PHYSICS

BOOKS - CBSE COMPLEMENTARY MATERIAL PHYSICS (HINGLISH)

CBSE EXAMINATION PAPER - 2016

Section A

1. 'A point charge +Q is placed at point O as shown in the figure. Is the potential difference

$V_A - V_B$ positive.

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2. How does the electric flux due to a point charge enclosed by a spherical Gaussian surface get a affected when its radius is increased ?

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3. State the principle of moving coil galvanometer.

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4. Define 'quality factor' of resonance in series LCR circuit. What is its SI unit?

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Section B

1. Plot a graph showing variation of de-broglie wavelength λ versus $1/\sqrt{V}$, where V is accelerating potential for two particle A and P carrying same charge but of masses m_1 and $m_2(m_1 > m_2)$. Which one of the two represents a particle of smaller mass and why?

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2. A nucleus with mass number A =240 and BE /A = 7.6 Me V breaks into two fragments each

of A =120 with BE/A =8.5 Me V .Calculate the released energy .

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3. Calculate the energy in fusion reaction:

$_1H^2 + _1H^2 \rightarrow _2He^3 + _0n^1$, where B.E. Of $_1H^2 = 2.23$MeV and $_2He^3 = 7.73$ MeV.

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4. Two cells of emfs 1.5 V and 2.0v having internal resistance 0.2Σ and 0.3 Σ respectively are connected in parallel . Calculate the emf and internal resistance of the equivalent cell .

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5. State Brewster's Law

The value of Brewster angle for a transparent medium is different for light of different

colours .

Give reason.

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Section C

1. A charge is distributed uniformly over a ring of radius 'a'. Obtain an expression for the electric intensity E at a point on the axis of the ring. Hence show that for points at large

distances from the ring, it behaves like a point charge.

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2. Write three characteristic features in photoelectric effect which cannot be explained on the basis of wave theory of light, but can be explained only using Einstein's equation.

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3. Write the expression for the magnetic force acting on a, charged particle moving with velocity v in the presence of magnetic field B.

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4. A neutron, an electron an alpha particle moving equal velocities, inter in magnetic field. Going into the plan of the paper as shown.

Trace their path in the field in magnetic.

$X \quad X \quad X \quad X \quad X \quad X$

$a \rightarrow$

$X \quad X \quad X \quad X \quad X \quad X$

$n \rightarrow$

$X \quad X \quad X \quad X \quad X \quad X$

$e \rightarrow$

$X \quad X \quad X \quad X \quad X \quad X$

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5. Define mutual inductance.

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6. A pair of adjacent coils has a mutual inductance of 1.5. H. If the current in one coil changes from 0 to 20 A in 0.5 s, what is the change in flux linkage with the other coil?

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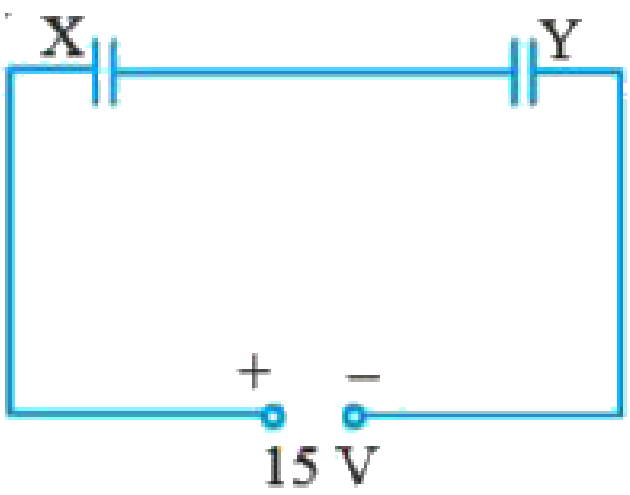
7. Two parallel plate capacitors X and Y have the same area of plates and same seperation and air between the plates while Y contains a dielectric medium of $\in_r = 4$



Calculate capacitance of capacitor if equivalent of the combind system.

