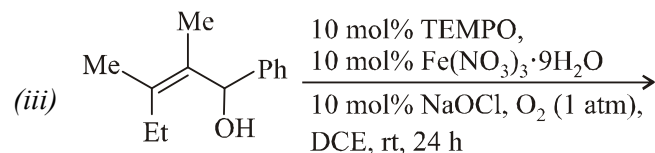
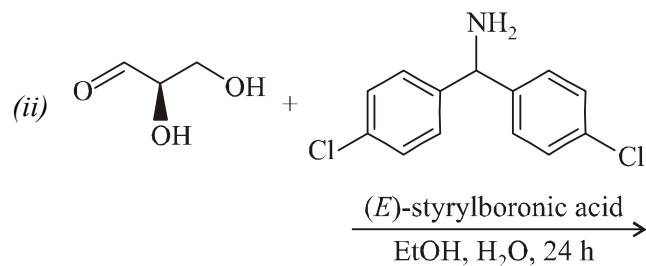
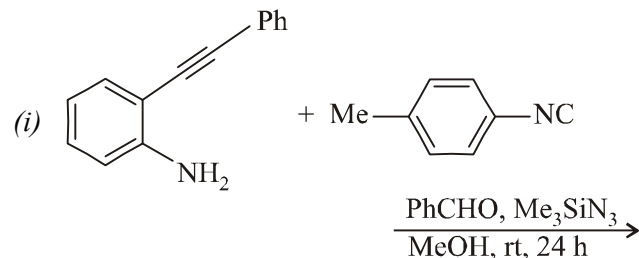


(4)

4. (a) Predict the product(s) and outline plausible mechanistic pathway for the following reactions : $2\frac{1}{2} \times 3$



- (b) Depict a suitable reaction pathway to access an amino acid derivative starting from appropriate substrate using Neber rearrangement in any step. $1\frac{1}{2}$
- (c) Cite an example of strain-promoted azide-alkyne cycloaddition reaction. 1

★ ★ ★

Each question contains equal marks distribution :

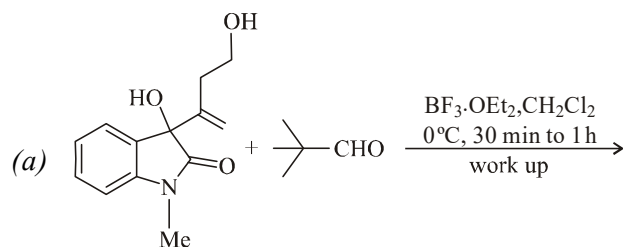
1. (a) Explain how TGA is used in quantitative determination.
- (b) Compare DTA and DSC (any four points).
- (c) Write decomposition reaction for $\text{CoC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ and find % mass loss for $\text{CoC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$. Molar mass of $\text{CoC}_2\text{O}_4 \cdot 2\text{H}_2\text{O} = 164.97$.
- (d) What is polymorphs? Can polymorphs identify using PXRD? What information do we get from Powder X-ray Diffraction (PXRD)?
- (e) How are Continuous X-rays and Characteristics X-rays emitted? $2+2+2+2+2=10$

(2)

2. (a) What are microscopic and macroscopic measurements?
- (b) Which experiments should be performed for gel like material to understand its physical roughness and particle size distribution? Justify with sophisticated tools.
- (c) SAED pattern is very helpful for understanding of crystallinity during HR-TEM analysis. Justify.
- (d) How we can protect the electron beam damage of any soft/biological samples during electron microscope studies?
- (e) Why does peak shift take place in PXRD analysis of Fe_2O_3 samples when ZnO nanoparticles doped in it? Will it be applicable for photocatalysis? $2+2+2+2+2=10$

UNIT—310-O1

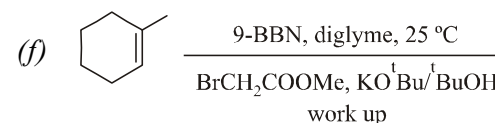
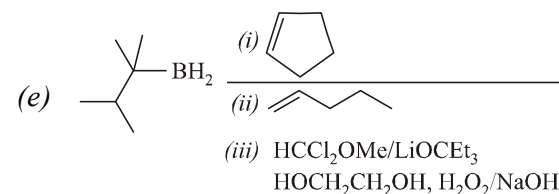
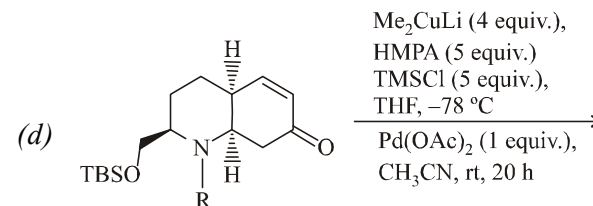
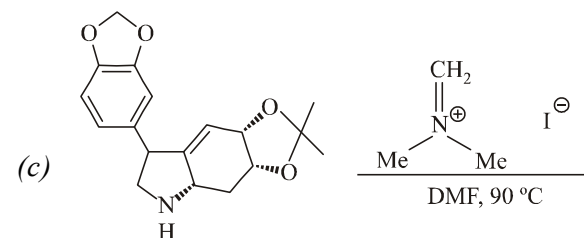
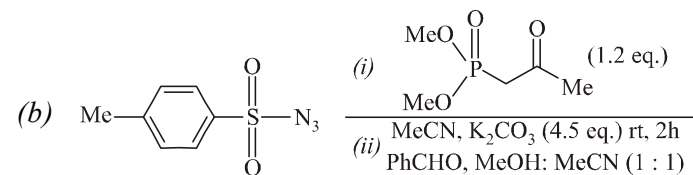
3. Predict the major product with proper stereochemistry of the following reactions and explain with plausible mechanism (Answer any four) : $2\frac{1}{2}\times 4$



CHEM-1029

[Continued]

(3)



CHEM-1029

[Turn Over]