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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

B. Sc. (Hons) in Cosmetic Science

BCS 4113
Beauty Culture- II
4th Year 1st Semester

End Semester SEQ Examination

2nd Batch

Date	**: 19th March 2024**
Time	**: 9.00 a.m. – 12.00 a.m. (Three hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 1 **(100 marks)**

1.1 List five tools and equipment that are used for nail enhancement. (20 marks)
1.2 List four common techniques used for nail art. (20 marks)
1.3 List five products that are used for nail enhancement. (20 marks)
1.4 Describe contra-actions caused by incorrect applications of acrylic nail. (40 marks)

Question 2 **(100 marks)**

2.1 Write short notes on following massaging techniques in manicure and pedicure service.
2.1.1 Tapotement (20 marks)
2.1.2 Effleurage (20 marks)
2.1.3 Petrissage (20 marks)
2.2 Describe the treatment objectives of manicure and pedicure services. (40 marks)

Question 3 **(100 marks)**

3.1 Describe factors affecting the condition of the nails. (25 marks)
3.2 List three functions of human nails. (15 marks)
3.3 Describe the nail structure of a human. (30 marks)
3.4 What is a hook nail? (15 marks)
3.5 What is a ski jump nail? (15 marks)

Question 4 **(100 marks)**

4.1 Describe the advice you can give to your client regarding the nailcare. (40 marks)
4.2 Write a short note on French manicure. (25 marks)

4.3 Describe steps in nail colour application. (35 marks)

Question 5 **(100 marks)**

5.1 Describe the method help to determine correct length and arch of eyebrows. (40 marks)

5.2 Describe the procedure of fixing and removing false eye lashes. (40 marks)

5.3 What are the importance of fixing false eye lashes? (20 marks)

Question 6 **(100 marks)**

6.1 Describe alternative methods of hair removal. (30 marks)

6.2 Describe advantages of threading service. (20 marks)

6.3 Describe disadvantages of threading service. (20 marks)

6.4 List five contraindication states for waxing. (10 marks)

6.5 Write a short note on waxing. (20 marks)

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Faculty of Health Sciences
BSC. (HONS) COSMETIC SCIENCES

BCS 4153 Perfume & Colors I
End Semester Examination SEQ
4th Year 1st Semester
4th Batch

Date: 18th of March 2024
Time: 09.00 am – 12.00 pm - Three Hours

INSTRUCTIONS TO CANDIDATES Page
- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01 **(100 marks)**

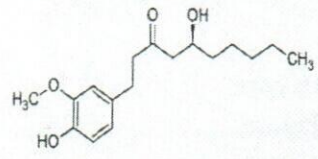
1.1 Essential oils and flower oils are widely used in cosmetic products and related household products due to the variety of their properties but mainly due to their pleasant odor.
- 1.1.1 State three essential oils which is widely used in cosmetic products. (15 marks)
- 1.1.2 Write three biological activities of essential oils. (15 marks)
- 1.1.3 Briefly describe why essential and flower oils in the cosmetic industry. (20 marks)
- 1.1.4 State two differences between essential oils and flower oils. (10 marks)

1.2 *Rosmarinus officinalis* L., also known as rosemary, is an aromatic plant that belongs to the Lamiaceae family and its widely used in cosmetic products.
- 1.2.1 Briefly describe the extraction method of rosemary essential oil. (10 marks)
- 1.2.2 Write three cosmetic products which has rosemary essential oil as the main ingredient. (15 marks)
- 1.2.3 Briefly describe the importance of rosemary essential oil for the hair care cosmetic products. (15 marks)

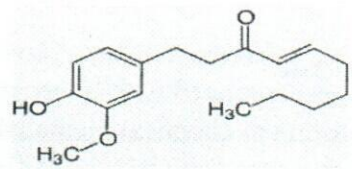
Question 02 **(100 marks)**

2.1 Resins are commonly used in the cosmetic industry and are derived from living natural and synthetic sources.
- 2.1.1 State two chemical properties of resins. (10 marks)
- 2.1.2 Classify the resins according to predominating chemical constituents. (20 marks)
- 2.1.3 Write the main chemical constitute of benzoin and storax resins. (10 marks)

2.2 Ginger contains gingerol and shogaol as the main phenolic arylalkalones. The chemical structures of gingerol (A) and shagoal (B) is given below.



