B.Sc. 5th Semester (Honours) Practical Examination, 2019-20
CHEMISTRY

Course ID : 51427   **Course Code : UG/CHEM/504/DSE-2**

Course Title : Green Chemistry (P2)

Time 2 Hours   **Full Marks: 15**

The figures in the right hand side margin indicate marks.

1. Prepare biodiesel from the supplied sample marked 'G'.   5

2. Calculate (i) the weight of biodiesel prepared and (ii) % of conversion.   3+3=6

3. Laboratory Notebook   2

4. Viva voce   2

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51427/17495

SP-I/Chemistry-501-DSE-1A/19

B.Sc. 5th Semester (Programme) Practical Examination, 2019-20
CHEMISTRY

Course ID : 51428   **Course Code : UGP/CHEM/501/DSE-1A**

Course Title: Green Chemistry (P1)

Time: 2 Hours   **Full Marks: 15**

The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.

দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।

1. Prepare biodiesel from the supplied sample marked 'G'.   5

   'G' চিহ্নিত প্রদত্ত নমুনা থেকে বায়োডিজেল প্রস্তুত করো।

2. Calculate (i) the weight of biodiesel prepared and (ii) % of conversion.   3+3=6

   উপরোক্ত বায়োডিজেল-এর (i) ওজন পরিমাপ করো এবং (ii) রূপান্তরের শতকরা হার নির্ণয় করো।

3. Laboratory Notebook   2

   পরীক্ষাগারে কাজের খাতা

4. Viva voce   2

   মৌখিক পরীক্ষা

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B.Sc. 5th Semester (Honours) Practical Examination, 2019-20
CHEMISTRY

Course ID : 51426   **Course Code : UG/CHEM/503/DSE-1**

Course Title : Advanced Physical Chemistry Lab

Time 2 Hours   **Full Marks: 15**

The figures in the right hand side margin indicate marks.

1. Perform *any one* from the following: 11

(A) The heat capacity of a solid is given by $G(J/K.mol) = 44·35 + 1·67 \times 10^{-3}T$. Calculate the change in enthalpy of the solid if it is cooled at constant pressure from 500 K to 300 K by a compute programming.

(B) Write the van der Waals equation of state as a cubic equation of V. Using a computer programme, find the volume of 1 mol of CO_2 at 1 bar (10^5Pa) and at temp. 298·15 K. Compare your result if CO_2 behaves ideally.

For, CO_2, $a = 0·364$ Pam^6 mol^{-2}; $b = 4·267 \times 10^{-5}$ m^3 mol^{-1} .

(C) One mole of a metal is heated from 25°C to 100°C at constant pressure.

$C_P (J/K.mol) = 23·7 + 0·00519$ T.

Calculate Δs for the transformation using a computer programme.

(D) Estimate the change in the pressure by a computer programme of 1·00 mol of a gas obeying van der waals equation of state at 0°C when its volume is changed from 22·414 L to 21·414 L,

For the gas $a = 0·3640$ Pam^6 mol^{-2}; $b = 4·267 \times 10^{-5}$ m^3 mol^{-1} .

3. Laboratory Notebook   2

4. Viva voce   2

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UGP-V/SC/504/SEC-3/19

B.Sc. 5th Semester (Programme) Examination, 2019-20
CHEMISTRY

Course ID : 51410 **Course Code : UGP/S.C./504/SEC-3**

Course Title: IT Skill for Chemists

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.

দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।

1. Answer *any five* questions: 2×5=10

   যে কোনো পাঁচটি প্রশ্নের উত্তর দাও ঃ

   (a) How many variables are there in the vander Waals gas equation $\left(P + \dfrac{a}{v^2}\right)(v - b) = RT$ at a definite temperature?

   নির্দিষ্ট তাপমাত্রায় ভ্যানডার ওয়াল গ্যাস সমীকরণ $\left(P + \dfrac{a}{v^2}\right)(v - b) = RT$-তে কয়টি অপেক্ষক আছে?

   (b) What is the full form of C.P.U.? 1 GB = ? MB

   C.P.U.-এর পুরো নাম কী? 1 GB = কত MB?

   (c) Express Δz where $z = f(x, y)$.

   $z = f(x, y)$ অপেক্ষকের ক্ষেত্রে Δz-এর সমীকরণটি লেখো।

   (d) Convert the unit of force: Newton to Dyne.

   বলের একক নিউটন-কে ডাইন এককে রূপান্তর করো।

   (e) Find $\log_{10}^{1000}$.

