PRABHAT KUMAR COLLEGE, CONTAI

M.A. 4TH Semester Examinations 2021
(Under CBCS pattern)

Subject : Chemistry

PAPER/COURSE – CHEM (INORG): 402
ADVANCED INORGANIC CHEMISTRY-I

FULL MARKS : 50

TIME : 02 Hrs.

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

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

Attempt any Four (04) of the following: ***4 x 10***

1. a) What is Curie temperature in magnetism? b) Briefly describe the temperature effect (above and below of Curie temperature) on ferromagnetic materials with the help of Weiss Theory. c) Calculate the magnetic moment (saturated) in: Fe(II), Co(II) and Ni(II) systems (H.S and L.S) (2+3+5)

2. a) What are the reasons of magnetic property in materials? (b) In Fe – system, show the electron-spin distribution and explain the origin of magnetic moment. (c) How Hysteresis loop is changed in magnetic materials? (2+3+5)

3. a) Draw and explain the structure of $Re_2Cl_8^{2-}$ using MO approach. b) What do you mean by 'magnetic flux' and 'magnetic permeability'? (c) Write down about of 'Interstitial carbide'. (4+ 4+ 2)

4. a) Draw the structures of the compounds using skeletal electron counting (i) $Rh_6(CO)_{16}$, (ii)$Os_5(CO)_{18}$ and (iii) Pb_7^{4-}.
b) Explain the structure and bonding of $[Cr_2(OAc)_4].2H_2O$.
(6+4)

5. a) K_3CoF_6 is paramagnetic while K_2NiF_6 is diamagnetic. Explain. b) Define – (i) magnetic induction, (ii) relative permeability and (iii) magnetic susceptibility. How they are interrelated? c) What is 'Neel temperature'? (3+ 6 +1)

6. a) What do you mean by spin state equilibrium? b) Explain the magnetic moment sequence of $CoCl_4^{2-} < CoBr_4^{2-} < CoI_4^{2-}$. c) Calculate the magnetic moments of Tb^{3+} and Dy^{3+}. (2+4+ 4)

7. a) What is Bohr magneton? Calculate it. (b) What is coercive energy? (c) μ_{exp} is higher the μ_s value for Td Ni(II) and Oh Co(II). Explain. d) What is spin crossover? (4+2+4)

8. Write down applications of Pt(II) and Pd(II) as catalyst. 5+5

(Internal Assessment - 10)

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Advanced Organic Chemistry-III
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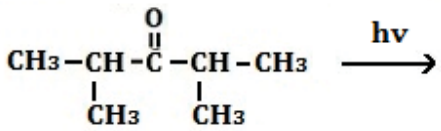
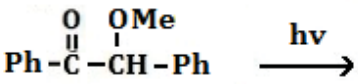
Attempt any Four (04) of the following: ***4 x 10***

1. a] Define the following terms: (2+2+2)
   (i) vibrational cascade, (ii) internal conversion, (iii) intersystem crossing.
   b] Draw a Jablonoski diagram. (4)
2. a] Write down the products with mechanism. (3+3+4)

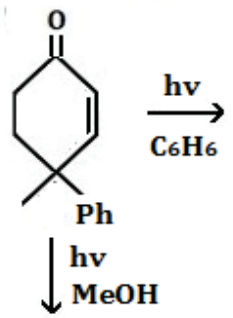
(i)



(ii)

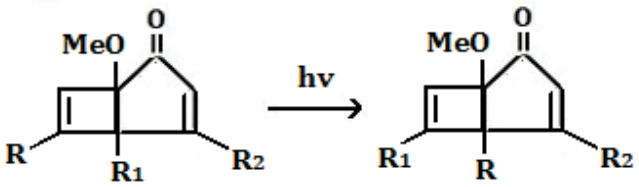


(iii)



3. a] What do you mean by Norrish type-I cleavage and Norrish type-II cleavage? Give example in each process. (3+3)

b] Show the mechanism of the following reaction. (4)



4. a] What are beta-lactum antibiotic? (2)

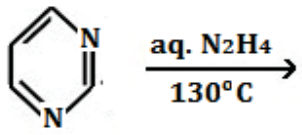
b] Describe the mechanism of action of Penicillins. (4)

c] Describe structure activity relationship (SAR) of different functional group of Penicillis. (4)

5. a] Diazines are more resistant to electrophilic substitution but more easily attacked by nucleophiles than pyridine. Explain. (3)

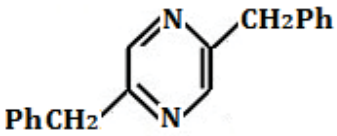
b] Why are mono-halodiazines more reactive than either 2- or 4- halopyridine? (3)

c] Write down the product with mechanism of the following reaction. (4)



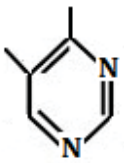
6. a] What are anti-biotics ? (2)
   b] Classify antibiotic on the basis of spectrum of activity. Give example. (3)
   c] Describe the function of Thiamin. (3)
   d] What are the three basic units of Streptomycin? (2)

7. a] Synthesize the following compounds showing mechanism as per direction. (4+4)
   (i)



from ph-CH_2-COCl

   (ii)



from acetylene

8. a]Describe the basic structure of DNA. (5)
   b] What are the function of mRNA and tRNA ? (3)
   c] What are the dietary sources of vitamin-D? (2)