-443 (H/E) **PHYSICS 2015**

ime : 3 Hours] **Class : 12th** [M. M. : 75

structions- (i) All questions are compulsory. Internal options are given in each question from question Nos. 5 to 18. (ii) Each question from Question Nos. 1 to 4 carry 5 marks and each sub question carries 1 mark. (iii) Each question from question Nos. 5 to 8 carry 2 marks and word limit for each answer is opprox. 30 words. (iv) Each question from question Nos. 9 to 13 carry 4 marks and word limit for each answer is approx. 75 words. (v) Each question from question Nos. 14 to 16 carry 5 marks and word limit for each answer is approx. 120 words. (vi) Each question from question Nos. 17 and 18 carry 6 marks and word limit for each answer is approx. 150

Q.1. Select and write the correct option from the options given in each question-

(a) The waves used in telecommunication are-

(i) Infra red (ii) Ultraviolet

(iii) Micro waves (iv) Cosmic rays

(b) The dielectric constant of air is-

(i) $8.85 \times 10^{-12}\ C^2N^{-1}M^{-2}$

(ii) 1

(iii) Infinite

(iv) Zero

(c) The specific resistance of a wire depends upon the-

(i) Length
(ii) Diameter
(iii) Mass
(iv) Material

(d) Zener - diode is used in-

(i) Amplification
(ii) Rectification
(iii) Oscillator in producing oscillations
(iv) Voltage regulation

(e) In a compound microscope the focal length of objective lens-

(i) Is more than the focal length of eyepiece lens
(ii) Is less than the focal length of eyepiece lens
(iii) Is equal to the focal length of eyepiece lens
(iv) Is two times to the focal length of eyepiece lens

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PREVIOUS YEAR QUESTION -2015

Q.2. Fill in the blanks-

(a) The value of angle of dip at magnetic poles of the Earth is ..... .

(b) Time period of geostationary satellite is ..... hours.

(c) Blue colours of sky is due to ..... .

(d) The number of photo electrons emitted per second depend on the ..... of incident radiation.

(e) With increase in temperature of a semiconductor its conductivity.....

Q.3. Select the appropriate option from column 'B' for each statement of column 'A' and match the correct pair-

Column 'A'	Column 'B'
(a) Electric potential	(i) Tesla
(b) Intensity of electric field	(ii) Coulomb-meter
(c) Optical detector	(iii) Joule/Coulomb
(d) Intensity of Magnetic field	(iv) Newton × Coulomb
(e) Lasser	(v) Newton/Coulomb
	(vi) Convertion of optiocal signal into electrical signal.
	(vii) Intense, monochromatic coherent source

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PREVIOUS YEAR QUESTION -2015

Q.4. Give answer in one sentence each-

(a) Which substance is used as depolarizer in Leclanche cell?

(b) What is the effect on self inductance of a solenoid, if a core of soft iron is placed in it?

(c) Which type of semi-conductor is formed when a trivalent impurity is dopped in a pure semiconductor?

(d) The planck's constant is h and frequency of a photon is v then write the formula for Einstein's photo electric equation.

(e) Write the relation between focal length and radius of curvature of a spherical mirror?

Q.5. The ultraviolet radiant bulbs are made of quartz. Not of glass. Why?

(Or) Why the Ozone layer is important for existence of life in the Earth?

Q.6. What is conjugate foci? Explain.

(Or) What is parallax? Explain.

Q.7. Define the follwoing-

Thermionic Emission and Dual Nature of Radiation.

(Or) What is matter waves? Write any two characteristics of it.

Q.8. What is optical fiber? On what principle does it work?

(Or) What is population inversion and optical pumping? Explain.

Q.9. Establish the formula for intensity of magnetic field at the centre of a current carrying circular coil.

(Or) Establish the formula of intensity of magnetic field due to a bar magnet

Q.10. Write Faraday's laws of electromagnetic induction and obtain an expression of induced e.m.f.

(Or) Write any four differences between step-up and step-down transformer.

Q.11. State Brewster's law. Prove that if light is incident at the angle of polarization the reflected and refracted rays are mutually perpendicular.

(Or) Write any four the necessary conditions for interference of light.

Q.12. Describe the terrestrial telescope on the basis of the following points-

(i) Labelled Ray diagram.

(ii) Derivation of formula for magnifying power, when final image is formed at the least distance of distinct vision.

(Or) The magnifying power of an objective lens of a compound microscope is 8 if the magnifying power of the compound microscope is 32. Then calculate magnifying power of an eyepiece lens.

Q.13. What is FAX machine? Draw it's block diagram and explain it's working.

(Or) What is MODEM? Draw it's block diagram and explain it's working.

Q.14. State and prove Gauss' Theorem.

(Or) Establish the formula for capacitance of parallel plate capacitor in presence of partially dielectric.

Q.15. What is self inductance? Establish expression for self inductance of a long solenoid.

(Or) An inductance and a capacitance are connected in series with a source of alternating e.m.f. Derive an expression for resultant voltage, impedance and phase difference between current and voltage in alternating circuit.

Q.16. Explain the use of N - P - N Transistor as an amplifier in common emitter mode under the following heads

(i) Labelled circuit diagram. (ii) Working

(Or) Write the logic symbols and prepare the truth tabels of the following gates.

(i) AND (ii) NOR

Q.17. Describe the experiment to find internal resistance of a cell by Potentiometer under the following points.

(i) Labelled electric circuit diagram.

(ii) Derivation of formula

(iii) Observation table

(iv) Two precautions

(Or) How cells are combined in parallel? Derive the expression for current flowing in the external circuit. When is this combination useful.

Q.18. Define dispersion without deviation. Derive an expression for its essential condition and resultant dispersion.

(Or) For spherical refracting surface establish the refraction formula

$$\frac{\mu}{v} - \frac{1}{u} = \frac{\mu - 1}{R}$$

Where symbols have their usual meanings.