COMMON HALF YEARLY EXAMINATION - 2018

Standard XII

Reg.No.: | 1 | 2 | A | C | 4 | 1 |

PHYSICS

Marks: 70

Time: 2.30 hours.

Instructions: 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

Section - I

$15 \times 1 = 15$

Note : i) Answer all the questions.

ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

1. A dipole is placed in a non-uniform electric field with its axis parallel to the field. It experiences

   a) only a net force
   b) only a torque
   c) both a net force and torque
   d) neither a net force nor a torque

2. If the resistance of a coil is 2Ω and $0°C$ and $\alpha = 0.004/°C$, than its resistance at $100°C$ is

   a) 1.4Ω
   b) 0Ω
   c) 4Ω
   d) 2.8Ω

3. The unit of grating element in a plane transmission grating is

   a) no unit
   b) m
   c) m^{-1}
   d) degree

4. In a thermo couple, the temperature of the cold junction is $20°C$, the neutral temperature is $270°C$. The temperature of inversion is

   a) $520°C$
   b) $540°C$
   c) $500°C$
   d) $510°C$

5. In RLC series AC circuit at resonance

   a) resistance is zero
   b) net reactance is zero
   c) impedance is zero
   d) voltage leads the current by a phase angle $\pi/2$

6. If the wavelength of the light is reduced to one half, then the amount of Scattering is

   a) increased by 16 times
   b) decreased by 16 times
   c) increased by 256 times
   d) decreased by 256 times

7. High frequency waves follow

   a) the ground wave propagation
   b) the line of sight direction
   c) ionospheric propagation
   d) the curvature of the earth

8. In P-type semiconductor, the minority carriers are

   a) holes   b) electrons

   c) atoms   d) electron-hole pair

9. Radioactive disintegration constant of Radio Phosphorous is

   a) 0.023103 s⁻¹   b) 0.01155 s⁻¹

   c) 0.0038505 s⁻¹   d) 0.038505 s⁻¹

10. In hydrogen atom, which of the following transitions produce a spectral line of maximum frequency?

    a) 2→1   b) 6→2

    c) 4→3   d) 5→2

11. In IC 741, what does Pin Number 3 indicates?

    a) inverting input   b) non-inverting input

    c) –Vcc   d) output

12. At what distance from a long straight wire carrying a current of 12 A will the magnetic field be equal to 3 x 10⁻⁵ Tesla?

    a) 0.02 m   b) 0.04 m

    c) 0.08 m   d) 0.01 m

13. If the work done in moving a charge of 6μC from one point to another in an electric fields is 1.2 x 10⁻⁵ J then the potential difference between them is

    a) 2 V   b) 6 V

    c) 12 V   d) 72 V

14. The output of the following circuit is

   a) A   b) B   c) A + B   c) A.B
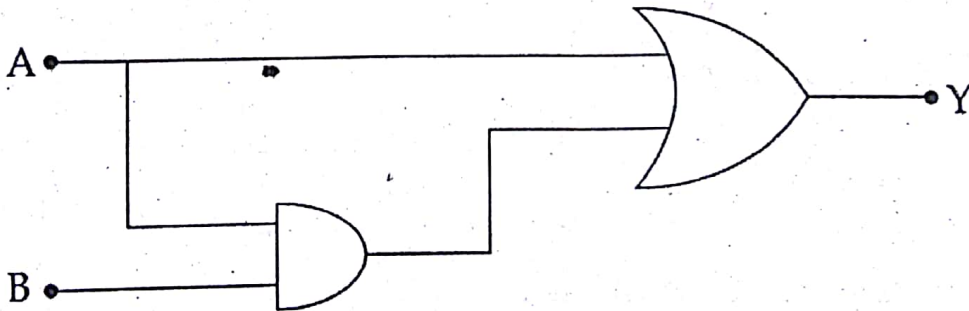
15. Arrange α, β and γ rays in the ascending order of their ionisation power

    a) α β γ   b) β α γ

    c) γ β α   d) γ α β

Section - II

Note : Answer any six questions:

(Question No.21 is compulsory)

16. State Coulomb's law in electrostatics.

17. The colour codes drawn on a carbon resistor is Orange, Red, Black. What is the value of the Resistor?

18. Find the magnetic induction at a point 10 cm from a long straight wire carrying a current of 10 A.

19. Discuss the advantages and disadvantages of ac over dc.

20. A light of wavelength 6000 $\overset{o}{A}$ falls normally on a thin air film, 8 dark fringes are seen between two points. Calculate the thickness of the air film.

21. Why ordinary plane transmission gratings cannot be used to produce diffraction effects in X-rays?

22. Classify the following nuclei as isotpes, isobars and isotones.

   a) $_{17}Cl^{34}$, $_{17}Cl^{35}$ b) $_{6}C^{14}$, $_{8}O^{16}$ c) $_{1}H^{1}$, $_{1}H^{2}$ d) $_{8}O^{16}$, $_{7}N^{16}$

23. Draw the symbol of an LED. Give its uses.

24. What is meant by skip distance?

Section - III

Note : Answer any six questions:

(Question No.28 is compulsory)

25. Prove that the energy stored in a Parallel Plate Capacitor is $\dfrac{q^2}{2C}$.

26. Obtain an expression for the self-inductance of a long Solenoid.

27. Write the uses of superconductors.

28. A 30 cm long tube contains sugar solution of unknown strength. When observed through Polarimeter, the plane of polarisation is rotated through 10°. Find the strength of sugar solution in g/cc. Specific rotation of sugar is 60° / decimeter / unit concentration.

29. Write any six properties of canal rays.

30. The binding energy per nucleon for $_{6}C^{12}$ nucleus is 7.68 MeV and that for $_{6}C^{13}$ is 7.47 MeV. Calculate the energy required to remove a neutron from $_{6}C^{13}$ nucleus.

31. Describe a photoemissive cell with a diagram.

32. Deduce the relation between α and β of a transistor.

33. What is the merits of Satellite Communication?

Section - IV

Answer all the questions:

5 x 5 = 25

34. a) Define electric potential at a point.

   b) Calculate (i) the potential at a point due to a charge of 4×10^{-7} C located at 0.09 m away   (ii) work done in bringing a charge of 2×10^{-9} C from infinity to the points.

(or)

Discuss with theory the method of inducing emf in a coil by changing its orientation with respect to the direction of a magnetic field.

35. Deduce an expression for the force on a current carrying conductor placed in a magnetic field.

(or)

Explain the function of FM transmitter with neat block digram.

36. Explain the spectral series of hydrogen atom.

(or)

Explain Einstein's theory of photoelectric effect.

37. How can emf of two cells be compared using a Potentiometer?

(or)

Derive an expression for Voltage gain of an amplifier with negative feedback.

38. Explain emission and absorption spectra.

(or)

Discuss the principle and action of a Bainbridge Mass Spectrometer to determine the isotopic masses.

******