-:JNV Udupi-class 12-Physics-Practice paper:-

Time-3hr Max marks-70

General Instructions:

(1) There are 35 questions in all. All questions are compulsory

(2) This question paper has five sections: Section A, Section B, Section C, Section D and Section E. All the sections are compulsory.

(3) Section A contains eighteen MCQ of 1 mark each, Section B contains seven questions of two marks each, Section C contains five questions of three marks each, section D contains three long questions of five marks each and Section E contains two case study based questions of 4 marks each.

(4) There is no overall choice. However, an internal choice has been provided in section B, C, D and E. You have to attempt only one of the choices in such questions. 5. Use of calculators is not allowed.

Section A (1mark each)

1.The potential difference applied across a given conductor is doubled. The mobility of the electrons in the conductor *1*(A)is doubled. (B) is halved. (C) remains unchanged. (D) becomes four times.

2. A charge particle is placed between the plates of a charged parallel plate capacitor. It experiences a force F. If one of the plates is removed, the force on the charge particle becomes *1* (A) F (B) 2F (C) (D) Zero 2F

3. An air-filled parallel plate capacitor is connected across a battery. After it is fully charged, the battery is disconnected. Now a dielectric slab is inserted between the plates of the capacitor to fill the space completely. Then the *1*

(A) capacitance will decrease.

(B) electric field between the plates will increase.

(C) potential difference between the plates will increase.

(D) charge on plates will remain the same.

4. . A current carrying loop is placed in a uniform magnetic field. The torqe acting on it does not depend upon

(a) area of loop (b) value of current

(c) magnetic field (d) None of these

5.A moving coil galvanometer can be converted into an ammeter by

(a) introducing a shunt resistance of large value in series.

(b) introducing a shunt resistance of small value in parallel.

(c) introducing a resistance of small value in series.

(d) introducing a resistance of large value in parallel.

6.A conducting wire is bent in the shape of a square and another wire of equal length into a circle. If they carry equal currents, their magnetic moments are in the ratio of *1*

(A) $2 : \pi$ (B) $\pi : 2$ (C) $\pi : 4$ (D) $4 : \pi$

7.A convex lens is dipped in a liquid whose refractive index is equal to the refractive index of the lens. Then its focal length will

(a) become zero (b) become infinite

(c) become small, but non-zero (d) remain unchanged

8. When interference of light takes place

(a) energy is created in the region of maximum intensity

(b) energy is destroyed in the region of maximum intensity

(c) conservation of energy holds good and energy is redistributed

(d) conservation of energy does not hold good

Note: next two questions follow the instructions and do accordingly

Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true and R is NOT the correct explanation of A 1

c) A is true but R is false

d) A is false and R is also false

9.ASSERTION(A): The electrical conductivity of a semiconductor increases on doping.
REASON(R): Doping always increases the number of electrons in the semiconductor.

10. ASSERTION(A):focal length of the lens is depend on the curvature of the surfaces.
REASON(R): focal length of a lens is depend on the refractive indices of the lens and the surrounding medium.

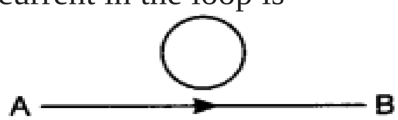
11.A window is provided in the middle of a wall. Its image is obtained on the opposite wall at a distance 'd' from it using a lens. If the window and its image are of the same size, then the focal length of the lens used is

(A) +4/d (B) + 2/d (C) – 4/d(D) –2/d

12.If all particles are moving with the same speed, then the particle associated with the maximum de Broglie wavelength will be

(A) proton (B) alpha-particle (C) neutron (D) bita-particle

13. The current flows from A to B is as shown in the figure. The direction of the induced current in the loop is



(a) clockwise. (b) anticlockwise.

(c) straight line. (d) no induced e.m.f. produced.

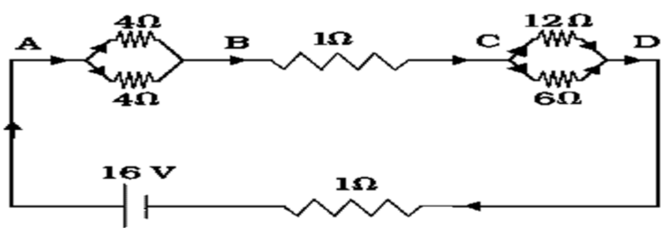
14. In Young's double slit experiment, the interfering waves from the two sources have a path difference of 0 and $\lambda/4$ at points P and Q on the screen, respectively. The ratio of intensities at P and Q will be

