

**U.G. 5th Semester Examination - 2021**

**CHEMISTRY**

**[HONOURS]**

**Discipline Specific Elective (DSE)**

**Course Code : CHEM(H)DSE-P-2B/PR**

**[PRACTICAL]**

Full Marks : 20

Time : 2 Hours

*The figures in the right-hand margin indicate marks.*

*Candidates are required to give their answer in their own words as far as practicable.*

Answer any **four** questions:

5×4=20

1. a) Describe the four classes of sources of fire hazards in chemistry laboratory.
- b) What is molar absorptivity coefficient,  $\epsilon$ ?
- c) Draw the diagram of a double-beam UV-vis spectrophotometer and mark the radiation source, beam-splitter, dispersion source and detector. 2+1+2
2. a) Describe the functions of Globar and thermocouple in IR spectroscopy.
- b) How solid samples are prepared using KBr pellet technique?

- c) How will you differentiate resorcinol and catechol using IR spectroscopy? 2+1+2
3. a) Draw the structure of a laminar flow flame and mention about the important zones in flame.
- b) Write a short note on hollow-cathode lamp.
- c) Write the principle to determination of calcium in tap water by AAS. (1+1)+2+1
4. a) Define flammable chemicals and combustible chemicals with examples.
- b) Define normal and reverse phase liquid chromatography.
- c) Draw a chromatogram for the HPLC separation of 0.1  $\mu\text{g}$  fructose, 0.2  $\mu\text{g}$  glucose and 0.15  $\mu\text{g}$  sucrose eluted at 8 min, 10 min and 13 min respectively. Assume that the dead time for solvent front is 2 min. 2+2+1
5. a) Why deuterium  $^2\text{H}$  cannot be detected in proton-NMR?
- b) What is TMS and why it is used?
- c) What is frequency-sweep and field-sweep NMR techniques? 1+2+2
6. a) Write the half-cell construction and the electrode equation for calomel electrode.
- b) Describe the composition of glass electrode.
- c) Write the principle for the potentiometric determination of a mixture of KCl and KI. 1+1+3

[Turn over]