

B.Sc. Semester - 3 (CBCS) Examination**Oct/Nov - 2023 [NEW COURSE]****Physics-P301(Core)****Time: 2:30 Hours****Marks: 70****Instructions:**

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

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- Q.1(A) Answer the following question. (any two) (10)
1. Explain optical fiber communication system in detail.
 2. Derive an expression for acceptance angle of the fiber.
 3. Explain critical angle of propagation for an optical fiber.
- Q.1(B) Answer the following question. (any one) (04)
1. An optical fiber has fractional refractive index change is 0.052 and cladding refractive index is 1.45. find its core refractive index and critical angle of propagation.
 2. Discuss principle and structure of optical fiber.
- Q.2(A) Answer the following question. (any two) (10)
1. Explain construction and working of Nd – YAG laser.
 2. Explain construction, working advantages and disadvantages of PN junction laser.
 3. Discuss three processes (absorption, spontaneous emission and stimulated emission) of laser.
- Q.2(B) Answer the following question. (any one) (04)
1. Write a note on optical resonant cavity (Fabry perot resonator).
 2. Describe three level pumping scheme for laser actions.
- Q.3(A) Answer the following question. (any two) (10)
1. Defining stability factor, describe the base resistor method (fixed biasing) for transistor biasing.
 2. What is phase reversal? Explain it in detail with graphical demonstration.
 3. Explain the terms frequency response and bandwidth for CE amplifier.
- Q.3(B) Answer the following question. (any one) (04)
1. Describe voltage (potential) divider bias method for transistor biasing.
 2. Explain in brief single stage transistor amplifier.
- Q.4(A) Answer the following question. (any two) (10)
1. Deriving an expression of current for L-C-R series a.c. circuit, explain series resonance and Q – factor.
 2. Explaining maxwell's LC bridge, write its advantages and disadvantages.
 3. Explaining the action of Hartley oscillator, define its feedback fraction.
- Q.4(B) Answer the following question. (any one) (04)
1. Explain Schering bridge method for the determination of capacitance of standard capacitors.
 2. Write a note on sinusoidal oscillator.
- Q.5(A) Answer the following question. (any two) (10)
1. What is Demodulation? Explain it with necessary operation.
 2. Why modulation is necessary? Write types of modulation.
 3. Write a note on Transistor amplitude modulator circuit.
- Q.5(B) Answer the following question. (any one) (04)
1. What is frequency modulation? Write differences between AM and FM.
 2. Write a note on types of AM radio receivers.