(A) 2 : 1 (B) 4 : 1(C) 1 : 2 (D) 2 : 1

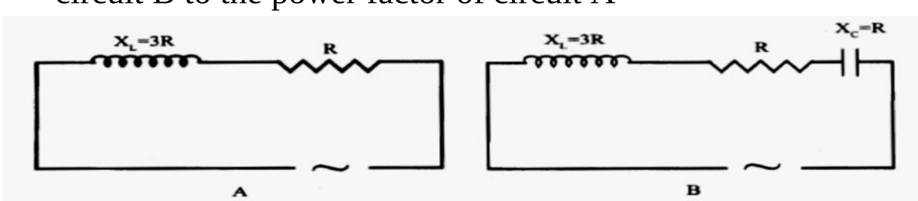
15. An induced e.m.f. is produced when a magnet is plunged into a coil. The strength of the induced e.m.f. is independent of
   (a) the strength of the magnet
   (b) number of turns of coil
   (c) the resistivity of the wire of the coil
   (d) speed with which the magnet is moved
16. The electrical conductivity of pure germanium can be increased by
   (a) increasing the temperature (b) doping acceptor impurities
   (c) doping donor impurities (d) All of the above
17The conductivity of semiconductors like Ge and Si:
   (a) increases when it is doped with pentavalent impurity.
   (b) increases when it is doped with trivalent impurity.
   (c) increases when it is doped with pentavalent or trivalent impurity.
   (d) none
18. Let n_h and n_e be the number of holes and conduction electrons in an extrinsic semiconductor. Then
(a) $n_h > n_e$ (b) $n_h = n_e$ (c) $n_h < n_e$ (d) $n_h \neq n_e$

<u>Section B(2mark each)</u>

<u>19.</u> A network of resistors is connected to a 16 V battery with internal resistance of 1Ω, as shown in the following figure. Compute the equivalent resistanceand current in the circuit.



<u>20.</u> Given below are two electric circuits A and B Calculate the ratio of power factor of the circuit B to the power factor of circuit A



<u>21</u> Name the constituent radiation of electromagnetic spectrum which
   (a) Is used in satellite communication.
   (b) Is similar to the radiations emitted during the decay of radioactive nuclei?
   (c) Is used for studying crystal structure
   (d) micro oven

<u>22.</u> Using Huygen'sprincipal prove that frequency of light travel from one medium to other remains same.

<u>23.</u> Using the Rydberg formula, calculate the wavelengths of the first two spectral lines in the Lyman series of the hydrogenspectrum

OR

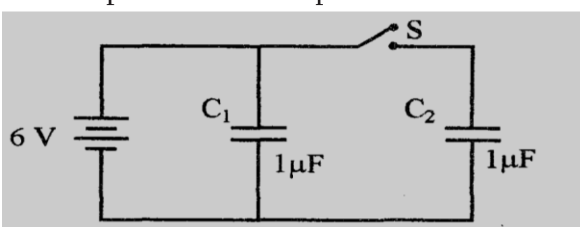
What is the nuclear radius of ^{125}Fe ,if that of ^{27} Al is 3.6 fermi?.

24. Explain with the help of a circuit diagram, the use of p-n diode as a full wave rectifier. Draw a sketch of the input and output waveforms.

25 Explain with the help of suitable diagram, the two processes which occur during the formations of a p-n junction diode. Hence define the terms (i) depletion region and (ii) potential barrier.

Section c(3mark each)

26 Figure shows two identical capacitors, C1 and C2, each of 1 μF capacitance connected to a battery of 6 V. Initially switch 'S' is closed. After sometime 'S' is left open and dielectric slabs of dielectric constant K = 3 are inserted to fill completely the space between the plates of the two capacitors. How will the (i) charge and (ii) potential difference between the plates of the capacitors be affected after the slabs are inserted ?



OR

a)An ammeter and a milliammeter are converted from the same galvanometer. Out of the two, which current measuring instrument has a higher resistance?.give reason.
b)An ammeter and voltmeter are converted from the same galvanometer of same range which one is connected with high resistance ? and how it is connected ?

27. The work function of a certain metal is 4.2eV.Will this metal give photoelectric emission for incident radiation of wavelength 330nm?

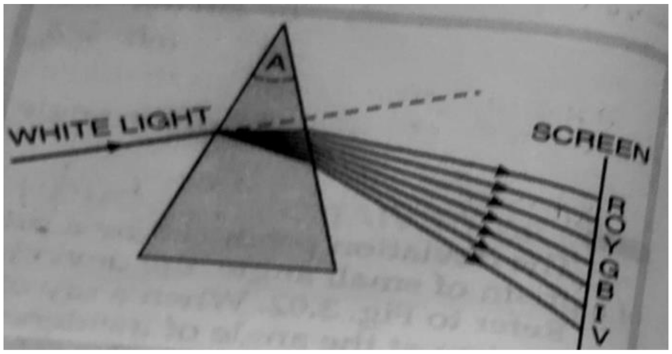
28 .State Huygen's principle. Draw diagrams to show the refracted wave front from a convex lens if point source is (i) at 2F (b) at F. c)at infinity

29 a)Draw a graph of binding energy per nucleon vs mass number
b)Explain nuclear fission reaction using property "nuclear force is short range force"

30. . In Young's double slit experiment, explain with reason in each case, how the interference pattern changes, when
(i) Separation between the slit is increased
(ii) Screened is moved away from the plane of the slits.and
(iii) If whole set up is immersed in water.

