

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 serialied 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

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.

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 ${}_{80}\text{U}^{198}$ and ${}_{97}\text{Au}^{197}$ having same number of neutrons are called 1
 7. Draw energy diagram of a p-type semiconductor for temperature $T > 0^\circ\text{K}$. 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\AA 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 $6.4 \times 10^6\text{m}$.) (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

(4)

or

- (i) Name the physical quantity whose SI unit is $\text{Nm}^2 \text{C}^{-1}$?
- (ii) Give the principle, construction and working of a Van de Graaff generator. 5

25. (i) What is a shunt ?
- (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