Total No. of printed pages = 8

3 (Sem 6) CHM M3

2015

CHEMISTRY

(Major)

Theory Paper : M-6.3

Full Marks – 60

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions (any *seven*) : 1×7=7

   (a) Methyl vinyl ketone has absorption bands at 219 nm and 324 nm. Assign type of electronic transitions to these absorptions.

   (b) What is globin of haemoglobin ?

   (c) Menalonic acid is the true precursor of terpenes. Draw the structure of menalonic acid.

   (d) What are ribozymes ?

[Turn over

(e) What is meant by quantitative structure – activity relationship in drug ?

(f) Name one coenzyme each derived from niacin and riboflavin.

(g) What is the repeating structural unit in nylon?

(h) Draw the structure of NADH.

2. Answer the following questions (any *four*) : 2×4=8

(a) Fluorescence occurs at a wavelength longer than the related absorption band. Justify this statement.

(b) What happens during the light reaction phase of photosynthesis ? Why is this phase important ?

(c) How are methoxyl groups in alkaloids determined ?

(d) Name any antiviral drug. Outline the mode of action of such a drug.

(e) What is meant by Chargaff's rule ? Why is it important ?

3. Answer question number (a) and also answer either (b) or (c) and (d) or (e). 5×3=15

(a) How can you identify the N-terminal amino acid of a peptide ? Write the steps involved. 1+4=5

(b) What products are expected to be formed when benzophenone is irradiated in the presence of toluene ? Account for the products formed. 1+4=5

Or

(c) (i) State and explain the Wigner spin conservation rule.

(ii) How is phosphorescence different from fluorescence ? 3+2=5

(d) (i) Draw α-D-glucose and β–D-glucose as pyranoses using Haworth projection. Which one is more stable and why ? 1+2=3

(ii) With the help of an example, define a glycosidic bond. 2

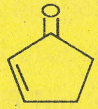
Or

(e) (i) Which monosaccharides will be obtained when D-arabinose is made to undergo Kiliani-Fischer synthesis ? Write the reactions involved ? 3

(ii) Write the reactions involved and show the conversion of glucose to fructose.

4. Answer either (a) or (b) ; (c) or (d) ; (e) or (f) : 10×3=30

(a) (i) Write the structure of the expected product(s) in the following reactions :



3

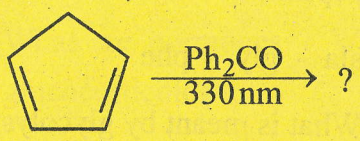
(ii) Define quantum yield. What does a quantum yield value greater than 1 indicate ? 2

(iii) Propose a mechanism for the polymerisation reaction leading to the formation of polystyrene from the corresponding monomer. 3

(iv) How is cellulose converted to cellophane ? 2

Or

(b) (i) Write the structure of the expected product(s) in the following reaction :



What role does benzophenone play in the reaction ? Use simple energy level diagram to explain the role played by benzophenone. 1+1+2=4

(ii) Why are photochemical reactions often regarded as reactions of the triplet state ? 1

(iii) What monomers are involved in the formation of terylene ? Write their structures. 2

(iv) Write the reaction involved in the formation of urea-formaldehyde resin. In what respect this resin is superior to phenol-formaldehyde resin ? 2+1=3

(c) (i) What are the constituents of a cell membrane ?

Write the general structure of a phospholipid. 2

(ii) Draw the structure of the following peptide : 2

ala - gly - phe

(iii) What is meant by glycolysis ? Write the overall reaction involved in glycolysis. 2

(iv) Write briefly about the biosynthesis of proteins i.e. translation. 4

Or

(d) (i) How are exopeptidases different from endopeptidases ? Give one example each to show the difference. 3

(ii) Between saturated and unsaturated naturally occurring fatty acids, which one has higher melting point and why ? 2

(iii) Write briefly about protein folding in solution. 3

(iv) Point out the structural differences between hemoglobin and myoglobin. 2

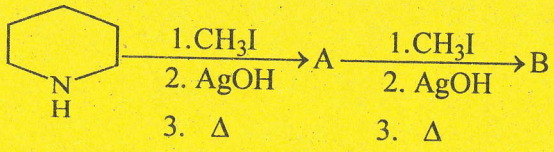
(e) (i) Draw the structure of geraniol and mark off the isoprene units. 2

(ii) What are hormones ? What role does glucocorticoids play ? 2

(iii) Draw the structure of one antimalarial drug. To what classification of antimalarials does it belong ? Against which malarial parasite is the drug active ? 1+½+½=2

(iv) Write the reaction involved in the preparation of paracetamol. Comment on its utility as a drug. 1+1=2

(v) Write all the steps involved in the following transformation : 2



(f) (i) State the gem dialkyl rule and comment on its utility. 2

(ii) How can you establish that nicotine contains a pyridine ring ? 2

(iii) Write about the mode of action of any one anti-cancer drug. 3

(iv) What is AIDS ? Suggest measures to prevent AIDS. 2

(v) Give an example of a chiral drug and draw its structure. 1