Padasalai's Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

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APJ PHYSICS TUITION POINT

SUBJECT: PHYSICS **HALF TEST-1** **MAX. MARKS: 70**

CLASS : XII **LESSON 6 to 11** **TIME ALLOWED: 3.00 hrs**

PART-I

I. ANSWER ALL THE QUESTIONS. **[15X1=15]**

1. The transverse nature of light is shown in,
   (a) interference (b) diffraction (c) scattering (d) polarisation
2. Light is incident normally on a diffracting through which first order diffraction is seen at 34°
   (a) 17° (b) 51° (c) 68° (d) none of these
3. A convex mirror has a focal length f. A real object placed at a distance f in front of it from the Pole produces an image at
   (a) 2f (b) f/2 (c) f (d) ∞
4. The number of photons required to give a definite energy varies
   (a) inversely as the wavelength (b) inversely as the frequency
   (c) directly as the frequency (d) independent of the frequency
5. Emission of electrons by the absorption of heat energy is called……emission.
   (a) photoelectric (b) field (c) thermionic (d) secondary
6. Ratio of longest wavelengths corresponding to Lyman and Balmer series in hydrogen spectrum is:
   (a) 9/31 (b) 5/27 (c) 3/23 (d) 7/29
7. A radioactive element $_{90}X^{238}$ decays into $_{83}Y^{222}$.The number of β-particles emitted are
   (a) 4 (b) 6 (c) 2 (d) 1
8. The half-life period of a radioactive element A is same as the mean life time of another radioactive element B. Initially both have the same number of atoms. Then
   (a) A and B have the same decay rate initially (b) A and B decay at the same rate always
   (c) B will decay at faster rate than A (d) A will decay at faster rate than B.
9. The reverse bias in a junction diode is changed from 8 V to 13 V then the value of the current changes from 40μA to 60 μA. The resistance of junction diode will be
   (a) $2 \times 10^5\ \Omega$ (b) $2.5 \times 10^5\ \Omega$ (c) $3 \times 10^5\ \Omega$ (d) $4 \times 10^5\ \Omega$
10. If the input to the NOT gate is A = 1011, its output is
    (a) 0100 (b) 1000 (c) 1100 (d) 0011
11. In the Boolean algebra, which of the following is not equal to A ?
    (a) A + A (b) A.A (c) $\bar{A}.A$ (d) $\overline{\bar{A} + \bar{A}}$
12. The output transducer of the communication system converts the radio signal into_____
    (a) Sound (b) Mechanical energy (c) Kinetic energy (d) None of the above
13. **Assertion:** The long distance communication beyond 30 MHZ is not possible through sky waves.
    Reason: The sky waves of high frequency beyond 30 MHZ are absorbed by ionosphere.
    (a) Both Assertion and Reason are true and the Reason is correct explanation of Assertion.
    (b) Both Assertion and Reason are true, but Reason is not correct explanation of Assertion.
    (c) Assertion is true, but the Reason is false. (d) Both Assertion and Reason are false.
14. The black hole at the centre of Milky way galaxy is
    (a) Sagittarius A* (b) Unimate (c) Polar* (d) Rogue

15. The gravitational waves were theoretically proposed by
a) Conrad Rontgen b) Marie Curie c) Albert Einstein d) Edward Purcell

PART-II

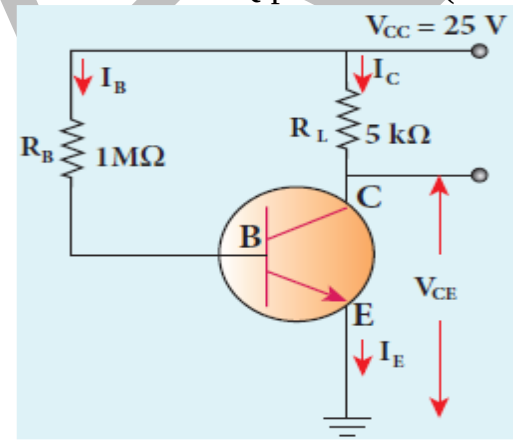
II. ANSWER ANY SIX QUESTIONS. Q.No 21 is compulsory. [6x2=12]

