

**Mid-Semester Examination 2025**  
**CH-419: Consumer Chemistry**

*Answer all the questions sequentially, Sections I, II and III should be answered separately.*

*Submit the section I (within 30 minutes) before attempting the other sections*

**Section-I**

**Q1. Fill in the blanks with the most appropriate words**

- (a) The property of liquid that is viscous when still but free-flowing upon agitation is Thixotropy
- (b) The honey bees that gather food for their colonies are called Finger <sup>worker</sup> bee.
- (c) Catechins are poly phenolic compounds found in Tea.
- (d) Theanine is responsible for generating  $\alpha$  brain waves. (Alpha)
- (e) Compound found in coffee that works by blocking the action of adenosines in the brain is Caffeine
- (f) Ferulic acid prevents damage to the skin from Pollution
- (g) The acid that has the keratolytic action is Salicylic acid (or  $\beta$  hydroxy acid)
- (h) Prostaglandins help regulate the growth of hair
- (i) Minoxidil is used for the treatment of Hair loss/baldness
- (j) TAED serve as Bleach activators
- (k) Amphetamine is used for the treatment of attention-deficit
- (l) A person who burns in 0.5 hr would develop erythema in 20 h with SPF 10
- (m) A 20% carbamide peroxide solution contains approximately 7.2 % of  $H_2O_2$
- (n) Cold cream is Water in oil type of emulsion
- (o) The black head over nose is best removed using BHA (Salicylic acid)
- (p) SPF is the measure UVB region of spectrum
- (q) The method of measure of the ratio of UVA vs UVB is called Boott-Star
- (r) The acids that act as the best exfoliator is  $\alpha$ -hydroxy acid, lactic, or Glycolic
- (s) Optical brightener absorb in UV region and emits in the Visible region
- (t) A glycemic index of below 60 is consider Medium
- (u) The glycemic index of dates is higher than apples

**Q2. Put the appropriate content in column 2 from the list given at the bottom that best matches the content of column 1**  
**20 x1**

Column 1	Column 2
Film formers	Nitrocellulose
Plasticizer	Dibutyl phthalate / Diethyl phthalate
Stearalkonium hectorite	Thickening agent
Honey	Invertase
Tea	Camellia sinensis
Polyphenols	Antioxidant
Flavonoids	Flavour and aroma of tea
Trigonelline	Aroma and Flavour of coffee
Androgenetic alopecia	Male baldness
Ferulic acid	Antipollution cream
Xylitol	Sugarless substitute
Benzocoumarin	Optical brightener
Sequesterant	Sodium tripolyphosphate
Antifungal	Tea tree oil
Zinc pyrithione	Antidandruff shampoo
Whiteness of cold cream	Borax
Plasticizer	Diethyl phthalate / Dibutyl phthalate
Cinnamates	UVB absorber
Cannabidiol	Antidepressant
Carbamide peroxide	Tooth whitener
<p>For Column II: Tooth whitener, UVB absorber, Borax, Tea tree oil, Sugar less substitute, Aroma and flavor of coffee, Antioxidant, Camellia sinensis, Dibutyl phthalate, Thickening agent, Diethyl phthalate, Sodium tripolyphosphate, Antipollution cream, Flavor and aroma of tea, Antidepressant, Antidandruff shampoo, Optical brighteners, Male baldness, Invertase, Nitrocellulose</p>	

Q3. Answer the following questions briefly and to the points

1. What are the benefits of alpha-hydroxy acid in skin care products?
2. Why salicylic acid is important in skin care product?
3. How khajur (date) jaggery help in digestion?
4. What is a film-former? Where does it find uses?
5. What is the role of plasticizers in nail polish?
6. Despite being a constituent of sugar honey does get spoiled for years?
7. What is inverted sugar? Is it more sweet than sucrose?
8. What are the health benefits of catechins?
9. Where thiamine is present? What does theanine do?
10. What is sebum and what is its role?
11. What is the advantage of using laureth sulfate over lauryl sulfate-based shampoo?
12. How does conditioner help lower friction of hair fibers making brushing easier?
13. Explain the basis of keratin treatment.
14. What is locard's exchange principle?
15. Explain the chemistry behind bleach activators.
16. What are the alternatives to Incense sticks?
17. Describe some important characteristics of an ideal sunscreen.
18. How does emulsion benefit the skin?
19. How do liposomes benefit the skin?
20. What is the primary difference between vanishing cream and cold cream?



### Section III

1. Which SDG is related to Zero Hunger; Gender Equality; Good Health and Wellbeing; No Poverty; Quality Education; Clean Water and Sanitation. [3]
2. Explain the effects of structure and geometry on aromatic / fused aromatic compounds. Provide 05 appropriate structures and the fluorescence efficiency values. [5]
3. Discuss any four targets associated with SDG 7. [8]
4. Mention 04 notable differences between Coal and Charcoal. [4]
5. Classify and explain different types and sources of energy. [9]
6. Solve the below numerical problems on Solar Cell Devices: [6]
  - a) A solar cell has the following parameters:  $V_{oc} = 0.6 \text{ V}$ ,  $I_{sc} = 15 \text{ mA/cm}^2$ ,  $FF = 76\%$  and area  $0.12 \text{ cm}^2$ . What will be its efficiency?   

$$\frac{I_{sc} \times V_{oc} \times FF}{1000} = \frac{15 \times 0.6 \times 76}{1000} = 0.684\%$$
  - b) Calculate the diffusion length (LD) of minority carriers in a solar cell material; where,  $D = 25 \text{ cm}^2/\text{s}$ , and minority carrier lifetime ( $\tau$ ) =  $10^{-6} \text{ s}$ .   

$$L_D = \sqrt{D \tau} = \sqrt{25 \times 10^{-6}} = 0.005 \text{ cm} = 50 \mu\text{m}$$
  - c) A solar cell has the following parameters: Thermal voltage ( $V_t = kT/q$ ) =  $0.0259 \text{ V}$  (at  $25^\circ\text{C}$ ), Short-circuit current density ( $J_{sc}$ ) =  $10 \text{ mA/cm}^2$ , Reverse saturation current ( $J_0$ ) =  $1 \mu\text{A}$ . Calculate the open-circuit voltage ( $V_{oc}$ ).   

$$V_{oc} = V_t \ln \left( \frac{J_{sc}}{J_0} + 1 \right) = 0.0259 \ln \left( \frac{10 \times 10^{-3}}{1 \times 10^{-6}} + 1 \right) = 0.0259 \ln(10^4 + 1) \approx 0.0259 \times 9.21 = 0.238 \text{ V}$$

- End -

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1000 W/m<sup>2</sup>  
0.6 / 104 cm