3 copies

INTERNATIONAL INDIAN SCHOOL – DAMMAM

PRELIMINARY EXAMINATION FEBRUARY - 2013

CLASS – XII

PHYSICS

Time Allowed : 3 hours *Maximum Marks : 70*

SET-'A'

General Instruction:

- *(i) All questions are compulsory.*
- *(ii) There is no over all choice. However an internal choice has been provided in one question of two marks, one question of three marks, all three questions of five marks.*
- *(iii) Question number 1 to 8 marks are very short answer type questions, carrying one mark each.*
- *(iv) Question number 9 to 16 short answer type questions, carrying two marks each.*
- *(v) Question number 17 to 25 are short type questions, carrying three marks each.*
- *(vi) Question number 26 is a value based question carrying four marks.*
- *(vi) Question number 27 to 29 are long type question, carrying five marks each.*
- *(v) Use of calculator is not permitted. However you may use log table if necessary.*

1. An equi-convex lens of focal length f is divided into two halves vertically. What will be the focal length of each half ?

2. What is the value of de Broglie wavelength associated with an electron projected under a potential of 10kV ?

3. What will happen to the energy stored on a charged capacitor when it is discharged through (i) a resistor & (ii) an ideal inductor ?

4 A bar magnet is kept suspended in a region of uniform magnetic field B with its dipole moment m makes an angle θ with B. How much maximum kinetic energy can it give, when it is released ?

5. Write mathematical relations that show the production of magnetic field due to varying electric field and vice versa.

6. Two nuclei have mass numbers in the ratio 1: 8. What is the ratio of their radii?

3 copies

INTERNATIONAL INDIAN SCHOOL – DAMMAM

PRELIMINARY EXAMINATION FEBRUARY - 2013

CLASS – XII

PHYSICS

Time Allowed : 3 hours *Maximum Marks : 70*

SET-'A'

General Instruction:

- *(i) All questions are compulsory.*
- *(ii) There is no over all choice. However an internal choice has been provided in one question of two marks, one question of three marks, all three questions of five marks.*
- *(iii) Question number 1 to 8 marks are very short answer type questions, carrying one mark each.*
- *(iv) Question number 9 to 16 short answer type questions, carrying two marks each.*
- *(v) Question number 17 to 25 are short type questions, carrying three marks each.*
- *(vi) Question number 26 is a value based question carrying four marks.*
- *(vi) Question number 27 to 29 are long type question, carrying five marks each.*
- *(v) Use of calculator is not permitted. However you may use log table if necessary.*

1. An equi-convex lens of focal length f is divided into two halves vertically. What will be the focal length of each half ?

2. What is the value of de Broglie wavelength associated with an electron projected under a potential of 10kV ?

3. What will happen to the energy stored on a charged capacitor when it is discharged through (i) a resistor & (ii) an ideal inductor ?

4 A bar magnet is kept suspended in a region of uniform magnetic field B with its dipole moment m makes an angle θ with B. How much maximum kinetic energy can it give, when it is released ?

5. Write mathematical relations that show the production of magnetic field due to varying electric field and vice versa.

6. Two nuclei have mass numbers in the ratio 1: 8. What is the ratio of their radii?

16. Draw the circuit diagram for plotting input and output characteristic curves for a transistor. What is the significance of output characteristic of the transistor.

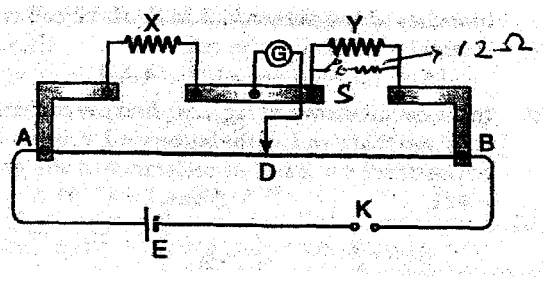
17. What is demodulation ?Describe by using block diagram, the detection of modulating wave from amplitude modulated wave.

18. What do you understand by the potential energy of the of system of charges. Three identical charges each of value q are placed at the corners of an equilateral triangle of side a, derive expression for the potential energy of this system.

19. Two wires have the same resistivity , but their cross-sectional areas are in the ratio 2:3 and the length in the ratio 1:2. They are first connected in series and then in parallel to a d.c. source. Find out the ratio of the drift velocity of the electrons in the two wires for the two cases.

