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SEAT No. \_\_\_\_\_

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# SARDAR PATEL UNIVERSITY V.V.NAGAR

B.Sc.INSTRUMENTATION (V)

SEM-IV, 15<sup>th</sup> April-2019 EXAMINATION

Monday

SUB. CODE:-US04CINV02

SUB: OSCILLATOR AND OPTICAL DEVICE

TIME:-10:00 AM to 1:00 PM

MARKS-70

Q.1 Choose correct answer

[10]

1. In \_\_\_ oscillator RC circuit gives total 180 degree change.  
(A) phase shift (C) colpitt's  
(B) Hartley (D) None of above
2. In L-C oscillator frequency can be varies by changing value of \_\_\_  
(A) Inductor (C) Resistor  
(B) Inductor and capacitor both (D) None of above
3. Normally in LASER \_\_\_ and in LED \_\_\_ emission occurs.  
(A) Stimulation, spontaneous (C) Spontaneous, stimulation  
(B) Spontaneous, absorption (D) None of above
4. In ordinary Photograph represent \_\_\_ dimension and in holography \_\_\_ dimension recording.  
(A) Two, Three (C) Three, Two  
(B) One, Two (D) None of above
5. In fiberoptics light propagate through total internal \_\_\_  
(A) Refraction (C) diffractions  
(B) Reflection (D) None of above
6. \_\_\_ is passing and carrying data in optical fiber.  
(A) Current (C) Sound  
(B) Light (D) None of above
7. \_\_\_ losses occur in fiber optics cable.  
(A) Absorption losses (C) Radiation losses  
(B) Material losses (D) All of above
8. The term \_\_\_ is used to describe pulse bordering effect by fiber.  
(A) Modal Dispersion (C) Material Dispersion  
(B) GM Interference (D) None of above
9. Among the following which type of loss is observed in optical fiber cable?  
(A) Material losses (C) Electric field losses  
(B) Dimension losses (D) None of above
10. Metal Cable transmits \_\_\_\_\_.  
(A) Current (C) Light  
(B) Current and Light (D) None of above

Q-2 Short answer type questions(Any Ten)

[20]

1. What is Piezo electric effect? Explain its equivalent circuit.
2. State both Barkhusen's criteria and explain in short.
3. Differentiate between LED and LASER.
4. Explain principal of fiber optics.
5. State classification of oscillator.
6. Draw and label the edge emitting diode.
7. Explain in short spontaneous emission and stimulated emission with figure.
8. State disadvantages of fiber optics.
9. Briefly explain single mode fiber cable.
10. What is photodetector? How its work?
11. What are the basic requirements of LED?
12. Explain Absorption loss.

- Q.3 Draw necessary diagram of 555 IC & explain in detail. [10]
- OR
- Q.3(A) Draw and Explain Colpit's Oscillators. [6]  
Q.3(B) Discuss application of timer IC as Astable multivibrator. [4]
- OR
- Q.4 Enlist different type of LED and explain surface emitting LED with schematic diagram. [10]
- OR
- Q.4 Explain one of the LASERS in detail and state applications of LASER. [10]
- Q.5 List different type of fiber and explain construction of fibers in details. [10]
- OR
- Q.5 What is photo detector? List different types of photo detectors and explain any one in detail. [10]
- Q.6(A) Draw block diagram of fiber optics communication system and explain it. [6]  
Q.6(B) State advantage and disadvantage of optical fiber system. [4]
- OR
- Q.6 Define total internal reflection. How it is used in fiber optics communication? with necessary diagram derive an equation of critical angle ( $Q_c$ ) and numerical aperture. [10]