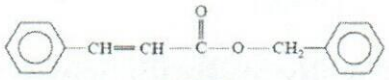
A



B

2.2.1 State a method to isolate both gingerol and shagoal. (20 marks)
2.2.2 Benzyl cinnamate is the active compound found in Peruvian balsam resin. Classify both Peruvian

balsam and ginger resin according to the predominating chemical constituent present.
Briefly describe the reason for your choice and the structure of benzyl cinnamate is given below.
(20 marks)



Cinnamein
(Benzyl Cinnamate)

2.2.3 Write two chemical tests to detect Tolu Balsam resin. (20 marks

Question 03 **(100 marks)**

3.1 Briefly describe why alcohol is used as a key ingredient in perfume and colors in variety of cosmetic products. (25 marks)
3.2 State four important properties of ethanol as the active ingredient for many cosmetic products. (20 marks)
3.3 Briefly describe the importance of fermentation in ethanol manufacturing process. (25 marks)
3.4 State three criteria to be considered when designing a synthetic procedure for fragrances. (15 marks)
3.5 Write three important synthetic processes for fragrance materials. (15 marks)

Question 04 **(100 marks)**

4.1 Banana oil is commonly used in the cosmetic industry to obtain a fruity smell to cosmetic formulations.
4.1.1 Write the name of the active chemical ingredient present in banana oil. (10 marks)
4.1.2 Indicating the starting materials write the reaction which lead to form the active compound of banana oil. (20 marks)
4.1.3 Briefly describe the spectroscopic determination of the synthetic banana oil. (20 marks)
4.2 State a physical method to distinguished cis and trans isomer structures of rose oil. (20 marks)
4.3 Propose a synthetic mechanism when banana oil is undergoes self-condensation when treated with sodium ethoxide. (30 marks)

Question 05 **(100 marks)**

5.1 State the classification of fixatives by providing two examples for each. (15 marks)
5.2 Briefly describe the function of fixatives. (20 marks)
5.3 Write the scientific name of the plant source of below mentioned fixatives. (20 marks)
5.3.1. Storax
5.3.2. Labdanum
5.3.3. Olibanum
5.3.4. Myrrh
5.4 Write short notes on the following fixatives.
5.4.1 Castoreum. (15 marks)
5.4.2 Tolu balsam. (15 marks)
5.4.3 Ambroxide. (15 marks)

Question 06 **(100 marks)**

6.1 List 05 factors used to create a distinct flavor. (20 marks)
6.2 State 03 challenges associated with biotechnological synthesis of flavors. (25 marks)
6.3 Write a short note on the chemical methods used in synthesizing flavors. (35 marks)
6.4 Identify the plant sources from which the following flavors are obtained. (20 marks)
6.4.1 Peppermint oil
6.4.2 Lemon oil

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
B.Sc. (Hons) in Cosmetic Science
BCS 4143– Cosmetic Technology IV
Batch – 04
4th Year 1st semester
End Semester Examination - SEQ

Date : 14th March 2024
Time : 9.00 am to 12.00 pm

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01 **(100 marks)**

1.1.Compare and contrast the UVA and UV B Radiation. (20 marks)

1.2. List **two (02)** examples for each two primary types of sunscreen agents used in formulations:

1.2.1 Physical (inorganic) (5 marks)

1.2.2 Chemical (organic) (5 marks)

1.3. Compare the mechanism of action of physical and chemical sunscreens. (20 marks)

1.4. List **two (02)** key considerations when formulating a sunscreen formulations. (10 marks)

1.5. What are **four (04)** common challenges /issues that can arise during the formulation process of sunscreens? (20 marks)

