(d) Evaluate : $\int \frac{1}{1+\sin x}\,dx$ 2

(De) Ùeeo $\frac{1}{\lfloor 4} + \frac{1}{\lfloor 6} = \frac{a}{\lfloor 7}$, a keâe ceeve evekeâeue

(ye) ceeve evekeâeeueS : ${}^{9}P_{5}$

(me) 6 ue[ekeâÙee Deej 4 ue[keâe keâe keâ#ee ce me velÙe keâ eueS 3 ue[ekeâÙee Deej 2 ue[keâe keâe Šece, ekeâleve Øekeâej me Ûevee pee mekeâlee n?

(o) ceeve evekeâeeueS : $\int \frac{1}{1+\sin x}\,dx$

3. (a) What do you mean by computer language? What are different types of computer languages? 3½

(b) What are input and output devices in a computer? Briefly explain two examples of each of them. 4

(De) keâchÙešj keâe Yee<ee me Deehe keÙee mecePele n? keâchÙešj keâe eJeeYeVe Yee<eeS keÙee n?

(ye) Skeâ keâchÙešj ce Fveheš Deej DeeGšheš e[JeeFme keÙee n? me#ehe ce Fvece ØelÙekeâ keâ oe Goenj Ce okeâj eeFS~

A (Printed Pages 8)

Roll No. _____

S-621

B.Sc. (Part-I) Examination, 2015

CHEMISTRY

Paper : III

(Physical Chemistry)

Time Allowed : Three Hours] ***[Maximum Marks : 50***

Note : Answer five questions, including Question No. 1, which is compulsory. Answer one question from each unit. Log table will be supplied on demand.

ØeMve me. 1 DeeveJeeÙe n, Fmekeâe eceueekeâj heeÙe ØeMvee keâ Gòej oeepeS leLee ØelÙekeâ FkeâeF me Skeâ ØeMve keâe Gòej oeepeS~ uele-meeejCee ceeieve hej oe peeSiee~

1. Answer the following : 2×10

(I) Evaluate :

(a) $\int \frac{1}{\sqrt{x}}\,dx$

(b) $\frac{d}{dx}(4x+6)^{-6}$

(II) Add the binary numbers 10011 and 1001 in both binary and decimal form.

(III) What is collision number and collision frequency?

(IV) Describe Bravais lattices in cubic crystals.

(V) Application of liquid crystals.

(VI) What are emulsions and their uses?

(VII) What are catalytic promotors and catalytic inhibitors? Give the examples of each.

(VIII) What do you understand by molecularity and order of a reaction?

(IX) Explain RAM and ROM.

(X) How and why real gases deviate from ideal bahaviour?

evecveeueeKele keâ Gòej oeepeS :

(I) ceeve evekeâeeueS :

(De) $\int \frac{1}{\sqrt{x}}\, dx$

(ye) $\frac{d}{dx}(4x+6)^{-6}$

(II) 10011 Deej 1001 yeeFvejeve vecyeje keâe yeeFveje Deej oMeceueJe heæeele oevee eJeeOe me peee[Ùe~

(III) meleó meKÙee SJe meleó DeeJeeòe keÙee n?

(IV) leve evekeâeÙe keâ e›eâmšuee ce yeeJeMe peeuekeâe keâe JeCeve keâeepeS~

(V) õJeeÙe jJe keâ GheÙeeie yeleeFS~

(VI) heeÙeme Je Gmekeâ GheÙeeie keÙee n?

(VII) Gløejkeâ mecJeOekeâ Deej Gløejkeâ meocekeâ keÙee n? ØelÙekeâ keâe Skeâ Goenjce oeepeS~

(VIII) ekeâmee DeeYee›eâÙee keâe 'DeeeCJekeâlee' leLee keâe keÙee DeeYeØeeÙe n?

(IX) RAM Deej ROM keâe JÙeeKÙee keâeepeS~

(X) JeemleeJekeâ ieme ekeâme Øekeâejej Deej keÙee DeeoMe JÙeJenej me eJeÛeueve oMeelee n?