   $\log_{10}^{1000}$ এর মান নির্ণয় করো।

   (f) Find out the Median and Mean for the numbers 2, 7, 8, 4 and 9.

   2, 7, 8, 4 এবং 9-এই মানগুলির মধ্যমা ও গড় নির্ণয় করো।

(g) How many no. of significant figures are there in Avogrado's number $\left(6{\cdot}023{\times}10^{23}\right)$?

অ্যাভোগাড্রো সংখ্যা $\left(6{\cdot}023{\times}10^{23}\right)$-তে তাৎপর্যপূর্ণ অঙ্ক সংখ্যা কত?

(h) What do you mean by Error in Measurement?

পরিমাপের ত্রুটি বলতে কী বোঝো?

2. Answer *any four* questions: 5×4=20

যে কোনো চারটি প্রশ্নের উত্তর দাও ঃ

(a) (i) Find the roots of the equation $x^2 + 3x - 2 = 0$.

$x^2 + 3x - 2 = 0$ সমীকরণের বীজগুলি নির্ণয় করো।

(ii) Write the names of two main types of Error in Measurement. 3+2=5

পরিমাপের ত্রুটির দুটি মূল প্রকারভেদ উল্লেখ করো।

(b) (i) If the mass of a stone is 10 gm and its volume is 3 c.c., then how you will represent the value of its density on the basis of significant figures.

একটি পাথরের ভর 10 gm এবং আয়তন 3 c.c. হলে তাৎপর্যপূর্ণ অঙ্ক সংখ্যারভিত্তিতে ওর ঘনত্বের মান-কে কীভাবে প্রকাশ করবে?

(ii) Draw the graph of the function $y = 3x + 8$ and show the slope of the line and its intercept. 2+3=5

$y = 3x + 8$ লেখচিত্রটি অঙ্কন করো এবং লেখচিত্রে নতি ও ছেদিতাংশ চিহ্নিত করো।

(c) (i) Write down the difference between RAM and ROM.

RAM এবং ROM-এর মধ্যে পার্থক্য লেখো।

(ii) Add the following binary numbers: 2+3=5

নিম্নলিখিত বাইনারি সংখ্যাগুলি যোগ করো ঃ

 (A) 11010 and 10111

 (B) 10001 and 1111

(d) (i) The weight of the different samples of mineral are 58, 59, 63, 55, 54, 51, 56, 51 and 53 gm. Calculate the standard deviation from the above numbers.

কোনো একটি খনিজ পদার্থের বিভিন্ন নমুনার ওজনগুলি হল যথাক্রমে 58, 59, 63, 55, 54, 51, 56, 51 এবং 53 গ্রাম। এই মানগুলি থেকে প্রমাণ বিচ্যুতি গণনা করো।

(ii) Find the S.I. unit of 'R' from the equation $R = \dfrac{PV}{nT}$, where the terms have their usual significance.   2½+2½=5

$R = \dfrac{PV}{nT}$ সমীকরণ থেকে "R" এর S.I. পদ্ধতিতে একক নির্ণয় করো। যেখানে রাশিগুলি প্রচলিত অর্থে ব্যবহৃত।

(e) (i) If $f(x) = x^3 + 3x^2 + 3x - 1$, then find $f(x)$ and $f'(x)$ for $x = 0.5$. $\left[f'(x) = \dfrac{d}{dx} f(x) \right]$.

যদি $f(x) = x^3 + 3x^2 + 3x - 1$, হয়, তাহলে $x = 0.5$ মানের জন্য $f(x)$ এবং $f'(x)$-এর মান নির্ণয় করো। $\left[f'(x) = \dfrac{d}{dx} f(x) \right]$

(ii) What do you mean by ASCII format?   3+2=5

ASCII ফর্ম্যাট বলতে কী বোঝো?

(f) (i) $V(x) = \dfrac{1}{2} Kx^2$, (K is a constant) Plot $V(x)$ vs. x.

$V(x)$ vs. x লেখচিত্রটি অঙ্কন করো যেখানে $V(x) = \dfrac{1}{2} Kx^2$, (K একটি ধ্রুবক)।

(ii) Find $\dfrac{dy}{dx}$ when $y = x^x$.   2½+2½=5

$y = x^x$-এর ক্ষেত্রে $\dfrac{dy}{dx}$ নির্ণয় করো।

3. Answer *any one* question: 10×1=10

যে কোনো একটি প্রশ্নের উত্তর দাও ঃ

(a) (i) Write down the full form of FORTRAN, DOS and ALU.