1.6 How is the SPF value of a sunscreen determined? (20 marks)

Question 02 **(100 marks)**

2.1 Mention **four (04)** common ingredients found in cuticle removers. (20 marks)

2.2 How does a base coat differ from a top coat in terms of formulation and application? (20 marks)

2.3 List **four (04)** potential safety risks associated with using nail polish? (30 marks)

2.4 List **four (04)** common ingredients found in nail strengtheners? (20 marks)

2.5 How do the ingredients of nail strengtheners work to improve the health and appearance of the nails? (30 marks)

Question 03 **(100 marks)**

You have provide a formulation of foot cream. (Formulation A)

Menthol (1%)
Tea tree oil (1%)

Shea Butter (5%)
Salicylic acid (2%)
Cetearyl alcohol (5%)
Glycerin (4.5%)
Phenoxyethanol (0.5%)
Water: Balance to 100%

3.1 Identify the followings from formulation A.

3.1.1 Emollient (2.5 marks)
3.1.2 Humectant (2.5 marks)
3.1.3 Exfoliating agent (2.5 marks)
3.1.4 Preservative (2.5 marks)
3.1.5 Active ingredient (2.5 marks)

3.2 List a compound that can be added to adjust the pH of the foot cream formulation. (10 marks)

3.3 After adding the pH adjuster, it was complained that the viscosity of the formulation is reduced. How do you explain this? (20 marks)

3.4 List an additional ingredient that can adjust the viscosity of the formulation. (10 marks)

3.5 It is observed that after adding a suitable ingredient to adjust the viscosity, the formulation is not stable.

3.5.1 List **four** parameters to identify the instability of the formulation. (20 marks)
3.5.2 Which parameter can be addressed by only changing the formulation technique without changing the ingredients? (10 marks)

3.6 Calculate the primary emulsion ratios to formulate 10 g of the formulation A. (20 marks)

Question 04 **(100 marks)**

4.1 Write the main steps in hair dressing. (10 marks)

4.2 Briefly describe how rheological properties and appropriate pH is important for cosmetic products. (20 marks)

4.3 Briefly explain the difference between aerosol and non-aerosol hair sprays. (20 marks)

4.4 Briefly explain the difference between the hair tonics and the hair conditioner. (20 marks)

4.5 Electrolytes are often chosen as thickeners over others to minimize cost. They are mainly used in surfactant-based systems (particularly anionic surfactants) to increase viscosity.

4.5.1 Write two common electrolytes used to increase the viscosity of cosmetic Products. (10 marks)
4.5.2 Briefly explain how electrolytes increases the viscosity in surfactant based systems. (20 marks)

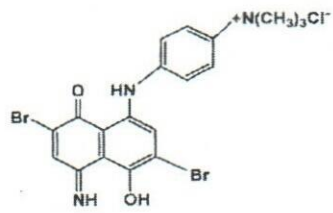
Question 05 **(100 marks)**

5.1 Classify the coloring agents according to their nature and solubility. (20 marks)

5.2 State the differences between temporary hair dye and the semi- permanent hair dyes based on the mechanism. (20 marks)

5.3 List the three main components in hair colorant. (15 marks)

5.4 Answer the following questions based on the structure "A" of the widely popular synthetic hair dye used in cosmetic hair products.



Structure A

5.4.1 Draw the structure in your answer script and circle chromophore of the molecule. (05 marks)

5.4.2 Maximum UV-Vis absorption of the above dye molecule in water occurs at 538 nm. Explain how you would theoretically attempt to shift the absorption to higher wavelengths based on the conjugation. (20 marks)

5.5 Hair gels are also very popular hair styling products. However, spray gels easy to evenly apply to the hair and provide a weaker hold and tube and jar gels provide a stronger hold. Briefly explain this statement based on viscosity. (20 marks)

