DPP - Daily Practice Problems

Name : _____ Date : _____

Start Time : _____ End Time : _____

CHEMISTRY 58

SYLLABUS : Polymer: Classification of Polymers, General Methods of Preparation of polymers and Mechanism of Polymerisation, Composition, Properties and Uses of Polymers.

Max. Marks : 120 **Time : 60 min.**

GENERAL INSTRUCTIONS

- The Daily Practice Problem Sheet contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.
- You have to evaluate your Response Grids yourself with the help of solution booklet.
- Each correct answer will get you 4 marks and 1 mark shall be deduced for each incorrect answer. No mark will be given/ deducted if no bubble is filled. Keep a timer in front of you and stop immediately at the end of 60 min.
- The sheet follows a particular syllabus. Do not attempt the sheet before you have completed your preparation for that syllabus. Refer syllabus sheet in the starting of the book for the syllabus of all the DPP sheets.
- After completing the sheet check your answers with the solution booklet and complete the Result Grid. Finally spend time to analyse your performance and revise the areas which emerge out as weak in your evaluation.

DIRECTIONS (Q.1-Q.24) : There are 24 multiple choice questions. Each question has 4 choices (a), (b), (c) and (d), out of which ONLY ONE choice is correct.

Q.1 Which is a naturally occurring polymer?
(a) Polythene (b) PVC
(c) Acetic acid (d) Protein

Q.2 Which one of the following is a linear polymer?
(a) Amylopectin (b) Glycogen
(c) Starch (d) Amylose

Q.3 Which of the following polymer is an example of fibre?
(a) Silk (b) Dacron
(c) Nylon-66 (d) All of these

Q.4 Natural rubber is which type of polymer?
(a) Condensation polymer
(b) Addition polymer
(c) Co-ordination polymer
(d) None of these

Q.5 Bakelites are
(a) Rubber
(b) Rayon
(c) Resins
(d) Plasticisers

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

Q.6 Which of the following is not correct regarding terylene?
(a) Step growth polymer (b) Synthetic fibre
(c) It is also called dacron (d) Thermosetting plastic

Q.7 Which of the following is a syndiotactic polymer in $-[-CH_2-C(YZ)-]_n-$?
(a) All Y groups lie on one side of the chain and all Z groups on the other side
(b) The Y and Z groups lie alternatively on each side of the chain
(c) The Y and Z groups are arranged in a random fashion
(d) Y and Z groups are same

Q.8 The degree of crystallinity of which of the following is highest
(a) Atactic polyvinylchloride
(b) Isotactic polyvinylchloride
(c) Syndiotactic polyvinylchloride
(d) All of these

Q.9 Example of condensation polymer is
(a) Formaldehyde → metaformaldehyde
(b) Acetaldehyde→ paraldehyde
(c) Acetone→ mesityl oxide
(d) Ethene→ polyethene

Q.10 Acetate rayon is prepared from
(a) Acetic acid
(b) Glycerol
(c) Starch
(d) Cellulose

Q.11 Which polymer is formed by chloroethene ?
(a) Teflon
(b) Polyethene
(c) PVC
(d) Nylon

Q.12 The catalyst used for the polymerisation of olefins is
(a) Ziegler Natta catalyst
(b) Wilkinson's catalyst
(c) Pd-catalyst
(d) Zeise's salt catalyst

Q.13 Acrilan is a hard, horny and a high melting material. Which of the following represents its structure ?

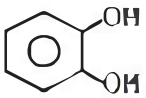
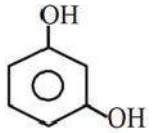
(a) $-\left(CH_2-CH(Cl)\right)_n-$ (b) $-\left(CH_2-CH(CN)\right)_n-$

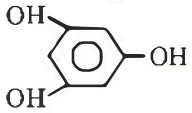
(c) $-\left(CH_2-C(CH_3)(COOCH_3)\right)_n-$ (d) $-\left(CH(COOC_2H_5)\right)_n-$

Q.14 The average mass molecular weight & average number molecular weight of a polymer are respectively 40,000 and 30,000. The polydispersity index of polymer will be
(a) < 1 (b) > 1
(c) 1 (d) 0

Q.15 In the process of forming 'mercerised cellulose' the swelling of cellulose is caused by
(a) Water (b) Na_2CO_3
(c) aq. NaOH (d) aq. HCl