FORTRAN, DOS ও ALU-এর পূর্ণ রূপগুলি লেখো।

(ii) Compute $\displaystyle\int_0^2 x^3 dx$ by Trapezoidal Method by taking $n = 5$.

গণনা করো- $\displaystyle\int_0^2 x^3 dx$ -ট্র্যাপিজয়ডিয়াল পদ্ধতির মাধ্যমে ($n = 5$ এর জন্য)

(iii) Define Relative error.   3+5+2=10

আপেক্ষিক ত্রুটির সংজ্ঞা দাও।

(b) (i) If $K_P = \dfrac{x^2}{\left(1 - x^2\right)} P$, then find the value of x when $x \ll 1$.

যদি $K_P = \dfrac{x^2}{\left(1 - x^2\right)} P$ হয়, তাহলে x-এর মান নির্ণয় করো যখন $x \ll 1$।

(ii) How do you write the algebraic expression $b^2 - 4ac$ in BASIC expression?

$b^2 - 4ac$ এই বীজগণিতিক রাশিমালাটিকে কীভাবে BASIC ল্যাঙ্গুয়েজ-এ প্রকাশ করবে?

(iii) Discuss the method of Least Square for the straight line fitting of a series of data points.

ক্রমান্বয়ে সাজানো তথ্যরাশির সরলরৈখিক লেখচিত্র অঙ্কনের ক্ষেত্রে ন্যূনতম বর্গ পদ্ধতি-টি আলোচনা করো।

(iv) Find the slope of the line $y = 2bx + c$, where b and c are constants. 2+2+4+2=10

$y = 2bx + c$ রেখাটির নতি নির্ণয় করো যেখানে b এবং c ধ্রুবক।

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B.Sc. 5th Semester (Honours) Examination, 2019-20

CHEMISTRY

Course ID : 51411   **Course Code : UG/CHEM-501/C-11**

Course Title: Inorganic Chemistry (IV)

Time: 1 Hour 15 Minutes   **Full Marks: 25**

The figures in the right hand side margin indicate marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* questions: 1×5=5

  (a) Give an example of each for MLCT and LMCT transition.

  (b) Find out the Russel-Saunder's ground state term symbol for Mn(IV).

  (c) What is the $\mu_{s.o.}$ of $[Cr(H_2O)_6]^{3+}$?

  (d) Calculate the CFSE of a high spin octahedral d^5 system.

  (e) What is the significance of Racah parameters?

  (f) Which parameters are plotted in an orgel diagram?

  (g) Mention two consequences of lanthanide contraction.

  (h) Write down the outer electronic configuration of the *nf* elements.

2. Answer *any two* questions: 5×2=10

  (a) (i) Compare the magnetic behaviour of $[C_oF_6]^{3-}$ with that of $[C_o(CN)_6]^{3-}$ on the basis of CFT.

   (ii) Lanthanide elements show the common stable oxidation state of $+ 3$ — comment.

   3+2=5

  (b) (i) CrF_2 and MnF_2 both have a central metal ion surrounded by Six F^- ligands. The $Mn - F$ bond lengths are equidistant, but four of the $Cr - F$ distances are long and two are short. Provide an explanation.

   (ii) What do you mean by magnetic super exchange?   3+2=5

  (c) (i) Discuss the spectral properties of lanthanoids and compare them with those of the d-block metals.

   (ii) What are the factors that affect the magnitude of crystal field splitting?   3+2=5

  (d) (i) Explain when Δ and CFSE are zero.

   (ii) $MnSO_4$ is pale but $KMnO_4$ has a deep colour — explain.

   (iii) Write down the electronic configuration of Gd^{3+}.   2+2+1=5

51411/16481   **Please Turn Over**

3. Answer *any one* question: 10×1=10

(a) (i) $[Zn(CN)_4]^{2-}$ is tetrahedral but $[Ni(CN)_4]^{2-}$ is square planar — why?

(ii) Tetrahedral low spin complexes are rare — explain.

(iii) Why OH^- ion is in lower position than H_2O in spectrochemical series.

(iv) A light pink aqueous Co(II) chloride solution becomes deep blue on addition of excess HCl. Account for the fact.

(v) Write down the selection rules for electronic transitions. 2+2+2+2+2=10

(b) (i) Explain the principle involved in the separation of individual lanthanides by ion-exchange technique.

