FEDERAL PUBLIC SERVICE COMMISSION
COMPETITIVE EXAMINATION FOR RECRUITMENT TO POSTS IN BS-17 UNDER THE FEDERAL GOVERNMENT, 2014
CHEMISTRY, PAPER-II

Roll Number

TIME ALLOWED:	**(PART-I MCQs)**	**30 MINUTES**	**MAXIMUM MARKS: 20**
THREE HOURS	**(PART-II)**	**2 HOURS & 30 MINUTES**	**MAXIMUM MARKS: 80**

NOTE: **(i)** **Part-II** is to be attempted on the separate **Answer Book.**
(ii) Attempt **ONLY FOUR** questions from **PART-II. ALL questions carry EQUAL marks.**
(iii) Candidate must write **Q. No.** in the **Answer Book** in accordance with **Q. No.** in the **Q. Paper.**
(iv) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
(v) Extra attempt of any question or any part of the attempted question will not be considered.

PART-II

Q. No. 2. Define the following terms: **(2 each)** **(20)**
(a) Catalytic cracking **(b)** Catalytic reforming **(c)** Fermentation
(d) Alkylation **(e)** Antibiotics **(f)** Plastic
(g) Surfactant **(h)** Unit operation **(i)** Unit Process
(j) Emulsion polymerization

Q. No. 3. **(a)** Explain the following with suitable examples. **(2 each)** **(14)**
(a) Partition Coefficient **(b)** Surface tension **(c)** Viscosity
(d) Colloidal solution **(e)** Emulsions **(f)** Nanoparticles
(g) Baeyer's strain theory

(b) Give one examples (with structure) of each of the following: **(2 each)** **(06)**
(a) *s – sp* hybridization **(b)** *sp2 – sp2* hybridization
(c) *sp – sp2* hybridization

Q. No. 4. **(a)** What do you mean by Chemiluminescence? Explain with examples. **(07)**

(b) Arrange the following functional groups in decreasing order of stability of carbocations? **(05)**
$(CH_3)_3C^+$, CH_3^+, $CH_3CH_2^+$, $(CH_3)_2CH^+$, $CH_2=CH-CH_2^+$, $C_6H_5CH_2^+$,

(c) Explain the following terms:
(a) Standard solution **(b)** Molar solution **(c)** Molal solution **(05)**
(d) Formal Solution **(e)** Normal solution

(d) How many grams of KOH are in 600 mL of 0.450 M KOH solution? **(03)**

Q. No. 5. Give one representative example of each of the following reactions. Give complete equation and label it. **(2 each)** **(20)**
(a) Witting reaction **(b)** Oxiation of 1^o and 2^o alcohols
(c) Friedel-Crafts alkylation **(d)** Hydration of Alkenes
(e) Glycol cleavage **(f)** Ozonolysis
(g) Tollen's test **(h)** Propagation reaction
(i) SNl reaction **(j)** Condensation polymerization

Q. No. 6. **(a)** What are wetting agents and for what purpose they are used? **(10)**

(b) Describe briefly the alternatives used to hydrogenation of vegetable oils for the formation vegetable Ghee. **(05)**

(c) Give a laboratory test to differentiate between unsaturated and saturated molecules. **05)**

Q. No. 7. **(a)** What approaches are followed to rule out keto-enol tautomerism. Draw the tautomerism exhibited by acetone and acetoacetic ester. **(10)**

(b) Explain the industrial preparation of Gels? Explain their use in medicine and cosmetics? **(10)**

Q. No. 8. **(a)** Draw the structures of the following molecules: **(10)**

(a) Cyclohex-en-1-one **(b)** Cyclohexanecarbaldehyde
(c) Hexadecane **(d)** 3-methyl-1-butene
(e) 4-bromo-3-methy1-1-butene **(f)** 4-ethenylcyclohexanol
(g) 2-methy1-3-butene-1-ol **(h)** 6-ethyl-1-methylcyclohexene
(i) 2-amino-3-phenylpropionic acid **(j)** 2-formyl-4-oxocyclohexanecarboxylic acid

(b) Name the following structures according to IUPAC/common system of nomenclature: **(10)**

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