647510 **BFS3PhyC301x** **Seat No :_____**

B.Sc.(FS) Semester - 3 (*CBCS*) Examination
Oct/Nov - 2022 [NEW COURSE]
Physics-P301(Core(New))

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. Derive an expression for acceptance angle of the optical fiber.
2. Explain critical angle of propagation for an optical fiber.
3. Discuss applications of fiber optics in detail.

Q.1 (b) Answer the following questions (any one). **[04]**

1. In an optical fiber, refractive indices of core and cladding are 1.56 and 1.49 respectively. Calculate its numerical aperture with the help of the fractional refractive index change.
2. An optical fiber has fractional refractive index change is 0.047 and cladding refractive index is 1.42. Find its core refractive index and critical angle of propagation.

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

1. Explain construction and working of Helium – Neon Laser.
2. What is Laser? Explain three processes of Laser .
3. What do you mean by pumping? Discuss the principle pumping schemes.

Q.2 (b) Answer the following questions (any one). **[04]**

1. Write applications of Laser.
2. Explain meta stable state.

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

1. Describing method of transistor biasing with collector feedback resistor, write its advantages and disadvantages.
2. Describe voltage (potential) divider bias method for transistor biasing.
3. What do you understand by d.c. load line? How will you construct it on output characteristics of transistor?

Q.3 (b) Answer the following questions (any one). **[04]**

1. Write a note on Stability Factor.
2. Derive an expression for voltage gain of a 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. Explaining De Sauty Bridge, write its advantages and disadvantages.
3. Explain the action of Colpit's oscillator along with feedback fraction.

Q.4 (b) Answer the following questions (any one). **[04]**

1. Derive the balance condition for an a.c. bridge.
2. Explain the principle of Phase Shift Oscillator.

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

1. What is modulation? Why is modulation necessary in communication system?
2. Drawing AM diode detector circuit, explain its action.
3. Drawing the transistor amplitude modulator circuit, discuss its working from it.

Q.5 (b) Answer the following questions (any one). **[04]**

1. Write limitations of Amplitude Modulation.
2. Write types of Modulation. Explain Amplitude Modulation along with figures.

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