(ii) State two limitations of Valence Bond Theory.

(iii) Why the d-orbital splitting diagram is reversed in tetrahedral and octahedral fields?

(iv) Magnetic moment of copper (II) acetate dihydrate is less than expected — why?

(v) 'Ni(II) forms tetrahedral and octahedral complexes respectively with ligands such as Cl^- and NH_3 but Pd(II) and Pt(II) form square planar complexes with both the ligands' — Explain.

2+2+2+2+2=10

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B.Sc. 5th Semester (Honours) Examination, 2019-20

CHEMISTRY

Course ID : 51412　　　　　　　　**Course Code : UG/CHEM/502/C-12**

Course Title: Organic Chemistry-V

Time: 1 Hour 15 Minutes　　　　　　　　　　　　　**Full Marks: 25**

The figures in the right hand side margin indicate marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* questions:　　　　　　　　　　　　　　　　　1×5=5

   (a) Write the structure of a disaccharide which is a reducing sugar.

   (b) Give the product(s) of the following reaction:
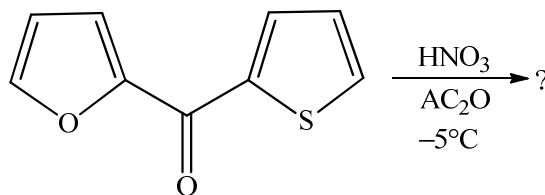
   (c) What form of glycine would you expect to predominate at (I) pH below 2·3 and (II) pH above 9·6?

   (d) Write down the structure of a L-amino acid which is a R-enantiomer.

   (e) Draw the structure of the sugar moiety in DNA with appropriate configuration.

   (f) Predict the diene and dienophile that would give the following Diels-Alder product:
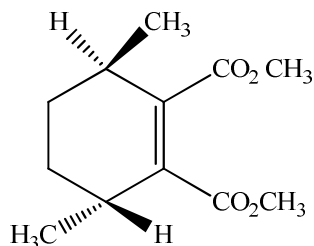
   (g) Draw the preferred conformation of *cis*-cyclohexane-1,3-diol.

   (h) Which of the two compounds will react with benzenediazoniumchloride under basic condition to give an azo-dye?
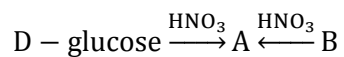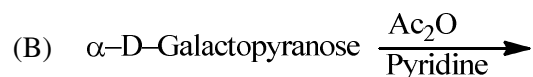

51412/16482　　　　　　　　　　　　　　　　　　　　　　**Please Turn Over**
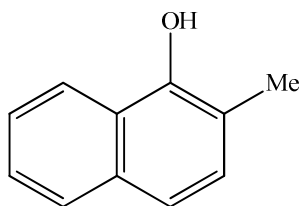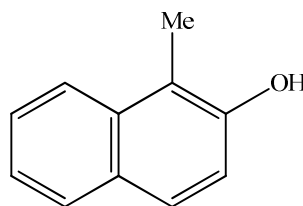
2. Answer *any two* questions: 5×2=10
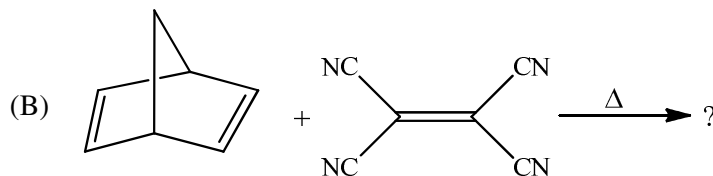
(a) (i) Draw Fischer projection of compounds A and B in the following equation: 2+(1½+1½)=5

$$D - glucose \xrightarrow{HNO_3} A \xleftarrow{HNO_3} B$$

(ii) Draw the structure of the compound formed in each of the following reactions:

(A) L-Monnonitrile $\xrightarrow[\text{Pd/BaSO}_4]{\text{H}_2, \text{H}_2\text{O}}$