16. State Rayleigh's scattering law?
17. What is myopia?
18. What is a photo cell? Mention the different types of photocells.
19. Calculate the cut-off wavelength and cutoff frequency of x-rays from an x –ray tube of accelerating potential 20,000 V.
20. Define curie.
21. Calculate the radius of the earth if the density of the earth is equal to the density of the nucleus. [mass of earth 5.97 $x10^{24}$ kg].
22. Write the Barkhausen conditions for sustained Oscillations.
23. Define skip distance.
24. Mention any two advantages and disadvantages of Robotics.

PART-III

III. ANSWER ANY SIX QUESTIONS. Q. No 31 is compulsory. [6x3=18]

25. Two light sources with amplitudes 5 units and 3 units respectively interfere with each other. Calculate the ratio of maximum and minimum intensities.
26. State and explain Brewster's law?
27. Explain Characteristic x – ray spectra.
28. The ratio between the de Broglie wavelengths associated with protons, accelerated through a potential of 512 V and that of alpha particles accelerated through a potential of X volts is found to be one. Find the value of X.
29. Explain the variation of average binding energy with the mass number by graph and discuss its features.
30. State and prove De Morgan's First and Second theorems.
31. The current gain of a common emitter transistor circuit shown in figure is 120. Draw the dc load line and mark the Q point on it. (V_{BE} to be ignored).



32. Give the applications of ICT in mining and agriculture sectors.
33. What are the possible harmful effects of usage of Nanoparticles? Why?

PART-IV

IV. ANSWER ALL THE QUESTIONS. **[5X5=25]**

34. Describe the working of nuclear reactor with a block diagram. [OR]
Obtain the equation for bandwidth in Young's double slit experiment.

35. Briefly explain the principle and working of electron microscope. [OR]
Sketch the static characteristics of a common emitter transistor and bring out the essence of input and output characteristics.

36. Obtain lens maker's formula and mention its significance. [OR]
Explain the working principle of a solar cell. Mention its applications.

37. What is modulation? Explain the types of modulation with necessary diagrams. [OR]
Explain the effect of potential difference on photoelectric current.

38. Comment on the recent advancement in medical diagnosis and therapy. [OR]
Explain the J.J. Thomson experiment to determine the specific charge of electron.

ANSWER KEY

Q.NO	HALF TEST-1	HALF TEST-2
1	d	c
2	d	a
3	b	a
4	b	b
5	c	c
6	b	b
7	d	d
8	c	c
9	b	c
10	a	c
11	c	d
12	a	c
13	c	a
14	a	b
15	c	c

