**Guess Paper- 2013**

**Subject: Physics**

**Class 12th**

**SET A**

***Time allowed: 3 hours Maximum Marks: 70***

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| ***General Instructions:***  ***(i) All questions are compulsory..***  ***(iii) Q.No. 1 to 8 are very short answer type questions, carrying one mark each.***  ***(iv) Q.No numbers 9 to 16 are short answer type questions, carrying two marks each.***  ***(v) Q.No. 17 to 25 are also short answer type questions, carrying three marks each.***  ***(vi)Q.No. 26 is a value based question, carrying four marks***  ***(vi) Q.No. 27 to 29 are long answer type questions, carrying five marks each.***  ***(viii) You may use the following values of physical constants wherever necessary***  **c=3x108 m/s h=6.6 x 10-34 Js e=1.6 x 10-19 C NA = 6.023 x 1023 /mole mn = 1.67 x 10-27 kg µ0 =4π x 10-7 T-m/A** **me = 9 x 10-31  kg** |

**Q1.** A point charge Q is placed at point O as shown in figure.Is potential difference VA- VB positive ,negative or zero ,if Q is (i) positive (ii) negative?

**Q2.** If a wire is stretched to double its original length without loss of mass, how will resistivity of the wire be influenced?

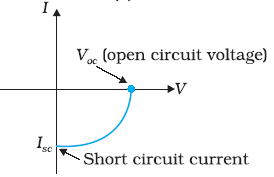
**Q3.** The permeability of magnetic material is 0.9983 .Name the type of magnetic material it represents.

**Q4.** Define the term wattles current.

**Q5.** How are radio waves produced?

**Q6.** In a single slit diffraction experiment, the width of the slit is made double the original width. How does this affect the size and intensity of central diffraction band?

**Q7.** Name the device which shows the variation of current (I) with voltage (V) as shown:



**Q8.** Define the term Transducer for a communication system.

**Q9.** N spherical droplets each of radius r have been charged to have a potential V each. If all these droplets were to coalesce to form a single large drop, what would be the potential of this large drop?

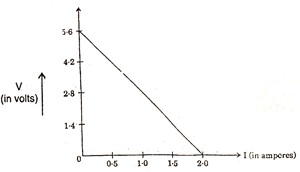
Or

Plot a graph showing the variation of force F versus 1/r2 where r is the distance between the two charges of each pair of charges (1C,2C) and (12C,-3C).Interpret the graphs obtained.

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**Q10.** 4 cells of identical emf E, internal resistance r, are connected in series to a variable resistor. The following graph shows the variation of terminal voltage of the combination with the current output:



(i) What is the emf of each cell used?  
(ii) For what current from the cells, does maximum power dissipation occur in the circuit?

**Q11.** A magnetic needle free to rotate in a vertical parallel to the magnetic meridian has its north tip down at 600 with the horizontal. The horizontal component of the earth’s magnetic field at the place is known to be 0.4G.Determine the magnitude of the earth’s magnetic field at the place.

**Q12.** (i) Define modulation index. (ii) Why is the amplitude of modulating signal kept less than the amplitude of carrier wave?

**Q13.** In young’s double slit experiment, the two slits0.15 mm apart are illuminated by monochromatic light of wave length 450 nm. The screen is 1 m away from the slits.

1. Find the distance of the second bright fringe and second dark fringe from the central maximum.
2. How will the fringe pattern change if the screen is moved away from the slits?

**Q14.** An electron is accelerated through a potential difference of 100 volts .What is the de Broglie wave length associated with it ? To which past of electromagnetic spectrum does this value of wavelength correspond?

**Q15.** An electron is moving at 106 m/s in a direction parallel to a current of 5 A, flowing through an infinitely long straight wire, separated by a perpendicular distance of 10cm in air. Calculate the magnitude of the force experienced by the electron. What is the direction of this force?

