**JIYA LAL MITTAL DAV PUBLIC SCHOOL**

**GRADE – XII SA-I (SEPT, 2015)**

**SUBJECT – PHYSICS**

**TIME: 3hrs. M.M-70**

**General Instructions:**

1. **All questions are compulsory.**
2. **There are 26 questions in total.**
3. **Questions 1 to 5 are very short answer questions and carry 1 mark each.**
4. **Questions 6 to 10 carry 2 marks each.**
5. **Questions 11 to 22 carry 3 marks each.**
6. **Questions 23 is value based question and carry 4 marks.**
7. **Questions 24 to 26 carry 5 marks each.**
8. **Use of calculator is not permitted. However, you may use log tables if necessary.**

1. Find number of electrons in one coulumb of charge.
2. Write two limitations of coulumb’s law.
3. In what condition does a charge particle moving through magnetic field follow a circular path?
4. The peak value of e.m.f applied to an inductor is Eo. Find its:
5. r ms and (b) average value over a complete cycle
6. What is the value of magnetic field due to current flowing in given wires at point o ?
7. A metallic sphere have inner radius R1 and outer R2 A charge. Q is placed at its center cavity. What will surface charge density on:
8. The inner surface
9. Outer surface
10. The given graph is for capacitor C1 and C2. They have same plate separation, but the plate area of C2 is double that of C1. which of line is corresponding to C1 and C2 and why?

1. How does resistivity of :
2. conductor and
3. Insulators vary with temperature? Give reason in each case.
4. Predict the direction of induced current in metal rings 1 and 2 lying in same plane where current I in the wire is increases steadity. Give reason.
5. Write two applications of eddy currents.
6. A uniform electric field E=Ex i N/C for x>0 and E=-Exi N/C for x<0 are given. A right circular cylinder of length l cm and radius r cm has its centre at origin and along its x-axis. Find out net outward flux. Using gauss’s law, write the expression for net charge with in the cylinder.
7. Write the expression for torque and force on an electric dipole kept in uniform electric field.
8. Two point charges 4Q and Q placed at im in air. At what point on the line joining the charge is electric field is zero? also calculate electrostatic potential energy if charge is Q=2 X 10-7C.
9. Use Kirchhoff’s law to determine the value of I1 in given circuit.
10. Drive the expression for magnetic field on the axis of a current carrying circular loop.
11. With the help of a circuit, show that how the galvanometer can be converted into ammeter? Also find the value to applied resistance.
12. How the capacitor and inductor behave for AC and DC. Explain.
13. A circuit containing 80mH inductor, 60MF capacitor and 15 resistor are connected to 230V, 50Hz supply obtain the average power transferred to each element of circuit and total power absorbed.
14. Prove the condition of wheat stone bridge.
15. What is TANK circuit? Write its various steps with diagram.
16. Define the terms.
17. Angle of Dip
18. Angle of inclination
19. Nutral point
20. What are wattfull and wattless current? Draw the necessary diagram.
21. Dimpi’s class was shown a video on effects of magnetic field on a current carrying straight conductor. She noticed that the force on the straight current carrying conductor becomes zero when it is oriented parallel to the magnetic field and this force becomes maximum when it is perpendicular to the field. She shared this interesting information with her grandfather in the evening. The grandfather could immediately relate it to something similar in real life situations. He explained it to Dimpi that similar things happen in real life too. When we align and orient our thinking and actions in an adaptive and accommodating way, our lives become more peaceful and happy. However, when we adopt an unaccommodating and stubborn attitude, life becomes troubled and miserable. We should therefore always be careful in our response to different situations in life and avoid unnecessary conflicts.

**Answer the following questions based on above information:**

1. Express the force acting on a straight current carrying conductor kept in a magnetic field in vector form. State the rule used to find the direction of this force.
2. Which one value is displayed and conveyed by grandfather as well as Dimpi?
3. Mention one specific situation from your own life which reflects similar values shown by you towards your elders.
4. Write the construction, working and theory of cyclotron also find the cyclotron frequency. Or

Show that the path followed by a charge particle in uniform electric field is parabolic and in uniform magnetic field. What will be the shape of its path if it is entered at right angle?

1. Find the expression for electric field on the axial line of electric dipole. Or

Find the expression for electric field on the equatorial line of an electric dipole.

1. Which device is used to measure or detect the current? Write its principle, construction and working. How the sensitivity of this device can be increased?

Or

 What is a potentiometer? How is it used? Explain its two uses.