INTERNATIONAL INDIAN SCHOOL – DAMMAM

SECOND TERMINAL EXAMINATION 2015-2016

subject – PHYSICS

SET A **MAX MARKS:70**

CLASS XII

General Instructions :

a) All questions are compulsory.

b) 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

c) Question no 1 to 5 are very short answer type questions carrying 1 mark each.

d) Question no 6 to 10 are short answer type questions carrying 2 marks each.

e) Question no 11 to 22 are short answer type questions carrying 3 marks each.

f) Question no 23 is a value based question carrying 4 mark

g) Question no 24 to 26 are long answer type questions carrying 5 marks each.

h) Use of calculator is not permitted.However you may use log table if necessary.

SET A

1 A capacitor has been charged by a dc source.What are the magnitudes of conduction and displacement current,when it is fully charged?

2 Which of the two main parts of an optical fibre has a higher value of refractive index?

3 The ground state energy of Hydrogen atom is -13.6eV .What are the kinetic and potential energies of electron in this state?

4 In a meter bridge ,two unknown resistances R and S when connected in the two gaps ,give a null point at 40 cm from one end.What is the ratio of R and S?

5 Which physical quantity has the unit Weber? Is it a scalar quantity or a vector quantity?

6 Two conducting wires X and Y of same diameter but different materials are joined in series across a battery.If the number density of electron in X is twice that in Y Find the ratio of drift velocity of electrons in the two wires.

7 State and prove Brewster's law.

8 A circular coil of radius 8 cm and 20 turns rotates about its vertical diameter with an angular speed of 50 s^{-1} in a uniform horizontal magnetic field of magnitude $3x10^{-2}T$. Find the maximum and average value of the emf induced in the coil.

9 Draw a graph showing the variation of photoelectric current with collector plate potential for two different frequency of incident radiation having same intensity. In which case will the stopping potential be higher?

10 Define the term magnetic inclination.Deduce the relation connecting the horizontal component and magnetic inclination with the help of a diagram.

OR

10 Write the expression for Lorentz magnetic force on a particle of charge q moving with velocity v in a magnetic field B.Show that no work is done by this force on the charged particle.

11 A concave lens has the same radii of curvature for both sides and has a refractive index 1.6 in air.In the second case it is immersed in a liquid of refractive index 1.4. Calculate the ratio of the focal lengths of the lens in the two cases.

12 State the principle of potentiometer.With the help of a circuit diagram ,explain how a potentiometer can be used to compare emf of two primary cells.

13 An inductor L of reactance X_L is connected in series with a bulb B to an ac source. Briefly explain how does the brightness of the bulb change when
i) number of turns of the inductor is reduced
ii) a capacitor of reactance Xc =X_L is included in series in the same circuit

14 Write any two properties of an electromagnetic wave.Identify the part of electro magnetic spectrum which is
i)suitable for radar systems used in air craft navigation.
ii)suitable for studying crystal structure of solids

15 Draw a graph showing the variation of stopping potential with frequency of incident radiation in relation to photoelecric effect.Deduce an expression for slope of this graph and Y intercept using Einstien's photoelectric equation.

16 A giant refracting telescope at an observatory has an objective lens of focal length 15m. If an eyepiece of focal length 1cm is used ,what is the angular magnification of the telescope ?If this telescope is used to view the moon,what is the diameter of the image of the moon formed by objective lens.The diameter of the moon is 3.48×10^6m and radius of lunar orbit is 3.8×10^8m.

17 An ac voltage $V=V_0 \sin\omega t$ is applied across a pure capacitor of capacitance C.Show mathematically the current flowing through it leads the applied voltage by an angle 90 Show graphically the variation of capacitive reactance with frequency of applied voltage.

18 Derive the expression for refractive index of the material of the prism interms of angle of minimum deviation.

19 Ratio of intensity of maximum and minimum in an interference pattern is 100:64. Calculate the ratio of intensities of the coherent source producing this pattern.

20 Using postulates of Bohr's theory of Hydrogen atom show that the radii of orbits increases as n^2.

21 State law of radioactivity.Derive the expression for the law of radioactive decay of a given sample having initially N_0 nuclei decaying to the number N present after a time t.

22 Explain with the help of a labelled diagram ,the principle and working of a step up transformer.Write any two sources of energy losss in a transformer.

OR

With the help of a labelled diagram explain the principle and working of an ac generator.

23 Nita found that her son could not hear properly.The specialist prescribed hearing aid for her son.Hearing aid consists of electromagnets in the loudspeakers used in the device.
1)What two values does Nita exhibit towords her son?
2)What is electromagnet? In what way its hysterisis curve is different from that used for

,manent magnets?

24 a) Show that a planar loop carrying a current I ,having N closely wound turns and area of cross section A,possesses a magnetis moment m=NIA

b) When this loop is placed in a magnetic field B ,find out the expression for torque acting on it.

c)A galvanometer coil of 50Ω resistance shows a full scale deflection for a current of 5mA. How will you convert this galvanometer into a voltmeter of range 0 to 15V.

OR

a) Draw a schematic sketch of a cyclotron.Explain its working principle and deduce the expression for the kinetic energy of the ions accelerated.

b) Two long parallel straight wires carrying current of 2A and 5A in the opposite direction separated by a distance of 1cm.Find the nature and magnitude of magnetic force between them.

25 What are coherant sources of light? State two conditions for two light sources to be coherant.Derive a mathematical expression for the width of interference fringes obtained in Young's double slit experiment with the help of a suitable diagram.

OR

a)State Huyghen's principle.Using the geometrical construction of secondary wavelets, explain the refraction of a plane wave front incident at a plane surface.Hence verify Snell's law of refraction.

b) Illustrate with the help of a diagram the action of i)convex lens ii)concave mirror on a plane wavefront incident on it.

26 a) Draw the graph showing the variation of binding per nucleon with the mass number. What are the main inferences from the graph?

b)Calculate the binding energy per nucleon in MeV of the nucleus $^{56}_{26}Fe$

Given mass of proton=1.00783U, mass of neutron=1.00867U,mass of $^{56}_{26}Fe$ =55.934939U

1U=931MeV.

OR

a)Using deBroglie's hypothesis ,explain with the help of a a suitable diagram ,Bohr's second postulate of quantisation of energy levels in a Hydrogen atom.

b)A radio active isotope has a half life of T years.How long will it take to reduce 1% of its original value?