(B) α–D–Galactopyranose $\xrightarrow[\text{Pyridine}]{\text{Ac}_2\text{O}}$

(b) (i) Use endo rule to predict the product of the following reaction. Draw the FMO of the transition state. 3+(1+1)=5
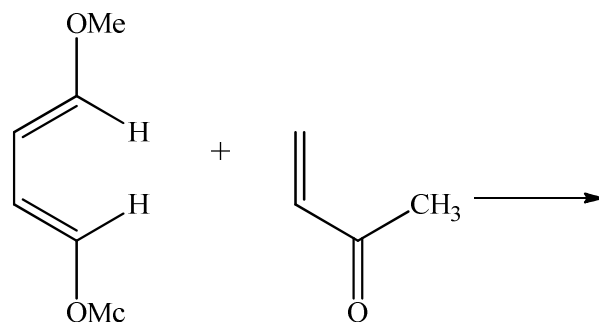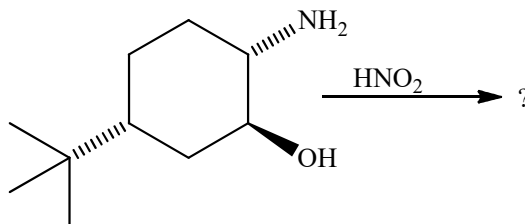

(ii) Predict the products of the following reactions:
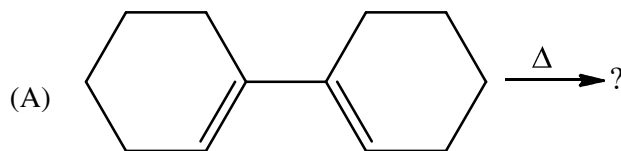
(c) (i) Write structures for compounds A – D. 2+2+1=5

$$Pyridine \xrightarrow[\text{II) H}_2\text{O}]{\text{I) NaNH}_2, \Delta} A \xrightarrow[\text{HBr}]{\text{NaNO}_2} B \xrightarrow[\Delta]{\text{H}_2\text{O}} C \xrightarrow[\Delta]{\text{PCl}_5} D$$
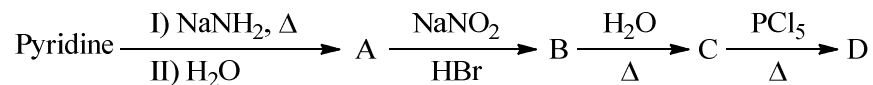
(ii) Identify the missing compounds A – D.
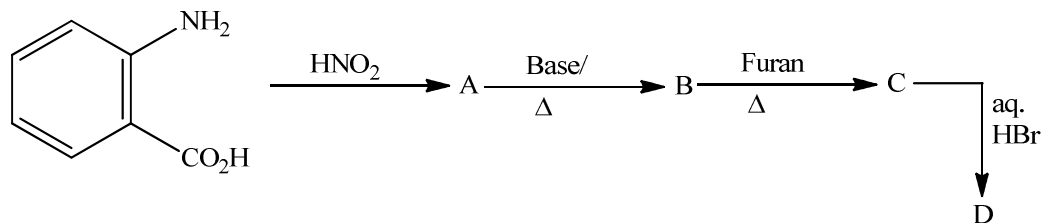
(iii) Why naphthalene has relatively less aromatic character as compared to benzene.

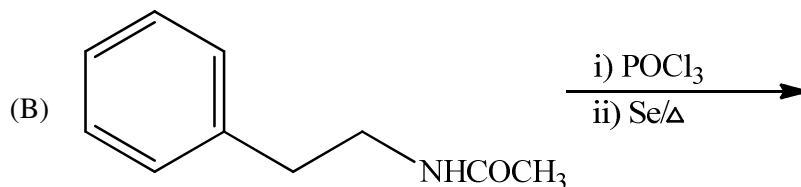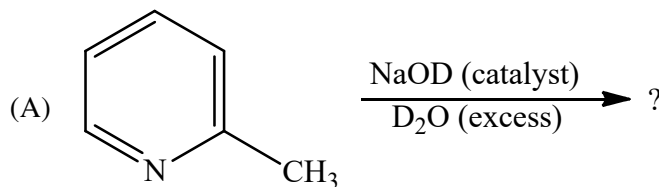(d) (i) Predict the product(s) and suggest a mechanism for the following reaction:　　　3+2=5

(ii) Draw the twist boat and half chair conformations of cyclohexane. Which is less stable and why?

3. Answer *any one* question:　　　　　　　　　　　　　　　　　　　　　10×1=10

(a) (i) Predict the products and explain your choice.　　　　　　　　　　(1½+1½)+5=10

(ii) 9, 10-positions in anthracene are very reactive towards electrophilic substitution. Why?

(iii) Outline Kiliani-Fischer synthesis of epimeric aldotetroses (A and B) starting with D-threose (use Fischer-projections). A can be oxidized with HNO_3 to an optically inactive aldaric acid while similar oxidation of B yields an optically active product. Identify A and B.

