AAQ-003-001428 Seat No. _____

B. Sc. (Forensic Sci.) (Sem. IV) (CBCS) Examination

April / May - 2016

FS-401 : Basic Concepts & Principles of Physical, Chemical & Biological Analytical Techniques - II

Faculty Code : 003
Subject Code : 001428

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

Instructions : (1) This question paper contains three questions. All are compulsory.
(2) Draw neat and labeled diagrams wherever necessary.
(3) Figure to the right indicate marks.

1 Give the answer of MCQ : **20**

(1) _____ are added for regular petrol.
(A) Orange dye (B) Red dye
(C) Green dye (D) Blue dye

(2) For benzene how many H-NMR signals obtained?
(A) 1 (B) 2
(C) 3 (D) 4

(3) Density of petrol at 15° C is _____
(A) 780-790 kg/m^3 (B) 760-770 kg/m^3
(C) None of the above (D) 710-770 kg/m^3

(4) The pink color of phenolphthalein in alkali solution gives the value of λ_{max} at _____
(A) 550-555 nm (B) 450-460 nm
(C) 480-500 nm (D) 600-700 nm

(5) Petrol consists essentially of _____ hydrocarbons.
(A) C_{20} to C_{30} (B) C_5 to C_{10}
(C) C_{40} to C_{50} (D) C_{18} to C_{28}

(6) Which solvent system is used for the thin layer chromatography of petrol?

(A) Hexane : Toluene : Acetic acid (50:50:02)

(B) Methanol : Butanol (50:50)

(C) Toluene : Methanol (50:50)

(D) All

(7) In TLC Blue dye from kerosene sample shows one blue colour spot at Rf value around

(A) 0.8 (B) 0.40

(C) 0.04 (D) 0.08

(8) Atomic absorbance spectroscopy follows' the _____ law.

(A) Beer's law (B) Lambert's law

(C) Kohlar's law (D) All of the above

(9) What is the value of λ_{max} for oil blue dye of kerosene?

(A) 575 nm – 600 nm (B) 645 nm – 655 nm

(C) 700 nm – 800 nm (D) 100 nm – 250 nm

(10) _____ is used as reference material in MR.

(A) TMS

(B) Methyl silicon

(C) CTC carbon Berta chloride

(D) Propanol

(11) The entire sample of pure petrol should distill below _____ °C.

(A) 100 (B) 300

(C) 180 (D) 215

(12) _____ is the process by which the sample is converted in to aerosol.

(A) Nebulization (B) Venturization

(C) Atomization (D) None of the above

(13) _____ detector is used in AAS.

(A) Barrier cell (B) Photocell

(C) Monochromator (D) Photo multiplier tube

(14) In thermal gravimetry to obtain the temperature of 1100° C, the material of furnace is _____.

(A) Nichrome wire (B) Tungsten wire

(C) Copper wire (D) All of the above

(15) In NMR spectroscopy _____ waves are used.

(A) Radio wave (B) UV-Visible

(C) IR (D) All of the above

(16) Research Octane number of motor spirit is

(A) 88 (B) 78

(C) 68 (D) 58

(17) What is the value of λ_{max} for oil orange dye of petrol?

(A) 460 nm (B) 470 nm

(C) 505 nm (D) 600 nm

(18) _____ cells release antibody against stimulation of a foreign substance in to body.

(A) B-cell (B) Thyroid cell

(C) Stem cell (D) All of the above

(19) On the basis of action of enzyme how many classes of enzymes are occurring?

(A) 4 (B) 5

(C) 6 (D) 8

(20) Many enzymes require the presence of small units in form of organic molecules for its activity, these units are known as _____

(A) Coenzyme (B) Cofactor

(C) Precursors (D) Active compounds

2 Give answer of following questions : **25**

(a) Write any three out of six. **6**

(1) Principle of atomic absorption spectroscopy.

(2) What is Nebulization?

(3) Give the full name of TG and DTG.

(4) Give the full form of NMR and which wavelength used in this spectroscopy?

(5) Which chemicals used in anticorruption cases?

(6) Explain encapsulation of enzymes.

(b) Write any three out of six : **9**

(1) Describe distillation process for diesel.

(2) Describe the thin layer chromatographic methods for detection of oil soluble dyes of petrol.

(3) Atomization process-write a short note with diagram.

(4) What is thermal analysis? Give the name and principle of thermal analysis method.

(5) Describe Chemistry of fire.

(6) Define antigen and antibody.

(c) Write any two out of five : **10**

(1) What is chemical shift and splitting of signal in NMR graph?

(2) Give the Full form of IBP and FBP and define aniline point, pour point. Smoke point and viscosity.

(3) Discuss the mode of action of enzymes.

(4) Instrumentation of TG.

(5) Techniques used for the analysis of coloring agent in kerosene or petrol?

3 Give answer of following questions : **25**

(a) Write any three out of six. **6**

(1) Give the physical and chemical characteristics of phenolphthalein?

(2) Define fire and arson

(3) Give full form of RON.

(4) Define enzyme purification.

(5) Which chemical used as reference compound in NMR and give its chemical structure.

(6) Write a note on Monochromator.

(b) Write any three out of six : **9**

(1) Principle of NMR

(2) Draw the chemical structure of phenolphthalein and give the chemistry of phenolphthalein?

(3) What is fire triangle and tetrahydrone ?

(4) Give the preparation of chloranil spray reagent and Rhoda mine spray reagent?

(5) Write a note on hollow cathode lamp.

(6) Describe heat transfer

(c) Write any two out of five. **10**

(1) Describe the security features of Indian currency note.

(2) What is fire and arson? Classify the fire on the basis of cause of fire and as well as source of ignition.

(3) Write a note on ELISA test.

(4) Explain the enzyme kinetics.

(5) Describe Nebulization and Atomization process in AAS.