Question 06 **(100 marks)**

6.1 Explain briefly the use of shampoo over soap. (15 marks)

6.2 State the categories of surfactants and briefly explain the use of surfactants in a shampoo formulation. (30 marks)

6.3 Briefly explain the importance of pH balance in shampoo for the growth of hair. (20 marks)

6.4 State **three** advantages of hair waving process. (15 marks)

6.5 State the significance of reducing agent in hair waving process. (20 marks)

-THE END-

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
BSC. (HONS) COSMETIC SCIENCE

BCS 4133 Cosmetic Analysis
End Semester Examination SEQ
4th Year 1st Semester
4th Batch

Date : 13th March 2024
Time : 09.00 a.m. – 12.00 p.m. (Three Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01 **(100 marks)**

1.1 A student has mistakenly mixed two chemicals. He found that 5.207 g of mixture consists of $MgCl_2$ and $NaNO_3$. He wanted to know the exact quantity of each compound in the mixture. Both compounds totally dissolved in water. He added an excess $AgNO_3$ precipitation agent to observe the formation of AgCl (s) precipitate. The precipitate was filtered and dried. The weight of solid obtained was 2.012 g.

(MW: AgCl=143.32 $gmol^{-1}$ and MW: $MgCl_2$ = 95.20 $gmol^{-1}$)

1.1.1 Write the chemical reaction involved in this gravimetric analysis. (10 marks)
1.1.2 Calculate the mass of $MgCl_2$ in the mixture. (30 marks)
1.1.3 Determine the mass percentage of $MgCl_2$ in the mixture. (10 marks)

1.2 The **chloride ion (Cl^-)** content in the 150 mL of face cleansing product **mixture (A)** was determined by using the Volhard method. An amount of 10 mL aliquot was taken from **mixture A** and it was treated with 15 mL of 0.15 $moldm^{-3}$ $AgNO_3$ solution. The excess of silver was titrated with 2.38 mL of standard solution of KSCN 0.12 $moldm^{-3}$ to reach the end point of red $Fe(SCN)^{2+}$complex.

(MW: Cl= 35.5 $gmol^{-1}$ and MW: $AgNO_3$ = 170 $gmol^{-1}$)

1.2.1 Write the **three (03)** chemical reactions involved in this chemical analysis. (15 marks)
1.2.2 Calculate the number of moles of Chloride presented in the given mixture. (25 marks)
1.2.3 Calculate the chloride concentration in the given mixture in **g/L**. (10 marks)

Question 02 **(100 marks)**

2.1 A 2g of night face cream product sample contained **0.25 g** of an unknown weak monoprotic organic acid **(HA).** An amount of 2 g of cream sample was dissolved in distilled water and made 25 mL of sample solution. It was titrated with 0.1 $moldm^{-3}$ NaOH solution. After addition of 8.6 mL of NaOH,

pH of the sample solution was 5.2. The end point was reached after the addition of 15.4 mL of NaOH. (Assume that NaOH only reacted with HA in the sample). Calculate each of the following.

2.1.1 The total number of moles of the unknown organic acid (HA) in the given face cream sample. (15 marks)

2.1.2 The molecular weight of the unknown organic acid. (10 marks)

2.1.3 The **H_3O^+** concentration **at pH 5.2.** (10 marks)

2.1.4 The number of moles unreacted HA remaining in the sample solution when the pH was 5.2. ($Ka = 1.8 \times 10^{-5}$ moldm^{-3}) (15 marks)

$$Ka = \frac{[H+][A-]}{[HA]}$$

2.2 A chemical analysis of a commercially available lipstick sample has yielded three products: an aromatic hydrocarbon **(X-H)**, its methyl derivative **(X-CH_3)** and its alcohol derivative **(X-CH_2OH)** by high-performance liquid chromatography. They have yielded three distinctive signals when separated on an octadecyl bonded (C18) stationary phase. The X-H was identified as the middle of the three signals.