(b) (i) What is Sanger's reagent? How can you detect the N-terminal amino acid of a peptide
     with this reagent?   (1+2)+2+2+2+1=10

 (ii) Proline produces yellow color with ninhydrin. —Explain.

 (iii) Complete the reaction:
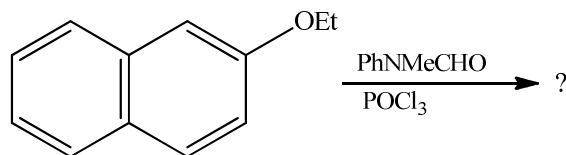
 (iv) According to Watson and Crick model draw the base pairs showing all the H-bonds in
      them.

 (v) Give the major product formed by the photochemical reaction of (2E, 4Z, 6E)-decatriene.

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B.Sc. 5th Semester (Honours) Examination, 2019-20
CHEMISTRY

Course ID : 51416   **Course Code : UG/CHEM-503/DSE-1**

Course Title: Advanced Physical Chemistry

Time: 1 Hour 15 Minutes   **Full Marks: 25**

The figures in the right hand side margin indicate marks.

Candidates are required to give their answers in their own words
as far as practicable.

1. Answer any *five* questions: 1×5=5

   (a) What is Thermodynamic Probability? How does it differ from Mathematical Probability?

   (b) What is Stirling's Approximation? Calculate the percentage of error in using Stirling's formula where $n = 10$.

   (c) Deduce the Miller indices of a plane in an orthorhombic crystal which cuts intercepts of $3a$, $-2b$, $3c/2$ along the three axes.

   (d) Why does cooling occur during adiabatic demagnetization of a paramagnetic salt?

   (e) Write down the Lewis and Randall statement of the third law of thermodynamics.

   (f) State the basic difference between the Einstein's and Debye treatment of solids.

   (g) Define Condensation polymer.

   (h) Represent Canonical-ensemble by its characteristic constants.

2. Answer *any two* questions: 5×2=10

   (a) (i) Derive Bragg's equation $n\lambda$ =2dsinθ employing a suitable diagram.

      (ii) If the 1st order reflection maxima of NaCl crystal occurs at an angle 5·9°, then at what angle 2nd order maxima will be obtained?   3+2=5

   (b) The Boltzmann distribution law for the number of molecules in the energy level ε_i is given by: $N_i = C.e^{-\beta\varepsilon_i}$.

      (i) How 'C' can be expressed in terms of β and ε_i?

      (ii) Write down the expression for the probability of the ith energy level being occupied.

      (iii) Show that $N_{i+1} < N_i$.

      (iv) Under what condition of temperature, $N_{i+1} = N_i$.   1+1+2+1=5

   (c) (i) State and explain Nernst heat theorem. Point out its limitations.

      (ii) Define residual entropy. How it is originated?   3+2=5

(d) (i) Define weight-average molar mass ($\bar{M}_w$) of a polymer. Calculate $\bar{M}_w$ for a system containing equal no. of particles with molecular weights 10,000 and 20,000.

(ii) Explain the following.

Why averaging is essential to assign the molar mass of a polymer? From Osmotive pressure measurement of a polymer the molar mass obtained is $\bar{M}_w$ or $\bar{M}_n$?   3+2=5

3. Answer any *one* question: 10×1=10

(a) (i) Consider a system of $'n'$ molecules, distributed among non-degenerate energy levels represented by $\varepsilon_0, \varepsilon_1, \varepsilon_2$ … etc. Write down the expression for the partition function (Q) for the system. Show that the internal energy (U) of the system can be expressed as:

$$U = nkT^2 \left(\frac{\partial lnQ}{\partial T}\right)_V$$

Where, k=Boltzmann constant, T and V being the temperature and volume of the system.

(ii) Assuming the expression for the energy associated with an oscillator vibrating with frequency (γ) in one direction, deduce Einstein equation for the head capacity of solids. Show that at high temperature the equation reduces to Dulong-Petits' law.   (1+4)+(3+2)=10

(b) (i) State and explain Havy's law of rational intercepts.

(ii) Calculate the ratio of number of molecules at two different energy levels A and B with $(\epsilon_B - \epsilon_A) = K_B T$ and $g_B/g_A = 3$ (g's are the degeneracies of the respective levels)

(iii) For a polymer, π/C vs. C plot on extrapolation to zero concentration gave an intercept with ordinate equals to $3{\cdot}47{\times}10^{-4}$ L. atm g^{-1} at 27°C. Determine the molar mass of the polymer.