**Q16.** Explain how a depletion region is formed in junction diode.

**Q17.** Describe briefly with the help of a circuit diagram, how the common emitter transistor act as an switch.

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**Q18.** Two convex lenses of same focal length but of aperture A1 and A2 (A2 > A1) are used as the objective lenses in two astronomical telescopes having identical eyepieces .What is the ratio of their resolving power? Which telescope will you prefer and why? Give reason.

**Q19.**Define relaxation time of free electrons drifting in a conductor .How its related to the velocity of electrons? Use this relation to deduce the expression for the electrical resistivity of the material

**Q20.** In the circuit shown R1= 4Ω, R2= R3= 15Ω, R4= 30Ω and E= 10V.Calculate the equivalent resistance of the circuit and the current in each resistor.



**Q21.** How a secondary rain bow is formed? Draw the diagram of the secondary rainbow formation through a water drop. How it is different from primary rain bow?

**Q22.**Show that in an ac circuit containing a pure inductor, the voltage is ahead of current by 900 in phase.

**Q23.** A bar magnet is placed in a uniform magnetic field find the expression of net force and torque .Write the expression of the work done as bar magnet rotates from angle α to β .

**Q24.**State Huygens’s postulates and verify Snell's law of refraction using wave theory.

**Q25. (a)** Depict the equipotential surfaces for a system of two positive point charges placed a distance d apart.

(b) Find the expression for the potential energy of a system of two point charges q1 and q2 separated by a distance r .

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**Q26.** Students of electronics club of a school put warning labels of DANGER. On the high voltage electronic components e.g UPS of computer laboratory, meter box of supply etc. Principal of school honoured the group.

1. What are the values recognized by the school administration
2. Why the appliances containing capacitors are dangerous even after switching off?

**Q27**. **(a)** Explain input and output characteristics of a common emitter transistor graphically. Draw the circuit diagram. (b)Two amplifiers are connected one after the other in series (cascaded).The first amplifier has a voltage gain of 10 and the second has a voltage gain of 20. If the input signal is 0.01 volt, calculate the output ac signal.

OR

(a)Describe briefly, with the help of a diagram, the role of the two important processes involved in the formation of p-n junction. (b) Name the device which is used as voltage regulator. draw the necessary circuit diagram and explain its working.

**Q28.** With the help of a labeled diagram, explain the principle and working of a moving coil galvanometer. (b) Two moving coil meters M1 and M2 have the following particulars:

R1 =10Ω N1 =30 A1 =3.6 X 10-3 m2 B1=0.25T

R2 =14Ω N2 =42 A2 =1.8X 10-3 m2 B2=0.50T

(Spring constants are identical) Determine the ratio of (a) Current Sensitivity and (B) voltage sensitivity of M2 and M1.

**OR**

1. Explain, giving reasons, the basic difference in converting a galvanometer into (i) a voltmeter and (ii) ammeter.
2. Two long straight parallel conductors carrying currents I1 and I2 are separated by a distance d. Explain briefly, with the help of a suitable diagram, how the magnetic field due to one conductor acts on the other. Hence deduce the expression for the force acting between the two conductors .Mention the nature of this force.

**Q29.** (a) How does an unpolarized light incident on a Polaroid get polarized? Describe briefly, with the help of necessary diagram, the polarization of light by reflection from a transparent medium. (b) Two polaroids A and B are kept in crossed position. How should a third Polaroid C be placed between them so that the intensity of polarized light transmitted by Polaroid B reduces to 1/8th of the intensity of unpolarized light incident on A?

OR

1. **A thin lens ,having two surfaces of radii of curvature R1 and R2 made from a material of refractive index µ2 , is kept in a medium of refractive index µ1.Derive the Lens Maker’s formula for this set-up**
2. **A convex lens is placed over a plane mirror. A pin is now positioned so that there is no parallax between the pin and its image formed by this lens-mirror combination. How can this observation be used to find the focal length of the convex lens? Give appropriate reasons in support of your answer.**

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