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CBE-2203-U

B. Sc./ B. Sc. B. Ed.

Fifth Semester

(End Semester)

Examination Dec. 2019

PHYSICS

Paper - PHY-SE-511

(Applied Optics)

Time : Three Hours]　　　　[Maximum Marks : 60

Note :– Attempt all sections.

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SECTION-A

(Objective Type Questions)　　10×1=10

Note :– Choose the correct options.

1. Laser beam is not :

   (a) Monochromatic

   (b) Unidirectional

   (c) Coherent

   (d) Non-coherent ·

2. The wavelength of helium-neon laser is :

   (a) 6943 $\overset{\circ}{A}$

   (b) 6328 $\overset{\circ}{A}$ ·

   (c) 6534 $\overset{\circ}{A}$

   (d) 6845 $\overset{\circ}{A}$

3. The application of fourier transform is :

(a) Phase contrast microscopy

(b) Raman spectroscopy

(c) NMR spectroscopy

(d) None of the above

4. High pass filtering allows :

(a) Low spatial frequency

(b) High spatial frequency

(c) Both (a) and (b)

(d) None of the above

5. The principle of fourier transform spectroscopy is based on :

(a) Interferrometry

(b) Reflection

(c) Refraction

(d) None of the above

6. The branch of spectroscopy which deals with

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interaction of magnetic active nucleic with external magnetic field is :

(a) Nuclear magnetic resonance spectroscopy

(b) Raman spectroscopy

(c) Infrared spectroscopy

(d) None of the above

7. The technique for recording and reproducing the three dimensional image of an object without the use of lenses is :

(a) Photography

(b) Holography

(c) Microscopy

(d) None of the above

8. The holography records :

(a) Only intensity

(b) Only phase distribution

(c) Both the intensity and the phase distribution

(d) None of the above

9. Optical fiber can be satisfactorily operated if :

   (a) Refractive index of the core is lesser than that of cladding

   (b) Refractive index of the core is greater than that of cladding

   (c) Refractive index of the core is equal to that of cladding

   (d) None of the above

10. Attenuation in optical fiber can be measured in :

   (a) dB/Km

   (b) dB/m

   (c) dB/cm

   (d) None of the above

SECTION-B

(Short Answer Type Questions)   4×5=20

Note :– Attempt any **four** questions. All questions carry **five** marks.

1. What is laser? Explain the characteristic of laser.

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2. Write the difference between low pass filters and high pass filters and write down its features.

3. Explain the application of fourier transform spectroscopy in atmospheric remote sensing.

4. Explain the application of holography in microscopy.

5. What is optical fiber? Explain the principal of optical fiber. http://www.dhsgsu.com

6. (a) Draw the energy level diagram of He-Ne laser.

   (b) Write down any **three** properties of optical fiber.

SECTION - C

(Long Answer Type Questions) 3×10=30

Note :– Attempt any **three** questions of the following.

1. Explain the meaning of Einstein's coefficients A and B and hence establish a relationship between them by the statistical mechanics.

2. What is spatial frequency filtering? Explain the basic principle of spatial frequency filtering.

3. Explain the principle of fourier transform spectroscopy and explain FTS is a powerful method for measuring emission and absorption spectra.

4. Describe the different types of holograms.

5. (a) On the basis of mode and refractive index write the fibers and explain them.

   (b) Why cladding is important in optical fiber.

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