BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : I**
BRANCH: CSE/ECE/IT/EEE **SESSION : MO/18**

SUBJECT: CH101 CHEMISTRY

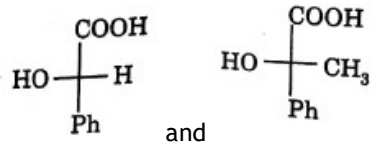
TIME: 3:00 HRS. **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) With proper diagram calculate the limiting radius ratio of anion and cation for 8-coordinate system like cesium chloride. What are the limitations of radius ratios limit? [5]

Q.1(b) Why do the transition metal complexes show mostly yellow-orange-red colour? Show the hybridization in $[Co(NH_3)_6]^{3+}$ and comment on its magnetic properties. [5]

Q.2(a) Explain the shape of BF_3 and PF_3 to compare the F-X-F (X=B or P) bond angle. Draw the following molecules into Flying-wedge projection and define the chiral center as R or S. [5]



Q.2(b) What is meso isomer? Compare the optical inactivity of mesoisomer and racemic mixture. Show the Newman projection structure of chair and boat conform of cyclohexane. Which one is more stable and why? [5]

Q.3(a) Give the mechanism of enzyme catalyzed reaction. Derive Michaelis Merten constant for enzyme catalyzed reaction. [5]

Q.3(b) What is consecutive reaction? Derive the rate equation for chain reaction between H_2 and Br_2. [5]

Q.4(a) CO_2 is IR inactive but Raman active –justify the statement. Write down the working principle of UV-VIS spectroscopy. [5]

Q.4(b) What is the influence of reduced mass and bond strength on IR spectroscopy? What do you mean by the term 'chemical shift'? Discuss the proton NMR signals for $CH_3CH_2CH_2NH_2$. [5]

Q.5(a) Define Degree of freedom with example. Calculate the degree of freedom for the following process within a open and closed chamber. What should be the degree of freedom if HCl is introduced into the closed system? [5]

$$NH_4Cl(s) \rightleftharpoons NH_4Cl(g) \rightleftharpoons NH_3(g) + HCl(g)$$

Q.5(b) What is the significance of Kc and Kp? Explain the mechanism of electrochemical corrosion. Write down the anode, cathode and complete cell reactions for lead acid battery. [5]

:::::10/12/2018:::::M