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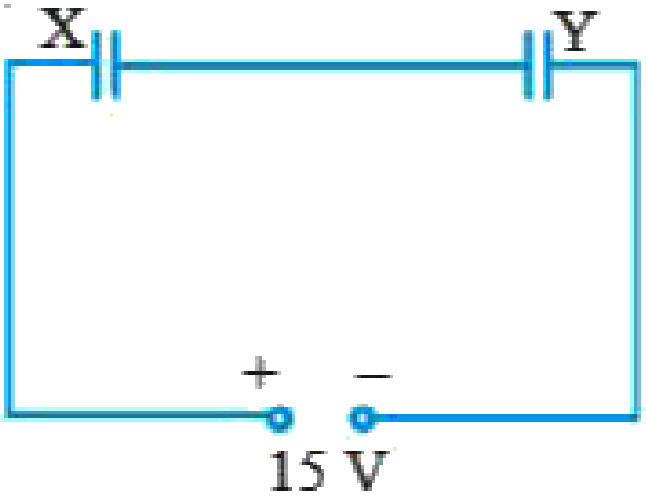
8. Two parallel plate capacitors X and Y have the same area of plates and same seperation and air between the plates while Y contains a

dielectric medium of $\in_r = 4$



Calculate the potential difference between the plates of X and Y.

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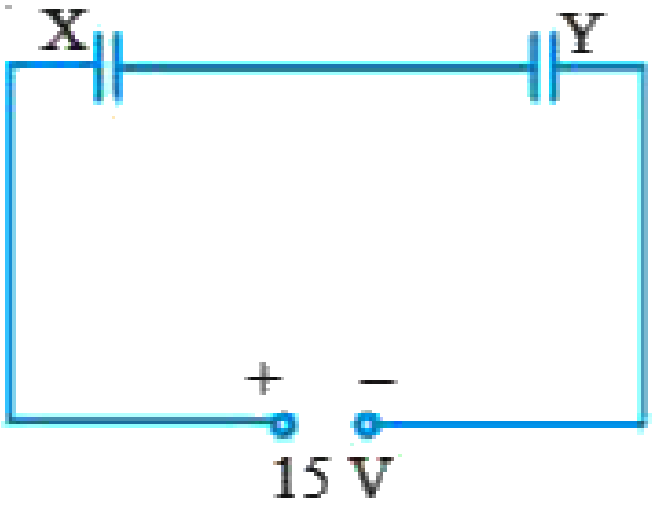
9. Two parallel plate capacitors X and Y have the same area of plates and same seperation and air between the plates while Y contains a dielectric medium of $\in_r = 4$



Estimate the ratio of electrostatic energy stored in X and Y.

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10. How are electromagnetic waves produces by oscillating charges ? Draw a sketch of linearly polarised em waves propagating in z-direction. Indicate the direction of oscillating electric and magnetic fields

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11. Write Maxwell's generalization of Ampere's Circuital Law. Show that in the process the

current produced within the plates of the capacitor is

$$i = \varepsilon_0 \frac{d\Phi_E}{d_t}$$

where Φ_E is the electric. flux produced during charging of the capacitor plates.

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12. Calculate the distance of an object of height h from a concave mirror of radius 20 cm to obtain a real image of magnification 2. Find the location of image also.

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13. Using mirror formula, explain why does a convex mirror always produce a virtual image.

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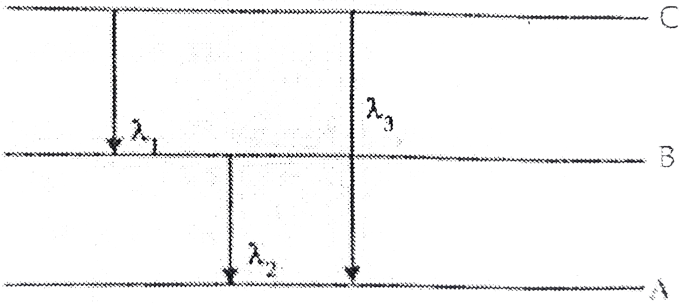
14. (i) State Bohr's quantization condition for defining stationary orbits . How does de-Broglie hypothesis explain the stationary orbits ?