2.2.1 Comment on the nature of the stationary phase. (10 marks)

2.2.2 Comment on the selection of the mobile phase for the separation. (20 marks)

2.2.3 Using a suitable diagram, predict the relative retention order of X-CH_3 and X-CH_2OH for the separation. (20 marks)

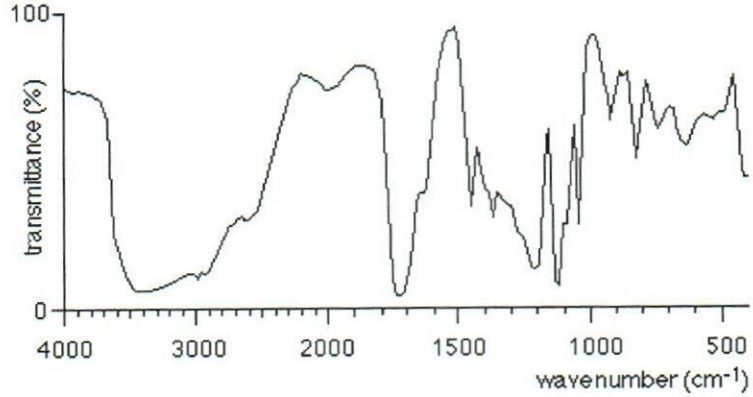
Question 03 **(100 marks)**

In a cosmetic analysis experiment, a solution of a specific cosmetic product is prepared, and its absorbance is measured using a spectrophotometer at various concentrations. The absorbance values obtained are plotted against the concentration, resulting in a linear curve. The equation of the line is **A = 0.025C + 0.012**, where A is the absorbance and C is the concentration in mg/mL.

3.1 Calculate the concentration of the cosmetic sample that has an absorbance of 0.150. (10 marks)

3.2 Calculate molar coefficient value of the molecule if a standard cuvette is used? (20 marks)

3.3 IR spectrum of a compound ($C_3H_4O_3$) that used to formulate above cosmetic product is given below. Based on that, comment on the functional groups of the compound. (30 marks)



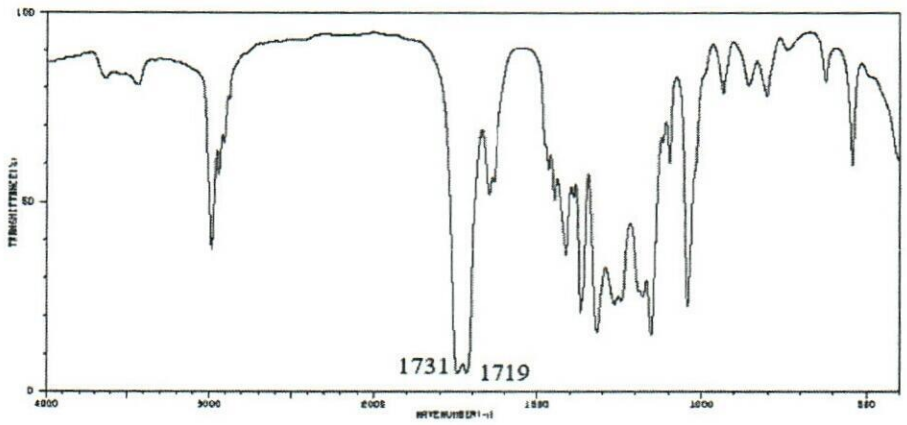
3.4 Three different compounds which added for the above formulation, **A, B** and **C**, have the molecular formula C_4H_8O. (40 marks)

