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

CLASS: MPHARM **SEMESTER : II**
BRANCH: PHARMACY **SESSION : SP/18**

SUBJECT: MPH2017 PHARMACEUTICAL PROCESS CHEMISTRY

TIME: 3 HOURS **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
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) Draw neat flow sheets depicting (i) nitrobenzene production and (ii) penicillin production simplified schematic. Discuss the engineering aspects of benzoic acid manufacture and list its applications. [6]

Q.1(b) Describe the types of direct chlorination processes used in VCM manufacture with process parameters, chemistry and kinetics. Enlist the advantages and disadvantages of chlorine disinfection. [6]

Q.2(a) Describe TNT manufacture by an environmental friendly method with the help of flow sheet, chemistry and process conditions. Explain why it is considered as environment friendly. [6]

Q.2(b) Describe the oxychlorination process in VCM manufacture with process parameters, chemistry of main product and chemistry of impurity formation. Explain the biosynthesis of penicillin with a simple schematic. [6]

Q.3(a) Derive an expression for thickness of cake and volume of filtrate for filtration. [6]
(i) At constant rate (ii) At constant pressure filtration

Q.3(b) An experimental filter press having an area of 0.041 m^2 is used to filter an aqueous $BaCO_3$ slurry at a constant pressure of 267 kPa. The filtration equation was obtained as: [6]
$t/V = 10.25 \times 10^6 V + 3.4 \times 10^6$
where t is in sec and V is in m^3. If the same slurry and conditions are used in a leaf press having an area of 6.97 m^2, how long will it take to obtain 1.00 m^3 of filtrate?

Q.4(a) What is crystallization? Discuss the factor affecting crystallization? [6]

Q.4(b) Geranial (C_{10} $H_{18}O$) is an essential oil of commercial values. It is conventionally purified by steam distillation. A pilot scale unit is charged with 0.5 Kg of crude geranial containing a small amount of non-volatile impurities. Live saturated steam at 105^0C is passed through the still at a rate of 20 Kg/h. Calculate the distillation time assuming the geranial is immiscible with water. Neglect condensation of steam. The vaporization efficiency is 0.8. Vapour pressure of water at 105^0C is 1.211bar and that of geranial is given by $\ln P_A^V = 21.1 - 7217 / T$ where P_A^V is in mm Hg & T in K. [6]

Q.5(a) Discuss the operation of Effluent Treatment Plant with help of suitable flow charts. [6]

Q.5(b) What is NFPA 704? How does the 704 labels differ from other hazardous material labels? [6]

Q.6(a) Discuss the principle and importance of OHSAS-180001. [6]

Q.6(b) Describe and explain the parameters analysed during planning and execution of manufacturing process of API's: a) Material cost b) Conversion cost c) Volume time output. [6]

Q.7(a) Describe the importance of Bio-catalysis and enzymatic engineering and role played by Merch & Co. to rationalize the scale up process Sitagliptin. [6]

Q.7(b) Write notes on i) production of penicillin and its purification. Ii) production of Vitamin B_{12} [6]

:::::01/05/2018:::::E