Roll No. 2017058733

Total No. of Questions : 26]

052/C

[Total No. of Printed Pages : 4

SS

2037

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/C** *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. One kilowatt hour is equal to

   (a) 36×10^5 J

   (b) 36×10^3 J

   (c) 36×10^{-5} J

   (d) 3.6×10^{-6} J

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.1

[Turn over

(2)

2. The output of OR gate is 1

   (a)   if either input is zero

   (b)   if both inputs are zero

   (c)   only, if both inputs are 1

   (d)   if either or both inputs are 1.   1

3. The de-Broglie wave corresponding to a particle of mass 'm' and velocity 'v' has a wavelength associated with it.

   (a) $\dfrac{h}{mv}$ (b) hmv

   (c) $\dfrac{mh}{v}$ (d) $\dfrac{h}{\sqrt{mv}}$ 1

4. Write whether the given statement is true or false : The diamagnetic substance obeys Curie's law.   1

5. Among α (alpha), β (beta) and γ (gamma) rays which one has highest penetrating power ?   1

6. What is audible range for normal human being ?   1

7. Arrange the following radiations in the descending order of wavelength : X-rays, radio waves, yellow light, infra-red rays.   1

8. What is meant by magnetic flux ?   1

9. A silver wire has a resistance of $2.1\,\Omega$ at $27.5\,°C$ and a resistance of $2.7\,\Omega$ at $100\,°C$. Determine the temperature coefficient of resistance of silver.   2

10. Why soft iron is used in making the core of a transformer ?   2

11. Self-induction is called the inertia of electricity. Explain, why ?   2

12. Give two properties of electromagnetic waves ?   2

13. Give two points of difference between interference and diffraction.   2

14. In Young's double slit experiment, the slits are separated by 0.28 mm and the screen is placed 1.4 m away. The distance between the central bright fringe and the fourth bright fringe is 1.2 cm. Find the wavelength if light used.   2

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15. For a common emitter amplifier, dc (direct current) current gain is 20. If the emitter current is 7mA, calculate the base and collector current.　　　2

16. Write any two factors, which justify the need of modulation for the transmission of the audio signals.　　　2

17. Derive an expression for electric potential at any point due to an electric dipole. Show that the potential at a point on the equatorial line of an electric dipole is zero.　　　4

<p align="center">or</p>

Two point charges 'q_1' and 'q_2' of magnitude $+10^{-8}$C and -10^{-8} C, respectively, are placed 0.1 m apart. Calculate the electric field at
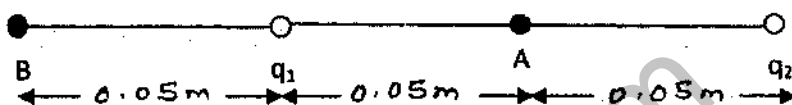
points A and B as shown in the figure.　　　4

18. Draw the circuit diagram of a Wheatstone bridge. Use Kirchhoff's laws to obtain the balanced condition of Wheatstone bridge.　　　4

19. Draw a labelled diagram of an AC (alternating current) generator. Give its principle and working of an AC (alternating current) generator.　　　4

20. Explain the laws of photoelectric emission on the basis of Einstein's photoelectric equation.　4

<p align="center">or</p>

Light of wavelength 5000 Å falls on a photosensitive plate with work function 1.9 eV. Find (a) energy of photon in eV (electron volt), (b) maximum kinetic energy of photoelectron and (c) stopping potential.　　　4

21. What are drawbacks of Rutherford's atomic model ? How did Bohr remove these ?　　　4

22. What is rectifier ? Explain with the help of circuit diagram, the working of p-n junction diode as a full wave rectifier.　　　4

(4)

23. Derive the mirror formula using the ray diagram for the formation of a real image by a concave mirror. 4

24. (a) What do you mean by accommodation ? 1

   (b) Draw a labelled diagram of human eye. What is myopia and hypermetropia ? How the eyes of a person suffering from these defects may be corrected ? 1,4

or

   (a) State Snell's law of refraction of light. 1

   (b) With the help of labelled diagram, give the principle and magnifying power of compound microscope, when final image is formed at least distance of distinct vision. 1,1,3

25. (a) An electric dipole consisting of charge $5\mu C$ and $-5\mu C$ and of length 10 cm. What is the total electric flux through the box ? 1

   (b) State Gauss's theorem in electrostatics. Apply this to derive an expression for electric field intensity due to a uniformly charged hollow sphere (i) at a point inside the sphere (ii) at a point outside the sphere. 1,3,1

or

   (a) Define the SI unit of capacitance. 1

   (b) With the help of labelled diagram, give the principle, construction and working of Van de Graff generator. 1,1,1,2

26. (a) State Maxwell's cork screw rule. 1

   (b) State Biot-Savart law. Using Biot-Savart law find the magnitude and direction of magnetic field at a point on the axis of a circular coil of radius 'r', number of turns 'N' carrying current 'I'. 1,4

or

   (a) What is radial magnetic field ? 1

   (b) With the help of labelled diagram, give the principle, construction and theory of moving coil galvanometer. 1,1,1,2

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