Q.16 The monomeric units of terylene are glycol and which of the following

(a)  (b) 

(c)  (d) 

Q.17 The process of vulcanisation makes rubber
(a) Soluble in water
(b) Elastic
(c) Hard
(d) Soft

RESPONSE GRID					
	6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ
	11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ	13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ
	16. ⓐⓑⓒⓓ	17. ⓐⓑⓒⓓ			

Space for Rough Work

Q.18 Orlon is a polymer of
(a) Styrene
(b) Tetrafluoroethylene
(c) Vinyl chloride
(d) Acrylonitrile

Q.19 Synthetic fibres like nylon-66 are very strong because
(a) They have high molecular weights and high melting points
(b) They have a high degree of cross-linking by strong C – C bond
(c) They have linear molecules consisting of very long chains
(d) They have linear molecules interlinked with forces like hydrogen bonding

Q.20 Which of the following is not a polymer ?
(a) Silk (b) DNA
(c) DDT (d) Starch

Q.21 Which of the following polymer has ester linkage ?
(a) Nylon-66 (b) PVC
(c) Terylene (d) SBR

Q.22 'Shellac' secreted by lac insects is a
(a) Natural plastic (b) Natural resin
(c) Natural elastic (d) Any of these

Q.23 Which of the following is oligosaccharide?
(a) Maltose
(b) Sucrose
(c) Both (a) and (b)
(d) None of these.

Q.24 Polythene is
(a) Thermoplastic
(b) Thermosetting
(c) Both (a) and (b)
(d) None of these

DIRECTIONS (Q.25-Q.27) : In the following questions, more than one of the answers given are correct. Select the correct answers and mark it according to the following codes:

Codes :
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

Q.25 Which of the following fibres are not made of polyamides?
(1) Dacron
(2) Orlon
(3) Rayon
(4) Nylon

Q.26 What is true about polymers?
(1) Polymers do not carry any charge
(2) Polymers have high viscosity
(3) Polymers scatter light
(4) Polymers have low molecular weight

Q.27 Which of the following is not a branched polymer?
(1) Polyester
(2) High density polythene
(3) Nylon
(4) Low density polythene

RESPONSE GRID					
	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ	22. ⓐⓑⓒⓓ
	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ

Space for Rough Work

DIRECTIONS (Q. 28-Q.30) : Each of these questions contains two statements: Statement-1 (Assertion) and Statement-2 (Reason). Each of these questions has four alternative choices, only one of which is the correct answer. You have to select the correct choice.

(a) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

(b) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(c) Statement -1 is False, Statement-2 is True.

(d) Statement -1 is True, Statement-2 is False.

Q.28 Statement-1 : The time of vulcanisation and temperature is increased by adding accelerators

Statement-2 : By vulcanising, a material of high tensile strength can be obtained.

Q.29 Statement-1 : In vulcanisation of rubber, sulphur cross links are introduced.

Statement-2 : Vulcanisation is a free radical initiated chain reaction.

Q.30 Statement-1 : Teflon has high thermal stability and chemical inertness.

Statement-2 : Teflon is a thermoplastic.

RESPONSE GRID	28. ⓐ ⓑ ⓒ ⓓ	29. ⓐ ⓑ ⓒ ⓓ	30. ⓐ ⓑ ⓒ ⓓ

DAILY PRACTICE PROBLEM SHEET 58 - CHEMISTRY			
Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	64
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

Space for Rough Work

DAILY PRACTICE PROBLEMS

CHEMISTRY SOLUTIONS

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1. **(d)** Protein is a natural polymer of α–amino acids

2. **(d)** Amylose is a linear polymer of α–D–glucose

(–Glucose–Glucose–Glucose–)

(C_1-C_4 α-linkage)

3. **(d)** Silk is protein fibre. Dacron is polyester fibre and Nylon -66 is polyamide fibre.

4. **(b)** Natural rubber is addition polymer of isoprene (2-methyl-1, 3-butadiene)

$$n CH_2=\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}-CH=CH_2 \xrightarrow{\text{Polymerisation}}$$

$$-(CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=CH-CH_2)_n-$$

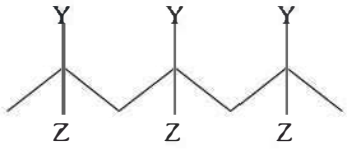
Natural rubber

5. **(c)** Resins are amorphous organic solids or semisolids which usually have a typical lustre and are often transparent or translucent.

