Padasalai's Centum Coaching Team – Special Question Paper 2017

XII Subject: PHYSICS (P6) Marks: 150 Time: 3hrs. Name :

PART – I 30x1=30

(i) Answer all the questions. (ii) Choose and write the correct answer.

1. Electric field intensity is 400 V/m at a distance of 2m from a point charge. It will be 100 V/m at a distance of (a) 50 Cm (b) 2 Cm (c) 1 m (d) 1.5 m
2. Electric potential energy (U) of two point charges is
   (a) $\frac{q_1q_2}{4\pi\varepsilon_o r^2}$ (b) $\frac{q_1q_2}{4\pi\varepsilon_o r}$ (c) pEcosθ (d) pE sin θ
3. The principal of lightning arresters (a) corona discharge (b) electric discharge (c) electrostatic induction (d) electromagnetic induction
4. The electric field inside the plates of two oppositely charged plane sheets of charge density σ is (a) $\sigma/2\varepsilon_o$ (b) - $\sigma/2\varepsilon_o$ (c) σ/ε_o (d) zero
5. The material through which electric charge can flow easily is
   (a) quartz (b) mica (c) germanium (d) copper
6. The colour code on a carbon resistor is red-red-black. The resistance of the resistor is
   (a) 2.2 Ω (b) 22 Ω (c) 220 Ω (d) 2.2 KΩ
7. Consider a circular coil of radius 10 cm in an air medium. If 5A current passes through it, what would be the magnetic induction at the centre?
   (a) π x 10^{-5}T (a) π x 10^{5}T (a) π x 10^{-15}T (a) π x 10^{-6} T
8. Nichrome wire is used as the heating element because it has
   (a) low specific resistance (b) low melting point (c) high specific resistance (d) high conductivity
9. An emf of 12V is induced when the current in the coil changes at the rate of 40 As^{-1}. The coefficient of self-induction of the coil is
   (a) 0.3 H (b) 0.003H (c) 30 H (d) 4.8 H
10. In a series LCR circuit, at resonance
    (a) $X_L = X_C$ (b) $X_L > X_C$ (c) $X_L < X_C$ (d) $\omega = \frac{1}{LC}$
11. The self-inductance of a straight conductor is
    (a) zero (b)infinity (c) very large (d) very small
12. Which of the following is a biaxial crystal?
    (a) calcite (b) quartz (c) tourmaline (d)topaz
13. A light wavelength pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light

(a) Bands disappear (b) no change(c) diffraction pattern becomes narrower and crowded
(d) diffraction pattern becomes broader and farther apart

14.A beam of monochromatic light enters from vacuum into a medium of refractive indexμ. The ratio of wavelengths of the incident and refracted waves is
(a) : 1 (b) 1: μ (c) μ^2 : 1 (d) 1 : μ^2

15.Atomic spectrum should be
(a) pure line spectrum (b) emission band spectrum
(c) absorption line spectrum (d) absorption band spectrum

16.In holography which of the following is/are recorded in photographic film?
(a) phase only (b) amplitude only (c) phase and amplitude (d) frequency and amplitude

17.In Millikan's oil drop experiment, charged oil drop is balanced between the two plates. Now the viscous force (a) acts downwards (b) acts upwards (c) Is zero (d) acts either upwards or downwards

18.According to Bohr's postulates, which of the following quantities take discrete values?
(a) kinetic energy (b) potential energy (c) angular momentum (d) momentum

19.The elliptical orbits of electron in the atom were proposed by
(a) J.J. Thomson (b) Bohr (c) Sommerfeld (c) de Broglie

20. If the kinetic energy of the moving particle is E, then the de Broglie Wavelength is,
(a) $\lambda = \frac{h}{\sqrt{2mE}}(b)\lambda = \frac{\sqrt{2mE}}{h}(c)\lambda = h\sqrt{2mE}$(d) $\lambda = \frac{h}{E\sqrt{2m}}$

21.At the threshold frequency, the velocity of the electron is
(a) zero (b) maximum (c) minimum (d) infinite