(iv) Show that $\bar{M}_w \geq \bar{M}_n$ for macromolecules.   2+3+3+2=10

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SP-V/CHEM/501/DSE-1A/19

B.Sc. 5th Semester (Programme) Examination, 2019-20
CHEMISTRY

Course ID : 51418   **Course Code : UGP/CHEM/501/DSE-1A**

Course Title: Green Chemistry

Time: 1 Hour 15 Minutes   **Full Marks: 25**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.

দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।

1. Answer *any five* questions: 1×5=5

যে কোনো পাঁচটি প্রশ্নের উত্তর দাও ঃ

(a) Which gas was released during Bhopal Gas Tragedy?

ভূপাল গ্যাস দুর্ঘটনায় কোন গ্যাস নির্গত হয়েছিল?

(b) Give an example of ionic liquid.

একটি আয়নিক তরলের উদাহরণ দাও।

(c) Write the full name of VOCs.

VOCs-এর পুরো নাম লেখো।

(d) Give two examples of Green solvent.

গ্রীন দ্রাবকের দুটি উদাহরণ দাও।

(e) What is Pigment?

রঞ্জক পদার্থ কী?

(f) Write two examples of alternative source of energy.

দুটি বিকল্প শক্তি-উৎসের নাম লেখো।

(g) What is heterogeneous catalyst? Give an example of it.

অসমজাতীয় অনুঘটক বলতে কী বোঝো? একটি উদাহরণ দাও।

(h) What is Micelle?

মাইসেল কী?

2. Answer *any two* questions: 5×2=10

যে কোনো দুটি প্রশ্নের উত্তর দাও ঃ

(a) (i) Microwave heating is more efficient than ordinary heating. — Explain.

সাধারণ উত্তাপনের থেকে মাইক্রোওয়েভ উত্তাপন বেশি কার্যকরী। — ব্যাখ্যা করো।

(ii) What is the principle of microwave heating? 2+3=5

মাইক্রোওয়েভ উত্তাপন কোন নীতিতে কাজ করে?

(b) (i) Define oil and fat.

তেল ও স্নেহপদার্থের সংজ্ঞা লেখো।
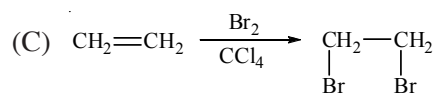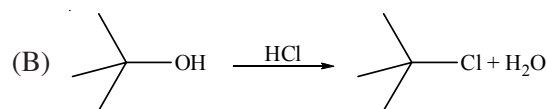
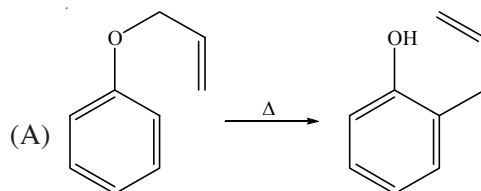(ii) Describe an ultrasound assisted reaction. 2+3=5

একটি আল্ট্রাসাউন্ড সহযোগী বিক্রিয়া বর্ণনা করো।

(c) (i) Define 'Atom Economy'.

'অ্যাটম ইকোনোমির' সংজ্ঞা লেখো।

(ii) Calculate the atom economy for the following reactions.

নীচের বিক্রিয়াগুলির ক্ষেত্রে অ্যাটম উকোনোমি গণনা করো ঃ

(A)

(B)

(C) $CH_2 \text{=} CH_2 \xrightarrow[CCl_4]{Br_2} CH_2 \text{---} CH_2$ 2+3=5
         | |
        Br   Br

(d) (i) What do you mean by Super Critical CO_2? Discuss its use in Green Chemistry. 2+3=5

সুপার ক্রিটিক্যাল CO_2 বলতে কী বোঝো? গ্রীন রসায়নের ব্যবহার আলোচনা করো।

3. Answer *any one* questions: 10×1=10

যে কোনো একটি প্রশ্নের উত্তর দাও ঃ

(a) (i) What do you mean by Antifouling agent? Give with an example.

অ্যান্টিফাউলিং পদার্থ বলতে কী বোঝো? একটি উদাহরণ দাও।

(ii) What are the environmental hazards from the use of TBTO?

TBTO ব্যবহারের ফলে পরিবেশের ক্ষতিকারক দিকগুলি কী?

(iii) Name a green replacement of TBTO.

