a 2V battery. Calculate the magnetic field at a point P, halfway between the centre and the periphery of the plates, after t= $10^{-3}$s. (The charge on the capacitor at time t is q(t)= CV[1-exp(-t/τ)], where the time constant τ is equal to CR). | **Page:273** | 3 |

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|---|---|---|---|
| 9 | How electromagnetic waves can be produced? | **Page:274** | 2 |
| 10 | Give any four properties of electromagnetic waves | **Page:276** | 2 |
| 11 | Give the formula to find the velocity of light. State the factors on which the velocity of light depends upon. | **Page:276** | 2 |
| 12 | What is the basis on which unit of time can be defined accurately? | **Page:277** | 1 |
| 13 | Give one practical evidence that electromagnetic waves are polarised. | **Page:277** | 1 |
| 14 | What is meant by radiation pressure of an electromagnetic wave? | **Page:277** | 1 |

15 A Plane electromagnetic wave of frequency 25 MHz travels in free space along the X-direction. At a particular point in space and time, E=6.3j^ V/m. What is B at this point 2

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16 The magnetic field in a plane electromagnetic wave is given by **Page:278**

$B_y$= 2X 10-7 sin (0.5X$10^3$x + 1.5 X $10^{11}$t) T. 3

a. What is the wave length and frequency of the wave?

b. Write an expression for the electric field.