APJ PHYSICS TUITION POINT

SUBJECT: PHYSICS **HALF TEST-2** **MAX. MARKS: 70**

CLASS : XII **LESSON 6 to 11** **TIME ALLOWED: 3.00 hrs**

PART-I

I. ANSWER ALL THE QUESTIONS. **[15X1=15]**

1. A ray of light is incident normally on the surface of an equilateral prism made up of material With refractive index 1.5. The angle of deviation is
   (a) 30^o (b) 45^o (c) 60^o (d) 75^o
2. For light incident from air onto a slab of refractive index 2. Maximum possible angle of refraction is,
   (a) 30^o (b) 45^o (c) 60^o (d) 90^o
3. **Assertion:** In interference, fringes may be of equal or un equal widths. But in diffraction, the fringes are always of unequal widths only.
   Reason: These are basic facts, which have been observed experimentally and explained theoretically.
   (a) Both Assertion and Reason are true and the Reason is correct explanation of Assertion.
   (b) Both Assertion and Reason are true, but Reason is not correct explanation of Assertion.
   (c) Assertion is true, but the Reason is false. (d) Both Assertion and Reason are false.
4. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
   a) 4125Å b) 3750Å c) 6000Å d) 2062.5 Å
5. The mass of photon in motion is
   (a) c/hf (b) hf/c (c) hf/c^2 (d) none of these
6. An electron with energy 12.09 eV strikes hydrogen atom in ground state, and give its all energy to hydrogen atom. Therefore hydrogen atom excited to---------- state.
   (a) fourth (b) third (c) second (d) first
7. The ratio of the wavelengths for the transition from n =2 to n = 1 in Li^{++}, He^{+} and H is
   (a) 1: 2: 3 (b) 1: 4: 9 (c) 3:2:1 (d) 4: 9: 36
8. Control rods used in nuclear reactors are made of
   (a) stainless steel (b) graphite (c) cadmium (d) plutonium
9. The density of electron and holes in an intrinsic semiconductor is n_e and n_h respectively. Which of the following options are true ?
   (a) $n_h > n_e$ (b) $n_e > n_h$ (c) $n_e = n_h$ (d) $n_h >> n_e$
10. The principle in which a solar cell operates
    (a) Diffusion (b) Recombination (c) Photovoltaic action (d) Carrier flow
11. Of the following, in which the output is high only when both the inputs are low
    (a) EX-OR (b) NAND (c) AND (d) NOR
12. The frequency range of 3 MHz to 30 MHz is used for
    (a) Ground wave propagation (b) Space wave propagation
    (c) Sky wave propagation (d) Satellite communication
13. In order to cover a circular region of radius 16 km, by a TV transmitter what must be the height of the transmitting antenna? (Radius of earth is 6400 km)
    (a) 0.02 km (b) 0.2 km (c) 0.1 km (d) 2 km

14. The first digitally operated programmable robot is
(a) Cylindrical (b) Unimate (c) polar (d) Cartesian
15. The technology used for stopping the brain from processing pain is
a) Precision medicine b) Wireless brain sensor c) Virtual reality d) Radiology

PART-II

II. ANSWER ANY SIX QUESTIONS. Q.No 18 is compulsory. [6x2=12]

16. What is Huygen's principle?
17. The optical telescope in the Vainu Bappu observatory at Kavalur has an objective lens of diameter 2.3 m. What is its angular resolution if the wavelength of light used is 589 nm?
18. How many photons of frequency 10^{14} Hz will make up 19.86 J of energy?
19. Define atomic mass unit u.
20. Calculate the radius of ${}_{79}Au^{197}$ nucleus.
21. Draw the circuit diagram for NPN transistor in CB mode.
22. Define intrinsic semiconductors.
23. Give the advantages and limitations of frequency modulation.
24. What is meant by Cosmology?

PART-III

III. ANSWER ANY SIX QUESTIONS. Q. No 30 is compulsory. [6x3=18]

25. What is optical path? Obtain the equation for optical path of a medium of thickness d and refractive index n.
26. Prove that when a reflecting surface of light is tilted by an angle θ, the reflected light will be tilted by an angle 2θ.
27. List out the laws of photoelectric effect.
28. A proton and an electron have same de Broglie wavelength. Which of them moves faster and which possesses more kinetic energy?
29. Discuss the gamma decay process with example.
30. Calculate the amount of energy released when 1 kg of ${}_{92}U^{235}$ undergoes fission reaction.
31. Explain Zener diode as a voltage regulator.
32. What is the principle of RADAR. Give the applications of RADAR.
33. Elaborate any two types of Robots with relevant examples.

PART-IV

IV. ANSWER ALL THE QUESTIONS. [5X5=25]

34. Explain how frequency of incident light varies with stopping potential. [OR]
Obtain an expression for the radius of n^{th} orbit of hydrogen atom based on the Bohr's Theory.
35. Explain the construction and working of a full wave rectifier. [OR]
Elaborate on the basic elements of communication system with the necessary block diagram.
36. Derive the equation for refraction at single spherical surface. [OR]
Discuss the applications of Nanomaterials in various fields.
37. Describe the function of a transistor as an amplifier with the neat circuit diagram. Sketch the input and output wave form. [OR]
Obtain Einstein's photoelectric equation with necessary explanation.
38. Obtain the law of radioactivity. [OR]
Discuss diffraction at single slit and obtain the condition for n^{th} minimum and maximum.