(ii) find the relation beween the three

wavelengths

λ_1, λ_2 and λ_3 from the energy level diagram shown :



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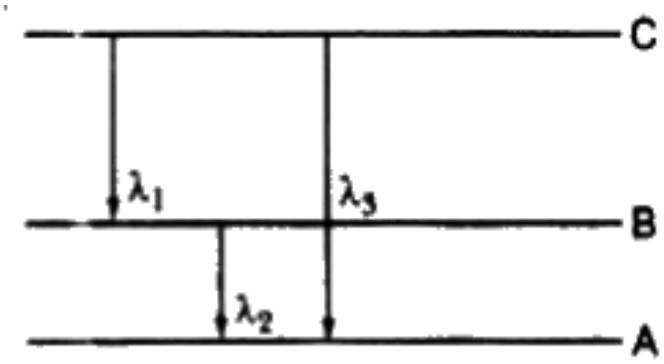
15. Find the relation between the three wavelengths $\lambda 1, \lambda 2$ and $\lambda 3$ from the energy

level diagram shown below.



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16. Draw a schematic ray diagram of reflecting telescope showing how rays coming from a distant object are received at the eye - piece . Write its two important advantage over a refracting telescope.

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Section E

1. An ac source of voltage $V = V_0 \sin \omega t$ is connected to a series combination of L, C and R. Use the phasor diagram to obtain expressions for impedance of the circuit and phase with the voltage. What is circuit in this condition called?

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2. In a series L_R circuit $X_L = R$ and power factor of the circuit is P_1 . When capacitor with capacitance C such that $X_L = X_C$ is put in series, the power factor becomes P_2 . Calculate $\frac{P_1}{P_2}$

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3. (i) Write the functions of a transformer . State its principle of working with the help of the a diagram mentions various energy losses

in this divice .

(ii) The primary coil of an ideal step up transformer has 100 turns and transformation ratio is also 100. The input voltage and power are respectively 220 V and 1100w. Calculate

(a) number of turns in secodary

(b) current in primary

(c) voltage across secodary

(d) current in secondary

(e) power in secondary

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4. (i) Write the functions of a transformer . State its principle of working with the help of the a diagram mentions various energy losses in this divice .

(ii) The primary coil of an ideal step up transformer has 100 turns and transformation ratio is also 100. The input voltage and power are respectively 220 V and 1100w. Calculate

(a) number of turns in secodary

(b) current in primary

(c) voltage across secodary

(d) current in secondary

(e) power in secondary

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5. (i) Write the functions of a transformer . State its principle of working with the help of the a diagram mentions various energy losses in this divice .

(ii) The primary coil of an ideal step up transformer has 100 turns and transformation ratio is also 100. The input voltage and power are respectively 220 V and 1100w. Calculate

(a) number of turns in secodary

(b) current in primary

(c) voltage across secodary

(d) current in secondary

(e) power in secondary

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6. (i) Write the functions of a transformer . State its principle of working with the help of the a diagram mentions various energy losses in this divice .

(ii) The primary coil of an ideal step up transformer has 100 turns and transformation

ratio is also 100. The input voltage and power are respectively 220 V and 1100w. Calculate

(a) number of turns in secodary

(b) current in primary

(c) voltage across secodary

(d) current in secondary

(e) power in secondary

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7. (i) Write the functions of a transformer . State its principle of working with the help of

the a diagram mentions various energy losses in this divice .

(ii) The primary coil of an ideal step up transformer has 100 turns and transformation ratio is also 100. The input voltage and power are respectively 220 V and 1100w. Calculate

(a) number of turns in secodary

(b) current in primary

(c) voltage across secodary

(d) current in secondary

(e) power in secondary

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8. (i) Write the functions of a transformer . State its principle of working with the help of the a diagram mentions various energy losses in this divice .