Section D(4mark each)

31. If a beam of white light is made to fall on one face of prism the light emerging from the other face of the prism consist of seven colours voilet, indiogo, blue, green , yellow, ornage, red . The phenomena of spliting of white light into its constituent colours is called dispersion of light

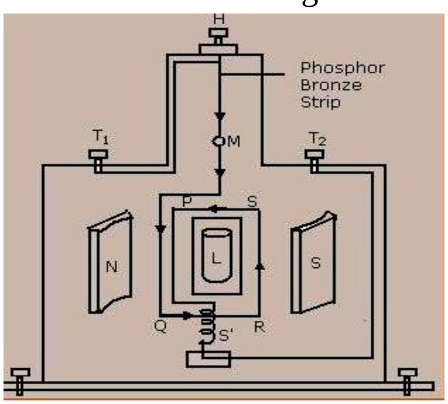


a) The refractive angle of a prism for a monochromatic light is 60° and refractive index is √2. For minimum deviation the angle of incidence will be

b)Write the increasing order of refractive index , speed and frequency of all the colours.

32. : MOVING COIL GALVANOMETER :

The galvanometer is a device used to detect the current flowing in a circuit or a small potential difference applied to it. It consists of a coil with many turns, free to rotate about a fixed axis, in a uniform radial magnetic field formed by using concave pole pieces of a magnet. When a current flows through the coil, a torque acts on it.



a) .What is the principle of moving coil galvanometer?

b. Why pole pieces are made concave in the moving coil galvanometer?

c. . If the rectangular coil used in the moving coil galvanometer is made circular, then what will be the effect on the maximum torque acting on the coil in magnetic field for the same area of the coil?explain

Section E(5mark each)

33. Using Gauss's law obtains the expression for the electric field due to a uniformly charged thin spherical shell of radius R at a point outside the shell. Draw a graph showing the variation of electric field with r, for r> R and r < R.

OR

i. Two straight long conductor are parallel each carry current I in the same direction separated by distance d,

a) write the expression for force act on either of the conductor.

b) What is the change in the magnitude of the force. If one of the conductor is rotated through 90degree such that they are perpendicular each other.

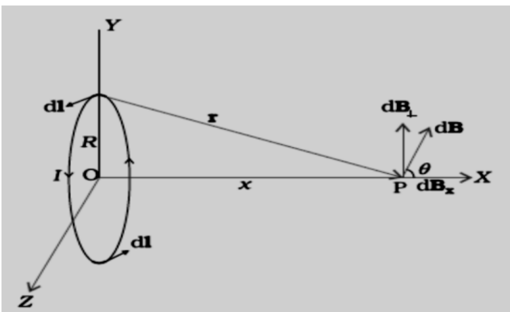
c) What is the change in the magnitude of the force If one of the conductor is rotated through 180degree such that they are antiparallel each other.

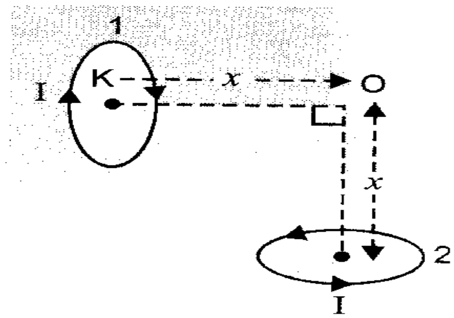
d)Define ampere

34. a) State Biot-Savart law.

b) The fig shows a circular coil carry current I find the magnetic field at point P.

c) To small circular loops marked 1 and 2 carrying equal currents are placed with the geometrical axis perpendicular to each other as shown in fig. find the magnitude and direction of the net magnetic field produced at the point O.





OR

(a)Describe briefly, with the help of a labeled diagram, the working of a step up transformer.

(b)Write any two sources of energy loss in a transformer.

(c)A step up transformer converts a low voltage into high voltage. Does it not violate the principle of conservation of energy? Explain.

35 .(a) Obtain lens makers formula using the expression

Here the ray of light propagating from a rarer medium of refractive index (n1) to a denser medium of refractive index (n2) is incident on the convex side of spherical refracting surface of radius of curvature R.

$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{(n_2 - n_1)}{R}$$

(b) D raw a ray diagram to show the image formation by a concave mirror when the object is kept between its focus and the pole .Using this diagram, derive the magnification formula for the image formed.

OR

(i)Draw a labelled ray diagram of an astronomical telescope to show the image formation of a distant object at normal adjustment. Write the main considerations required in selecting the objective and eyepiece lenses in order to have large magnifying power and high resolution of the telescope.

(ii) A compound microscope has an objective of focal length 1.0 cm and eyepiece of focal length 2 cm and tube length 20cm.calculate the magnification produced by the microscope.

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