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PBE-003-001304 Seat No. _____

B. Sc. (Sem. III) (CBCS) Examination

November / December - 2018

Chemistry : Paper - 301

(Old Course)

Faculty Code : 003
Subject Code : 001304

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) There are three main questions.

(2) Question 1 contains 20 sub-questions of one mark each, all are compulsory.

(3) Question 2 and 3 carry 25 marks each with internal option.

1 Answer the following in short / single line / one word : **20**

(1) Give an equation of wavelength λ according to De-Brogli.

(2) Give symbol of wave function.

(3) What is stable oxidation state of Cerium (Ce) ?

(4) Write electronic configuration of Terbium (Tb).

(5) What is atomic number of Lanthanum (La) ?

(6) Give IUPAC name of $CH_3 - \overset{\overset{O}{\|}}{C} - \overset{\overset{O}{\|}}{C} - CH_3$

(7) Give structure of witting reagent.

(8) Give the structure of Vinegar.

(9) Give IUPAC name of HCOOH.

(10) Arrange the following acid molecules in increasing order of acidity.

$Cl - CH_2 - COOH, CH_3COOH, HCOOH$

(11) The surface tension of liquid is decrease with increasing temperature. (True or False)

(12) Oswald Viscometer is useful for what ?

(13) The molar volume of a liquid at a temperature where its surface tension is unity is called ?

(14) In equation $P + F = C + 2$ where F is _____. (Fill blank)

(15) How many are phase(s) of mixture of gases system ?

(16) Give full form of NCV.

(17) Give full form of B.T.U.

(18) Which combustible gases present in water gas ?

(19) Cibazole is also known as_____. (Fill blank)

(20) Give any two examples of Chromophore group.

2 (a) Answer any **three** of the following : **6**

(1) What is misch metal ?

(2) Define eigen value and eigen function.

(3) Prove that $\psi = A\sin\alpha x$ is an eigen function for d^2/dx^2 but not for d/dx.

(4) What are contents of Fehling-A and Fehling-B solution ?

(5) Define hydrogen bonding with an example.

(6) Discuss any one chemical properties of Ketones.

(b) Answer any **three** of the following : **9**

(1) What is Lanthanide contraction ?

(2) Explain normalization condition of wave function.

(3) Explain spectral (colour) properties of Lanthanides.

(4) Explain physical properties of mono carboxylic acid.

(5) Explain trans esterification.

(6) Explain physical properties of aldehydes.

(c) Answer any **two** of the following : **10**

(1) Derive Schrodinger equation for particle wave.

(2) Discuss basic postulates of wave mechanics.

(3) Give uses of lanthanides and their compounds.

(4) Explain Wolf-Kishner reduction reaction with mechanism.

(5) Give at least one formation reaction for each acid derivative.

3 (a) Answer any **three** of the following : **6**

(1) Explain additive and constitutive property in short.

(2) Explain dipole momentum.

(3) Define : Phase and Component.

(4) Give any one synthesis of Phenacetin.

(5) What are gross and net calorific value ?

(6) Give a synthesis of Indigo.

(b) Answer any **three** of the following : **9**

(1) Discuss drop method to determine surface tension.

(2) Explain water system in refernce of phase rule.

(3) Explain simple eutectic Pb-Ag system.

(4) Give classification of fuels.

(5) Give structure and synthesis of Methyl orange.

(6) Explain characteristics of good fuel.

(c) Answer any **two** of the following : **10**

(1) Describe Abbe's refractometer for measurement of Refractive Index.

(2) Explain steam distillation with figure.

(3) Discuss optical activity and specific rotation.

(4) Discuss advantages and disadvantages of solid, liquid and gaseous fuels.

(5) Give classification of dyes with example.