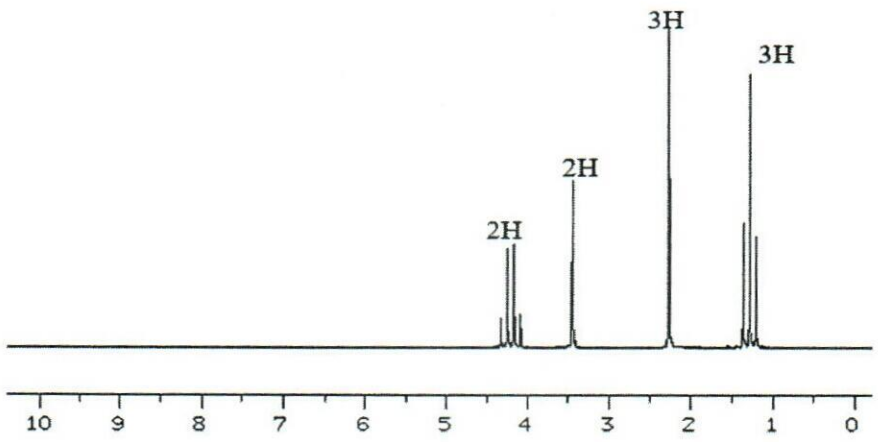
Information about these three compounds includes:

- All three compounds have infrared absorptions at about 3500 cm^{-1}.
- The infrared spectra of A and B each contain a peak at about 1650 cm^{-1}, while that of C does not.
- Only A has a branched carbon chain.
- B is the E-isomer of a pair of stereoisomers.
- Deduce a possible displayed formula for each of the compound A, B and C.

Question 04 **(100 Marks)**

You have a provide an IR spectrum and H NMR spectrum of $C_6H_{10}O_3$ molecule. Based on the spectrums, answer the following questions.





4.1 Which range of energy is used in H NMR spectroscopy. (10 marks)

4.2 Find the degree of unsaturation of the molecule. (20 marks)

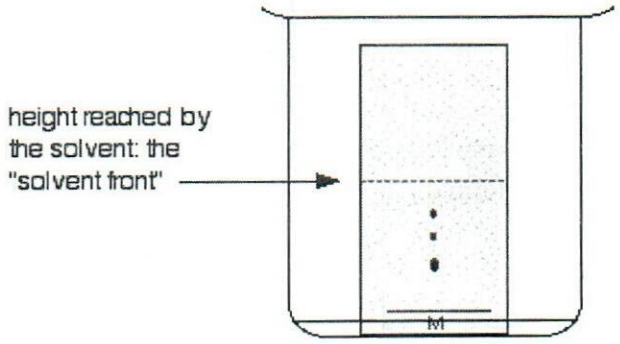
4.3 Predict the functional groups of the molecule using the IR spectrum. (20 marks)

4.4 Determine the structure of the molecule using the H NMR spectrum. (50 marks)

Question 05 **(100 Marks)**

5.1 List four (04) main uses of chromatography techniques. (20 marks)

5.2 This diagram shows the results of a simple thin layer chromatography experiment.

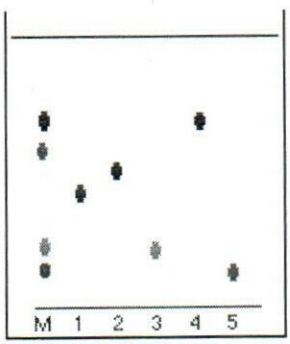


5.2.1 Describe briefly, but precisely, what you would have done in order to get to this stage. (30 marks)

5.2.2 In order to help identify the things in a chromatogram, you can measure the Rf value for each spot. How would you calculate the Rf value for each of the spots on the chromatogram? (20 marks)

5.2.3 This technique can be used to identify particular amino acids in a mixture of amino acids. However, these are all colorless. You can dry the plate and then spray it with something to make the spots visible. What would you spray the plate with? (15 marks)

5.3 A mixture of amino acids **(M)** was tested against five known amino acids (1 to 5) and the following chromatogram was made. What can you say about the mixture M? (15 marks)



Question 6 **(100 marks)**

6.1 Describe the differences between Column chromatography and Thin Layer Chromatography (TLC). (30 marks)

6.2 Describe the technique of Sodium Dodecyl Sulphate Polyacrylamide gel electrophoresis (SDS-PAGE). (35 marks)

6.3 Describe factors affecting gel electrophoresis. (35 marks)