22. Which of the following is used to detect the presence of blocks in blood vessels?
(a) ${}_{15}P^{31}$ (b) ${}_{15}P^{32}$ (c) ${}_{26}Fe^{59}$ (d) ${}_{11}Na^{24}$

23.The ratio of nuclear density to the density of mercury is about
(a) 1.3 x 10^{10} (b) 1.3 (c) 1.3 x 10^{13}(d) 1.3 x 10^{4}

24. Nuclear fission can be explained by
(a) Shell model (b) liquid drop model (c) quark model(d) Bohr atom model

25. The energy equivalent of 1 amu is
(a) 931 eV (b) 931 V (c) 931 MeV (d) 9.31 M eV

26. The forbidden energy gap of conductor is
(a) 0.7eV (b) 1.1 eV (c) zero (d) 3eV

27. According to the laws of Boolean algebra, the expression (A+AB) is equal to
(a) A (b) AB (c) B (d) $\bar{A}$

28. The colour of light emitted by a LED depends on

(a) Its reverse bias (b) the amount of forward current (c) its forward bias (d) type of semiconductor material

29. Printed documents to be transmitted by fax are converted into electrical signals by the process of (a) reflection (b) scanning (c) modulation (d) light variation

30. In A.M. receiver, if 900 kHz station is tuned, then the local oscillator will have to produce a frequency of (a) 600 kHz (b) 455 kHz (c) 10.7 MHz (d) 1355 kHz

PART- II

(i) Answer any fifteen questions. 15x3=45

31. Define one coulomb on the basis of coulomb's law.
32. Why is it safer to be inside a car than standing under a tree during lightning?
33. State Kirchhoff's law.
34. Distinguish between electric power and electric energy.
35. The resistance of a Nichrome wire at $0^{o}C$ is 15Ω. It's temperature coefficient of resistance is $0.005/\,^{o}C$, find its resistance at boiling point of water?
36. Mention the limitations of cyclotron.
37. State Fleming's right hand rule.
38. Calculate the mutual induction between two coils when a current of 4A changing to 8A in 0.5 s in one coil, induces an *emf* of 50 mV in the other coil.
39. Define specific rotation.
40. Give the conditions for the sustained interference to take place.
41. State Moseley's law. Write its equation.
42. Calculate the longest wavelength that can be analyses be a rock salt crystal of spacing d = 2.82 Å in the first order.
43. Write any 3 uses of photo electric cells?
44. What is α-decay? Give an example.
45. What is pair production and annihilation of matter?
46. What is an intrinsic semiconductor? Give two examples.
47. Give the Barkhausen criteria for oscillations.
48. The gain of an amplifier without feedback is 100 and gain with positive feedback is 200. Calculate the feedback fraction.
49. Mention any 3 advantages of integrated circuit. (IC)
50. Define amplitude modulation.

PART – III 7x5=35

i) Answer question No.54 is Compulsory. (ii) Answer any six questions of the remaining 11 questions. (iii) Draw diagrams wherever necessary.

51. Deduce an expression for the effective capacitance of capacitors of capacitances C_1, C_2 and C_3 connected in parallel.

52.Obtain the condition for bridge balance in Wheatstone bridge.

53. Explain the construction and working of Daniel cell.

54. (a) A moving coil galvanometer of resistance 20Ω produces full scale deflection for a current of 50 mA. How you will convert the galvanometer into (i) an ammeter of range 20 Aand (ii) a voltmeter of range 120 V. **OR**

(b) A rectangular coil of 500 turns and of area $6x10^{-4}$ m^2 is suspended inside a radial magnetic field of induction 10^{-4} T by a suspension wire of torsional constant $5x10^{-10}$ Nm per degree.

55. Explain the various energy loses in a transformer. How are they minimized?

56.Mention any 5 characteristics of electromagnetic waves.

