

B.Sc. Semester - 3 (CBCS) Examination**Oct/Nov. -2019 [NEW COURSE]****Physics-P301 (Core)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1 (a) Answer the following questions (any two). [10]

- (1) Describe the critical angle of propagation for an optical fiber.
- (2) Derive an expression for acceptance angle of an optical fiber.
- (3) Discuss fiber optics communication system with block diagram.

Q.1 (b) Answer the following questions (any one). [4]

- (1) Write advantages of an optical fiber.
- (2) What is fractional refractive index change? Derive an expression of numerical aperture.

Q.2 (a) Answer the following questions (any two). [10]

- (1) What is Laser? Discuss about absorption and spontaneous emission.
- (2) What is population inversion? Explain why Laser action cannot occur without population inversion between atomic level?
- (3) Explain three level Ruby Laser.

Q.2 (b) Answer the following questions (any one). [4]

- (1) Write industrial application of Laser.
- (2) What do you mean by pumping? Discuss metastable states.

Q.3 (a) Answer the following questions (any two). [10]

- (1) Describe voltage divider bias method for transistor biasing.
- (2) What is phase reversal? Explain it with graphical demonstration.
- (3) Explain following terms for R-C coupled single stage CE transistor amplifier:
(i) Frequency response and (ii) Bandwidth

Q.3 (b) Answer the following questions (any one). [4]

- (1) Define stability factor. Write only name of transistor biasing methods.
- (2) Derive an expression for voltage gain of a CE transistor amplifier from its a.c. equivalent circuit.

Q.4 (a) Answer the following questions (any two). [10]

- (1) Derive an expression of current for L-C-R parallel a.c. circuit at resonance and explain Q – factor.
- (2) Explain Maxwell's impedance bridge. Write its advantages and disadvantages.
- (3) Explain action of Phase Shift Oscillator. Write its advantages and disadvantages.

Q.4 (b) Answer the following questions (any one). [4]

- (1) Write a note on De Sauty's Bridge.
- (2) Explaining action of Hartley Oscillator, define feedback fraction.

Q.5 (a) Answer the following questions (any two). [10]

- (1) What is radio broadcasting? Explain radio transmission and reception with block diagram of communication system.
- (2) Explain types of AM radio receivers.
- (3) Discuss transistor amplitude modulator circuit.

Q.5 (b) Answer the following questions (any one). [4]

- (1) Draw AM diode detector circuit and explain its action.
- (2) What are the limitations of amplitude modulation?