TBTO-এর বিকল্প গ্রীন যৌগের নাম লেখো।

(iv) What is renewable feed stock? Give an example.

নবীকরণযোগ্য শক্তির উৎস কী? উদাহরণ দাও।

(v) Discuss the role of H_2O as a green solvent in Chemical Synthesis.

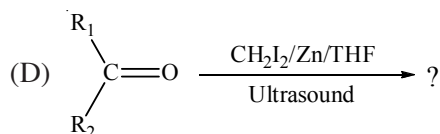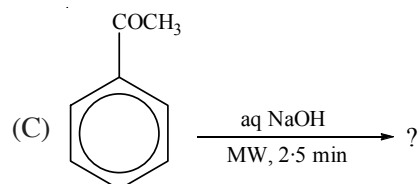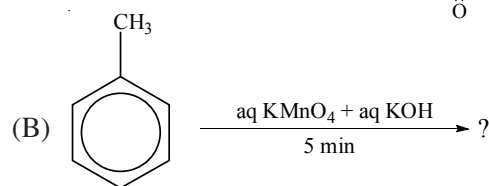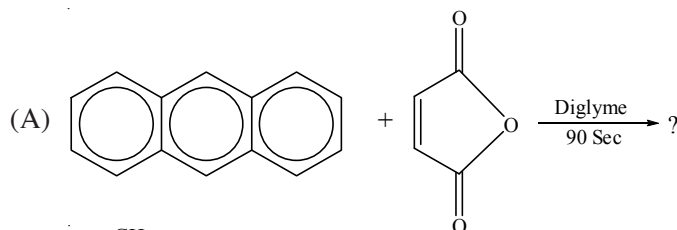গ্রীনদ্রাবক হিসাবে জলের ভূমিকা আলোচনা করো।

(vi) Give an example of a biocatalyst. 2+2+1+2+2+1=10

একটি জৈব-অনুঘটকের উদাহরণ দাও।

(b) (i) What happens in the following reactions?

কী ঘটে নিম্নলিখিত বিক্রিয়াগুলিতে?

(ii) How can you convert catechol to adipic acid by biological method?

জৈবিক পদ্ধতিতে কীভাবে Catechol থেকে adipic acid-এর রূপান্তর করবে?

(iii) Write down one example of each : Microwave assisted Hoffman Elimination reaction and Oxidation of alcohol.

একটি করে উদাহরণ লেখো ঃ

Microwave সহযোগী Hoffman Elimination বিক্রিয়া এবং অ্যালকোহলের জারণ বিক্রিয়া।

(iv) Explain with suitable example why photocatalysis is an important tool in Green Chemistry.　　　　　　　　　　　　　　　　　4+2+2+2=10

উদাহরণসহ গ্রীন রসায়নে আলোক উদ্দীপকের ভূমিকা ব্যাখ্যা করো।

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B.Sc. 5th Semester (Honours) Practical Examination, 2019-20
CHEMISTRY

Course ID : 51421   **Course Code : UG/CHEM/501/C-11(P-II)**

Course Title : Inorganic Chemistry-IV

Time 2 Hours   **Full Marks: 15**

The figures in the right hand side margin indicate marks.

1. Attempt *any one* question: 11

(A) Separate Ni(II) and Co(II) ions from the supplied sample mixture (marked "I") using paper chromatography technique.

Distribution of marks for Question 1A

(i) Preparation of solvent mixture for paper chromatography   3

(ii) Proper use of paper chromatography technique   2

(iii) Preparation of data in tabular from   2

(iv) Correct identification of metal ions   2+2=4

(B) Prepare $[Fe(acac)_3]$ complex and determine its λ_{max} value.

Distribution of marks for Question 1B

(i) Preparation of the complex   6

(ii) Yield of the product   2

(iii) Purity of prepared complex   2

(iv) Determination of λ_{max} of the complex   1

2. Viva voce   2

3. Laboratory Notebook   2

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B.Sc. 5th Semester (Honours) Practical Examination, 2019-20
CHEMISTRY

Course ID : 51422 **Course Code : UG/CHEM/502/C-12**

Course Title : Organic Chemistry Lab

Time 2 Hours **Full Marks: 15**

The figures in the right hand side margin indicate marks.

1. Separate the components from the given organic binary mixture marked C using TLC/Paper chromatography and calculate the R_f value of each component. 6

2. Assign the labelled peaks in the supplied spectra of the unknown organic compound. 5

3. Laboratory Notebook 2

4. Viva voce 2

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