SEAT No._____

[196]

No. of printed pages: 2

SARDAR PATEL UNIVERSITY
M. Sc. (IV SEMESTER) EXAMINATION 2019
26th MARCH 2019, Tuesday
2.00 p.m. TO 5.00 p.m.
Advanced Characterization Techniques – II (PS04EPHC22)

N. B. Figures to the right indicate marks. Total marks:70

Q. 1 Select the correct answer : (only code) **(08)**

[1] .....is the ratio between current and voltage.
(a) Resistance (b) Impedance
(c) Both (a) and (b) (d) Capacitor

[2] Ability of current to resist the flow of electrical current is represented by.....
(a) impedance (b) imaginary impedance
(c) real impedance (d) complex impedance

[3] .....is the measurement of optically rotation as a function of wavelength.
(a) Circularly birefringence (b) Circular dichroism
(c) Circularly birefringent (d) Optical rotatory dispersion

[4] The emerging vector rotates an angle with respect to the original plane of polarization light, such a medium is called
(a) Optical rotatory dispersion
(b) Circularly birefringent
(c) Circular dichroism
(d) Cotton effect

[5] Rotational spectroscopy lies between.....
(a) 100 μm to 1 cm (b) 1 cm to 4 cm
(c) 10 μm to 100 μm (d) 1 μm to 10 μm

[6] Anion exchanger used in ion exchange chromatography is.....
(a) Amberlite IRC 50
(b) Rexgn^{d} 201
(c) Rexyn 102
(d) Dowex^{a} 50

[7] HPLC stands for.....
(a) High Pressure Liquid Chromatography (b) High Performance Liquid Chromatography
(c) both (a) and (b) (d) Highly Placed Liquid Chromatography

[8] In reversed phase HPLC, there is a.....
(a) non polar solvent/polar column
(b) polar solvent/non-polar column
(c) non polar solvent/non-polar column
(d) any of the above

(P.T.O)

Q. 2 Answer any seven of the following.

[1] Define: Real impedance and Imaginary impedance.
[2] Why electrochemical impedance spectroscopy is an established as a powerful tool?
[3] Explain: Ideal resistor and Ideal capacitor.
[4] Explain the term circular birefringence and circular dichroism.
[5] What is cotton effect?
[6] What is microwave spectroscopy?
[7] On what principal does HPLC work?
[8] Discuss Gel electrophoresis
[9] The microwave spectrum of HI molecule consist of series of lines with a spacing of 12.8 cm^{-1} i.e. B = 6.4 (Given: $\mathbf{h = 60624 \times 10^{-27}}$, $\mathbf{\pi = 3.14}$, $\mathbf{C = 3.0 \times 10^{10}}$), **Calculate I_{HI}.**

Q. 3 (a) Explain: Impedance, complex impedance and fundamental impedance experiment. (6)

Q. 3 (b) Write note on complex dielectric, modulus and impedance data representations. (6)

OR

Q. 3 (b) Explain: Interfacial electrochemical reaction with representative electrical circuit. (6)

Q. 4 (a) Describe the different types of optical rotatory dispersion curves. (6)

Q. 4 (b) Give an account of the application of optical rotatory dispersion and circular dichroism. (6)

OR

Q. 4 (b) Describe the instrumentation for ORD and CD measurements (6)

Q. 5 (a) Answer the following. (6)
(I) Discuss instrumentation for microwave spectroscopy.
(II) Differentiate between IR and Microwave spectroscopy.

Q. 5 (b) Discuss theory of microwave spectroscopy using diatomic molecule as rigid rotator. (6)

OR

Q. 5 (b) Discuss application of microwave spectroscopy. (6)

Q. 6 (a) Answer the following. (6)
(I) Discuss principle of Gas chromatography.
(II) State application of Gas chromatography.

Q. 6 (b) Discuss principle of Ion chromatography and state application of ion chromatography. (6)

OR

Q. 6 (b) How will you separate amino acids with ion chromatography. (6)

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