OR

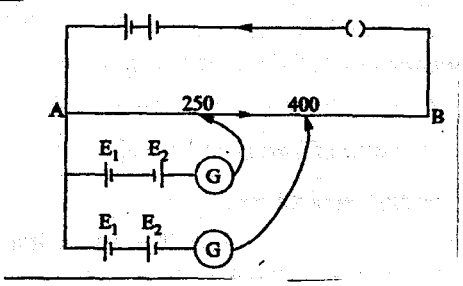
In the meter bridge network shown in figure, the balancing length is 40cm from point A. When the switch S is closed then the balancing length is shifted 20cm towards right. Find the value of X and Y.



20. State the condition for resonance to occur in a series LCR a.c. circuit and derive an expression for the resonant frequency. Draw a graph showing the variation of current I and frequency ω in an LCR series a.c. circuit.

21. Describe Davision and Germer experiment for verifying wave nature of electron.

22. (a) State Kirchhoff's laws for an electrical network.
(b) In the potentiometer circuit shown in figure the length shown are balancing lengths and $E_1 > E_2$. Find the ratio of E_1 and E_2.



23. What is diffraction of light? Under what condition it is prominent? Draw the intensity distribution curve for the diffraction pattern for a single slit experiment.

24. What were the observations by the Rutherford from his famous alpha scattering through gold foil experiment. Explain, how these observations helped him to give the model of atom.

25. With the help of a circuit diagram, explain the working of a transistor as an amplifier. Write the expressions for its various gains.

26. Some students were near a pond. Pond appeared shallow to them. So they decided to have fun by playing in pond water. Rohan happened to pass through. He noticed the intention of the children. Immediately he approached them and instructed not to indulge in the adventure. He explained that the pond was much deeper than it appeared. This way he avoided mishappening.
(a) What qualities Rohan displayed?
(b) With the help of a ray diagram explain, why water appeared less deeper than what actually it was?

27. (a) What are coherent sources? State the essential conditions for obtaining sustained interference pattern.

(b) Find the ratio of intensities at two points X and Y on the screen of a young double slits (with identical slits) experiment, where the waves from the slits reach with path difference 0 and $\lambda/4$ respectively.

OR

(a) What is critical angle ? Show that $n = 1/\sin i_c$.

(b) Two lenses of focal length 75cm and f are placed in contact coaxially. Find the value of f for which (i) effective power of the combination is – 1.5 D, and (ii) effective focal length combination is 25cm.

28. (a) Obtain an expression for the magnetic dipole moment of the revolving electron of the Hydrogen atom and hence define Bohr magneton.
(b) Calculate the net magnetic field at the common centre of two concentric circle of radii 8 cm and 12cm carrying current 4A and 8A respectively in opposite direction.

OR

(a) State and prove Curie law in magnetism. What is perfect diamagnetism?
(b) Draw hysterisis loops(graph between M and H for complete cycle) for soft iron and steel and describe two points of difference between them.

29. (a) Define electric potential at a point. Obtain expression for it at a distance r from a point charge q.

(b) A hollow metallic sphere of radius 40cm is given a charge of 20μC. Find the values of electric potential at distances 20cm, 40cm and 60cm from the centre of this sphere.

OR

(a) What do you understand by the term capacitance of a conductor. Obtain expression for the energy stored in a parallel plate capacitor charged with potential V.

(b) A parallel plate capacitor of capacitance 24μF is charged by a battery of emf 20V. It is disconnected from the battery and then connected to an uncharged capacitor of capacitance 16 μF. Find the loss of energy in this process.

Some important physical constants :

$c = 3 \times 10^{8}\ ms^{-1}$	$h = 6.626 \times 10^{-34}\ Js$
$e = 1.6 \times 10^{-19}\ C$	$\mu_o = 4\pi \times 10^{-7} TmA^{-1}$
$m_e = 9.1 \times 10^{-31}\ kg$	$m_p = 1.6 \times 10^{-27}\ kg$
$m_n = 1.675 \times 10^{-27}\ kg$	Boltzmann's constant $k = 1.381 \times 10^{-23} JK^{-1}$
Avogadro's number $N_A = 6.023 \times 10^{23}\ mol^{-1}$	
$1/4\pi\varepsilon_o = 9 \times 10^{9}\ Nm^2C^{-2}$	Rydberg constant $= 1.03 \times 10^{7} m^{-1}$