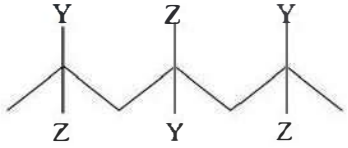
6. **(d)** Terylene is fibre not a thermosetting plastic because on heating it melts and does not show plastic property.

7. **(b)** There are 3 stereochemical arrangements.

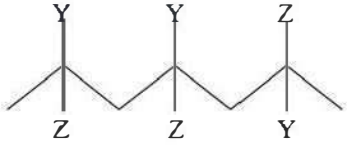
(i) Isotactic (same order) : Here similar groups are arranged on one side of the chain. All Y groups lie on one side and all Z groups on the opposites side of the chain.



(ii) Syndiotactic (Alternating order). The Y and Z groups lie alternately on each side of the chain.



(iii) Atactic (Random order). The Y and Z groups are arranged in a random fashion



8. **(c)** Syndiotactic polyvinylchloride

$$\left\{ CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle |}{CH}}-CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle |}{CH}}-CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle |}{CH}}-CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle |}{CH}} \right.$$

$$\left. -CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle |}{CH}} \right\}$$

9. **(c)** Polymers formed by condensation process involves elimination of small molecule like H_2O, CO_2 etc. for example,

$$\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{>}}C=O + CH_3-\underset{\displaystyle O}{\overset{\displaystyle ||}{C}}-CH_3 \xrightarrow[HCl]{dil}$$

Acetone

$$\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{>}}C=CH-\underset{\displaystyle O}{\overset{\displaystyle ||}{C}}-CH_3 + H_2O$$

Mesityl oxide

10. **(d)** Rayon fibre is chemically identical to cotton but has a shine like silk. Rayon is also called a regenerated fibre because during its preparation, cellulose is regenerated by dissolving it in NaOH and CS_2.

11. **(c)** Chloroethene (vinyl chloride) forms PVC (polyvinyl chloride).

12. **(a)** $Al(C_2H_5)_3 + TiCl_4$ is Ziegler Natta catalyst.

13. **(b)**

14. **(b)** Average number molecular weight $\bar{M}_n = 30{,}000$

Average mass molecular weight $\bar{M}_w = 40{,}000$

$$\text{Polydispersity index (PDI)} = \frac{\bar{M}_w}{\bar{M}_n} = \frac{40{,}000}{30{,}000} = 1.33$$

15. **(c)** Cellulose forms a translucent mass on treatment with aq. NaOH which imparts a silky lustre to cotton. This process is mercerisation and the cotton so produced is known as mercerised cotton.

16. **(c)** Terylene is made from glycol and terephthalic acid

$$HO-CH_2-CH_2-OH$$

Glycol

and HOOC–C$_6$H$_4$–COOH

Terephthalic acid

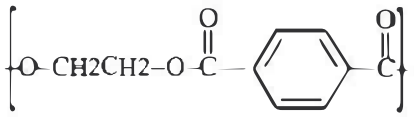
17. **(c)**

18. **(d)**

19. **(d)** They have linear molecules interlinked with forces like hydrogen bonding.

20. **(c)** DDT is an organic compound used as insecticide not a polymer.

21. **(c)** Terylene has ester linkage. It is the polymer of ethylene glycol with terephthalic acid. It is used in textile industry.



Dacron or terylene

22. **(b)**

23. **(c)** Carbohydrates which on hydrolysis give two to nine molecules of monosaccharides are called oligosaccharides. Both maltose and sucrose are disaccharides which on hydrolysis give two molecules (same or different) of monosaccharides. So, these two are oligosaccharides.

24. **(a)** Thermoplastics are those which become soft on heating and can be remoulded again.

25. **(a)** Orlon, dacron and rayon are not polyamides.

26. **(a)** Polymers have high molecular weights. Thus statements (1), (2) and (3) are correct.

27. **(a)** Low density polythene is the only branched polymer among the given choices

28. **(c)** The time of vulcanisation is reduced by adding accelerators and activators.

29. **(b)** Vulcanisation is a process of treating natural rubber with sulphur or some compounds of sulphur under heat so as to modify its properties. This cross-linking gives mechanical strength to the rubber.

30. **(b)** Due to the presence of strong C–F bonds, teflon has high thermal stability and chemical inertness.