Roll No. .....

052

Total No. of Questions : 26] [Total No. of Printed Pages : 4

SS

2087

ANNUAL EXAMINATION SYSTEM

PHYSICS (Theory)

(Common for Science & Agriculture Groups)

(English Version)

(Evening Session)

Time allowed : Three hours Maximum marks : 70

Note : (i) You must write the subject-code/paper-code **052** *in the box provided on the title page of your answer-book.*

(ii) Make sure that the answer-book contains 30 pages (including title page) and are properly serialed as soon as you receive it.

(iii) Question/s attempted after leaving blank page/s in the answer-book would not be evaluated.

(iv) Use of unprogrammable calculator/log tables is allowed.

(v) Answers should be to the point and supported by relevant formulas / law / principle/ diagram.

(vi) Question no. **1** *to* **8** *will be of one mark each.*

(vii) Question no. **9** *to* **16** *will be of two marks each.*

(viii) Question no. **17** *to* **23** *will be of four marks each. There will be internal choice in any* ***two*** *questions.*

(ix) Question no. **24** *to* **26** *will be of six marks each. There will be internal choice in them.*

1. When the external resistance is very small then the cells must be connected in series in the combination of the cells so that the current becomes maximum. (yes / no) 1

2. S.I. unit of magnetic dipole moment is 1

3. Phosphor bronze strip for restoring torque in a moving coil galvanometer because :

(a) It is non-magnetic

(b) It is a good conductor of electricity.

(c) It is perfectly elastic.

(d) All of the above

Choose the correct option from the above. 1

4. Arrange these electromagnetic waves (emw) in the increasing order of their frequency :
X-rays, UV rays, IR rays, Gamma rays. 1

5. What happens to a photon when it passes through crossed electric and magnetic fields ? 1

6. The nuclides like $_{80}U^{198}$ and $_{97}Au^{197}$ having same number of neutrons are called 1

7. Draw energy diagram of a p-type semiconductor for temperature $T > 0°K$. 1

8. What are repeaters in communication system ? 1

(1×8)

9. Two wires made of same material have lengths ℓ and 2ℓ and having radii r and r/2. What is the ratio of their resistances ? 2

10. Define dip at a point or place. 2

11. Define wattless current. How it can be achieved in a circuit ? 2

12. Write any two uses of uv rays. 2

13. Our eye is more sensitive to yellow colour then why do we use red colour for traffic light signal. 2

14. Light of wavelength 6000°A in air enters a medium of refractive index 1.5, what will be its frequency in the medium ? 2

15. Draw a circuit diagram for studying input and output characteristics of a transistor. Also give its input and output resistance. 2

16. A transmitting antenna at the top of a tower has a height of 40m and the height of receiving antenna is 60m. What is the LOS ? 2
(given radius of earth to be 6.4×10^6m.) (2×8)

17. What will happen when an electric dipole is placed in a uniform electric field ? Also explain briefly what happens when an ideal electric dipole is kept (i) parallel (ii) perpendicular to the direction of magnetic field. 4

18. What are the factors on which the internal resistance of a cell depends ? How internal resistance of a cell can be determined by using a potentiometer ? 4

19. Determine formula for root mean square (rms) value of alternating current. 4

20. Derive the relation :

$$-\frac{\mu_1}{u}+\frac{\mu_2}{v}=\frac{(\mu_2-\mu_1)}{R}$$

for the image formed due to refraction when light moves from rarer medium (refractive index μ_1) to denser medium (refractive index μ_2), if the denser medium is concave towards rarer medium and a virtual image is formed. What are the assumptions used above ? 4

21. Plot a graph showing the variation of stopping potential with the frequency of incident radiations for two different photosensitive materials. On what factors does the slope and intercept on lines depend ? 4

or

An electron and a photon are moving with the same speed, which will have more wavelength? 4

22. What are the postulates of Bohr's atom model for hydrogen atom? Also draw energy levels diagram for H atom. 4

23. Explain the working of a transistor as an oscillator. 4

or

For a transistor connected in CE mode the voltage drop across collector is 2V and β is 50. Find the base current, if $R_c = 2K\Omega$. 4

24. (i) What is the SI unit of permittivity in vacuum ? 1

(ii) State Gauss's law in electrostatics. Using the law, deduce the expression for the electric field due to a uniformly charged conducting shell of radius R at a point (i) outside the shell (ii) inside the shell (iii) on the surface of the shell. Also show variation of electric field with the distance from the centre graphically. 5

or

(i) Name the physical quantity whose SI unit is $Nm^2 C^{-1}$? 1

(ii) Give the principle, construction and working of a Van de Graaff generator. 5

25. (i) What is a shunt ? 1

(ii) With the help of a neat and labelled diagram explain the principle and working of a moving coil galvanometer. What is the function of (i) radial field (ii) soft iron cores. 5

or

(i) What is the importance of amperian loop ? 1

(ii) Give Ampere's circuital law. Apply the law to find electric field at a point for a solenoid carrying current. 3

(iii) What will be the magnetic field for a solenoid of 300 turns / meter, which is carrying a current of 7A? The length of the solenoid is 0.5m and has radius of 1 cm. 2

26. (i) Give SI unit for power of a lens. 1

(ii) What is the power of accommodation of human eye ? 1

(iii) What is near sightedness, give its cause, how it can be corrected ? 2

(iv) The far point of a myopic person is 80cm in front of the eye. What is the power of lens required to enable him to see the distant object clearly ? 2

or

(i) Define minimum angle of deviation by a prism. 1

(ii) Derive an expression for refractive index of the material of a prism. 3

(iii) Also show that small angle prisms do not deviate the light much. 2