Unit - I

FkeâeF - I

2. (a) If $\frac{1}{\lfloor 4} + \frac{1}{\lfloor 6} = \frac{a}{\lfloor 7}$, find a 2

(b) Find the value of $^{9}P_{5}$ 1½

(c) In how many ways can a team of 3 girls and 2 boys for a dance be selected from a class of 6 girls and 4 boys? 2

ØeLece keâeeš keâe DeeYee›eâÙee keâ eueS Jeie JÙepekeâ keâe JÙelheVe keâeepeS~ emeæ keâeepeS ekeâ Fme Øekeâej keâe DeeYee›eâÙeeDee keâe Deæ-DeeÙekeâeue Øeejecyekeâ meevõlee me mJele$e nelee n~ «eeHeâ Éeje Fme Øekeâej keâe DeeYee›eâÙeeDee keâe Jeie emLejekeâ ekeâme Øekeâej %eele ekeâÙee peelee n? ØeLece keâeeš keâe DeeYee›eâÙeeDee keâ Jeie emLejekeâ keâe Ùeeveš keÙee neiee?

9. Write short notes on : 2½ + 2½ + 2½

(a) Active Centers,

(b) Activated complex,

(c) Theories of Catalysis

evecveeueeKele hej mee#ehle ešhheeCeÙee eueeKeS –

(De) mee›eâÙe keâvõ

(ye) mee›eâÙele mekeâj

(me) GlØejce keâ emeæevle

Unit - II

FkeâeF - II

4. (a) Calculate the critical temperature of a Vander Waals gas for which P_c is 100 atm and b is 50 cm^3 mol^{-1}. 2½

(b) State law of corresponding state and deduce the relevant equation. 2½

(c) Discuss Maxwell's distribution of molecular velocities. How three types of molecular velocities are related to each other? 2½

(De) Ùeeo JeeC[j Jeeue ieme keâ eueS P_c SJe b ›eâceMe: 100 JeeÙeceC[ue leLee 50cm^3 mol^{-1} ne lee Fmekeâ ›eâeevlekeâ leehe keâe ieCevee keâeepeS~

(ye) meiele DeJemLee eveÙece keâe euæKeS SJe mecyeevOele meceekeâjce keâe JÙelheVe keâeepeS~

(me) cekemeJeue keâ DeeeCJekeâ Jeiee keâ eJelejce keâe eJeJeÛevee keâeepeS~ leevee Øekeâej keâ DeeeCJekeâ Jeie ekeâme Øekeâej Skeâ omej me mecyeevOele n?

5. Explain the following in brief:

   (a) Nematic liquid crystals and Cholesteric liquid crystals. 4

   (b) Thermography. 3½

evecvveeueeKeÌe keâe me#ehe ce JÙeeKÙee keâeepeS :

(De) eveceeškeâ SJe keâeuemšejkeâ õJeeÙe jJe

(ye) Lecee«eeHeâe

Unit - III

FkeâeF - III

6. Derive Bragg's equation. How has it been utilized to assign the structure of a crystal of NaCl? Draw and discuss the structure of NaCl and CsCl. 7½

e›eâmšue Éejeˆ X-eJeekeâjCe keâ eJeJeÌeve mecyevOee yeie meceekeâjCe keâe JÙeÌheeòe keâeepeS~ Ùen ekeâme Øekeâejˆ me NaCl e›eâmšue keâ Deekeâejˆ keâ eveOeejCe ce meneÙekeâ n~ NaCl Deeˆ CsCl e›eâmšuee keâe eÛee$eÌe keâjkeâ JÙeeKÙee keâjˆ~

7. Write short notes on following : 2+2+2+1½

   (i) Gold number

   (ii) Gels,

   (iii) Coagulation,

   (iv) Peptization

evecvveeueeKeÌe hejˆ mee#eheÌe eŠhheeCeÙee eueeKeS :

(De) mJeCe meKÙee,

(ye) eMuee<e (peume)

(me) mkeâove

(o) hehšekeâjCe

Unit - IV

FkeâeF - IV

8. Derive an expression for rate constant for reactions of first order. Prove that half life period of such reactions is independent of initial concentration. How is the rate constant of such reaction evaluated graphically? What are the units of rate constant for first order reactions? 7½