(ii) The primary coil of an ideal step up transformer has 100 turns and transformation ratio is also 100. The input voltage and power are respectively 220 V and 1100w. Calculate

(a) number of turns in secodary

(b) current in primary

(c) voltage across secodary

(d) current in secondary

(e) power in secondary

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9. In Young's double slit experiment, deduce the condition for (a) constructive, and (b) destructive interference at a point on the screen. Draw a graph showing variation of intensity in the interference pattern against position 'x' on the screen.

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10. Compare the interference pattern observed in Young's double slit experiment with single slit diffraction pattern, pointing out three distinguishing features.

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11. Plot a graph to show variation of the angle of deviation as a function of angel of incidence for light passing through a prism. Derive an expression for refractive index of the prism in

terms of angle of minimum deviation and angle of prism.

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12. What is dispersion of light? What is its cause?

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13. Define the term drift velocity

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14. On the basis of electron drift, derive an expression for resistivity of a conductor in ten density of free electrons and relaxation time. On what factors does resistivity of a conduc

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15. Why are constantan and manganin used for making standard resistances ?

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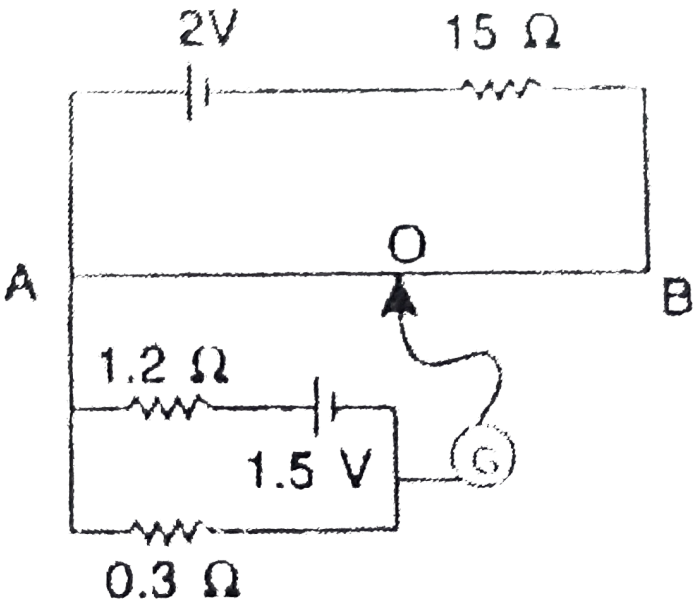
16. (i) State the principle of working of a potentiometer.

(ii) In the following potentiometer circuit AB is a uniform wire of length 1 m and resistance 10Ω

Calculate the potential gradient along the

wire and balance length AO (=l)



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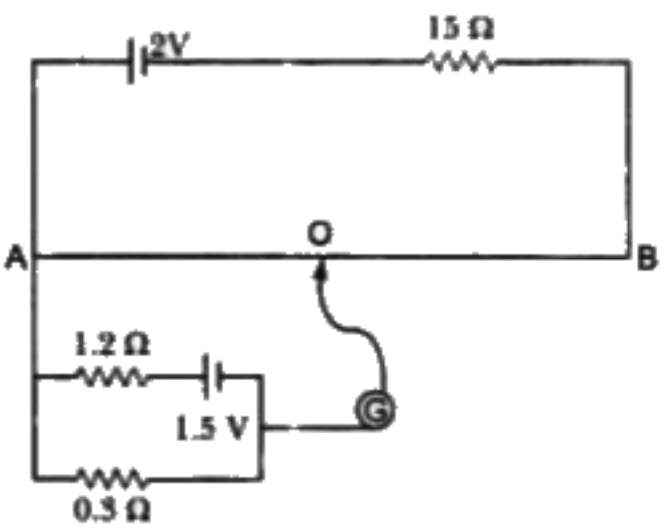
17. In the following potentiometer circuit AB is a uniform wire of length 1 in and resistance R the potential gradient along the wire and

balance length AO (= l).



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