Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATIONS, DECEMBER - 2019

SUBJECT: ANALYTICAL AND OPTICAL INSTRUMENTATION [ICE 4101]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

1A. Discuss various sources and detectors of Visible spectrophotometers.

1B. Compare and contrast the working of an interference filter and a monochromator.

1C. With a neat schematic discuss the working of ratio recording type IR Spectrometer.

(4+3+3)

2A How are photo multiplier tubes efficient devices for Light detection? If a PMT has 5 dynodes each with a gain of 5 what is the current amplification at the output of PMT.

2B With neat schematics compare the working and constructional details of Transmission and Reflection holograms.

2C Describe the advantages and disadvantages of HPLC over normal liquid chromatography.

(4+3+3)

3A Explain how splitting of different signal peaks happens in NMR spectroscopy. How does shielding affect the chemical shift of different proton types in NMR?

3B What is radiometry? With neat figure explain its working.

3C Explain the working of Infrared gas analyser for measurement of carbon monoxide.

(4+3+3)

4A Prove that Laser of two energy levels doesn't meet the requirement of light amplification.

4B Differentiate Homo-junction and Hetro-junction semiconductor laser.

4C Explain the operation of Rayleigh's Interferometer.

(5+3+2)

5A With neat diagram, explain working of optical time domain reflectometer.

5B What is dispersion in optical fibre? Explain two different types of dispersion.

5C Name a suitable technique for the measurement of hydrogen and explain the same.

(5+3+2)

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