57.Prove that the energy of an electron for hydrogen atom in the nth orbit is $E_n = -me^4/8\varepsilon_o^2 n^2h^2$

58. Derive an expression for de Broglie wavelength of matter waves.

59. Explain Einstein's theory of photoelectric effect.

60. Mention the properties of neutrons.

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

62. Mention the principle of RADAR and write its applications?

PART – IV **4x10=40**

(i) Answer any four questions is detail. (ii) Draw diagrams whenever necessary.

63.State the principle and explain the construction and working of Van de Graff generator.

64. Obtain an expression for the force between two long parallel current carrying conductors. Hence define 'ampere'.

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

66. Derive an expression for bandwidth of interference fringes in Young's double slit experiment.

67.State Bohr's postulates. Obtain an expression for the radius of nth orbit of hydrogen atom.

68. Explain the construction and working of a Geiger –Muller counter.

69. Sketch the circuit of a Colpitts oscillator and explain its working.

70. Make an analysis of amplitude modulated wave. Plot the frequency spectrum.

Send your answer script here

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மாணவர்கள் செய்ய வேண்டியது என்ன?

1. *Click Here & Enter Your Details (Students Only)*
2. நமது பாடசாலை வலைதளத்தில் வழங்கப்படும் சிறப்பு வினாத்தாளை பிரிண்ட் எடுத்து விடுமுறை நாட்களில் முழுமையான, முறையான தேர்வு எழுதி வினாத்தாள் தயாரித்து வழங்கிய ஆசிரியருக்கு அனுப்பி வைக்க வேண்டும்.
3. A4 Size (Or) Legal Size உள்ள துணிக்கவர்கள் இரண்டு வாங்கிக்கொள்ள வேண்டும். ஒரு தாளில் வினாத்தாள் தயாரித்த ஆசிரியர் முகவரியை "பெறுநர்" பகுதியில் குறிப்பிட்டு அதில் தங்கள் விடைத்தாளை வைக்க வேண்டும்.
4. மற்றோரு கவரில் மாணவர்கள் தங்கள் சுயமுகவரியை "பெறுநர்" எனும் இடத்தில் எழுதி அதற்கு தேவையான அளவில் ஸ்டாம்ப்களையும் ஒட்டிய பிறகு, அக்கவரையும் விடைத்தாள் எழுதி அனுப்பும் கவருக்குள்ளேயே வைத்து அனுப்ப வேண்டும்.
5. ஒன்றுக்கும் மேற்பட்ட மாணவர்கள் இணைந்து விடைத்தாளை அனுப்பினால் மொத்தமாக ஒரே கவரில் அனுப்பலாம். ஆனால் ஒரு கவரில் மூன்று விடைத்தாள்களுக்கு மேல் இருக்கக்கூடாது.
6. ஆசிரியர்கள் தங்கள் விடைத்தாளை திருத்திய பிறகு தங்கள் சுயவிலாசமிட்ட கவரில் (Return Cover) வைத்து தங்களுக்கு விரைவில் திருப்பி அனுப்புவார்.
7. தங்கள் விடைத்தாளை உரிய ஆசிரியருக்கு அனுப்பி வைத்த தேதியிலிருந்து 3 வாரங்களுக்குள் தங்களுக்கு மீள கிடைக்காவிடில் இங்கு தரப்பட்டுள்ள "புகார் பதிவு படிவத்தில்" தங்கள் விவரத்தை பதிவு செய்யவும். **Click Here for Complaint Box!**
8. Slow Learners மீது மட்டும் கவனம் செலுத்தாமல் மீத்திறன் மிகுந்த மாணவர்களுக்கும் உதவும் நோக்கில், மாணவர்களின் நலன் கருதி, இச்சேவையில் தங்களை இணைத்துக்கொண்டுள்ள பாடசாலை ஆசிரியர் குழுவினை, மாணவர்கள் மிகுந்த பணிவுடன் தொடர்பு கொண்டு திருத்தப்பட்ட விடைத்தாள் குறித்த தங்கள் சந்தேகங்களையும், ஆலோசனைகளையும் அலைபேசி மூலமாக பெறலாம்.

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