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SECOND REVISION TEST, JANUARY - 2020

Thiruvallur District STANDARD - XII

Time : 3.00 hrs

PHYSICS

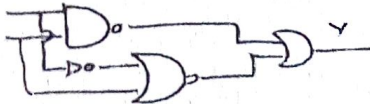
Marks: 70

Part - A

Choose the correct answer.

15×1=15

- 1) The Boolean expression for the given circuit is _____



- a) A b) B c) AB d) A+B
- 2) If N_0 is the original mass of the substance of half life period 5 years, then the amount of substance left after 15 year is _____
- a) $N_0/2$ b) $N_0/3$ c) $N_0/4$ d) $N_0/8$
- 3) The de-broglie wavelength of neutron in thermal equilibrium with heavy water at a temperature T (Kelvin) and mass (m) is
- a) $\frac{h}{\sqrt{3mKT}}$ b) $\frac{2h}{\sqrt{3mKT}}$ c) $\frac{2h}{\sqrt{mKT}}$ d) $\frac{h}{\sqrt{mKT}}$
- 4) Out of the following options which one can be used to produce a propagating electromagnetic wave?
- a) A chargeless particle b) An accelerating charge
- c) A charge moving at constant velocity d) A stationary charge
- 5) If voltage applied to a capacitor increased from V to 2V, choose the correct conclusion
- a) Q remains the same, C is doubled b) Q is doubled C doubled
- c) C remains same, Q doubled d) Both Q and C remain same
- 6) The internal resistance of a 2.1v which gives a current of 0.2A through a resistance of 10Ω is
- a) 0.2Ω b) 0.5Ω c) 0.8Ω d) 1Ω
- 7) Electromagnets are made of soft iron has
- a) low retentivity and high coercive force
- b) high retentivity and high coercive force

T

2 XII - Physics

- c) low retentivity and low coercive force
d) high retentivity and low coercive force
- 8) The flux linked with a coil at any instant t is given by $\phi_B = 10t^2 - 50t + 250$.
The induced emf at $t = 3s$ is
a) $-190V$ b) $-10V$ c) $10V$ d) $190V$
- 9) The velocity of light in air is $3 \times 10^8 \text{ms}^{-1}$ and that in water is $2.2 \times 10^8 \text{ms}^{-1}$.
The polarising angle of incidence is
a) 45° b) 50° c) 53.74° d) 63°
- 10) The variation of frequency of carrier wave with respect to the amplitude of the modulating signal is called
a) Amplitude Modulation b) Frequency Modulation
c) Phase Modulation d) Pulse with Modulation
- 11) "Sky Wax" is an application of nano product in the field of
a) Medicine b) Textile c) Sports d) Automotive industry
- 12) Stars twinkle due to
a) reflection b) total internal reflection
c) refraction d) Polarisation
- 13) A milli voltmeter of 25 milli volt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be
a) 0.001 b) 0.01 c) 1 d) 0.05
- 14) What is the flux through a cube of side 'a' if a point charge q is at one of its corner
a) $2q/\epsilon_0$ b) $q/8\epsilon_0$ c) q/ϵ_0 d) $q/2\epsilon_0$
- 15) The ratio between the first three orbits of hydrogen atom is
a) 1:2:3 b) 2:4:6 c) 1:4:9 d) 1:3:5

Part - B

Answer any six of the following. Question No. 24 is compulsory: $6 \times 2 = 12$

- 16) What are the properties of an 'equipotential surface'?

- 17) State the application of Seebeck effect?
- 18) Suppose a cyclotron is operated to accelerate protons with a magnetic field of strength IT . Calculate the frequency in which electric field between two Dees could be reversed.
- 19) How will you define 'Q-factor'?
- 20) What is meant by 'Frannhofer lines'?
- 21) Explain the reason for glittering of diamond?
- 22) Define work function of a metal. Give its unit.
- 23) Distinguish between intrinsic and extrinsic semiconductors.
- 24) Calculate the number of nuclei of Carbon-14 undecayed after 22,920 years if the initial number of Carbon-14 atoms is 10,000. The half life of Carbon-14 is 5730 years.

Part - C

III. Answer any six of the following. Question No. 32 is compulsory: $6 \times 3 = 18$

- 25) Give the applications of ICT in mining and agriculture sector.
- 26) Elaborate any two types of Robots with relevant examples.
- 27) Prove laws of reflection using 'Hygens' principle.
- 28) When a light of frequency 9×10^{14} Hz is incident on a metal surface, photo electrons are emitted with maximum speed of $8 \times 10^5 \text{ms}^{-1}$. Determine the threshold frequency of the surface.
- 29) Discuss the properties of neutrino and its role in beta decay.
- 30) Using Farady's law of electromagnetic induction, derive an equation for motional emf.
- 31) State and explain Kirchoff's rule.
- 32) What is an LED? Give the principle of operation with a diagram.
- 33) Dielectric strength of air is $3 \times 10^6 \text{Vm}^{-1}$. Suppose the radius of a hollow sphere in the Vande Graff generator is $R=0.5\text{m}$. Calculate the maximum potential difference created by this Vande Graff generator.

Part - D

Answer all question:-

5×5=25

- 34) Obtain the expression for electric field due to an infinitely long charged wire. [or]
Explain the working principle of Solar cell. Mention its application.
- 35) Explain the construction and working of transformer. Mention the various energy losses in a transformer. [or]
Obtain the law of radio activity.
- 36) How the emf of two cells are compared using potentiometer? [or]
Give the construction and working of Photo emissive cell.
- 37) Discuss the conversion of galvanometer into ammeter and also a voltmeter.

[or]

Obtain the equation for radius of illumination (or) Snell's window.

- 38) Explain in detail about 'Types of Spectra'? [or]
Elaborate on the basic elements of communication system with the necessary block diagram.

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