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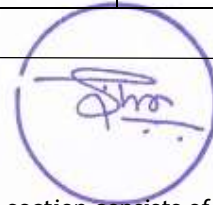
Branch: Signature of Invigilator:

Semester: VIth Date: 28/04/2022 (MORNING)

Subject with Code: CL314 ELASTOMER TECHNOLOGY

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

**Department of Chemical Engineering
Birla Institute of Technology, Mesra**

Subject Name: CL314 Elastomer Technology

SECTION A- (Answer All Questions)

Total Marks -30

Part-I Multiple Choice Questions

Marks-20x0.5=10

1. pH of fresh rubber latex is

1. 7
2. 2
3. 3
4. 8

2. What kind of product is obtained on chlorination of natural rubber?

1. elastomer
2. thermoplastic
3. resinous
4. none of the mentioned

3. To produce the smoked rubber, the rubber sheets are hanged in smoked chambers at _

1. 0-20°C
2. 20-30°C
3. 30-40°C
4. 40-50°C

4. How much would the unsaturation of cyclized rubber reduce to its original when it forms polycyclic structure?

1. 57-60%
2. 20-30%
3. 40%
4. 70%

5. What are the temperature and pressure conditions when natural rubber is hydrogenated in the presence of nickel catalyst?

1. 5-10 atm and 180-200 °C
2. 15-20 atm and 180-200 °C
3. 30-35 atm and 100-120 °C
4. 15-20 atm and 100-120 °C

6. Which tree gives out the latex to obtain natural rubber?

1. Eucalyptus
2. Hevea brasiliensis
3. Anogeissus
4. Astragalus

7. Which substance is added to the dilute latex to prevent darkening of latex?

1. sodium bisulfite
2. potassium sulfite
3. sodium sulfate
4. potassium sulfate

8. Mastication of rubber is done for improving

1. Plasticity
2. Viscosity
3. Crystallinity
4. None of these

9. Rubber is collected from

1. Root
2. Flower
3. Leaf
4. Stem

10. The latex is diluted to _____ and filtered to remove suspended impurities.

1. 5-10%
2. 10-15%
3. 15-20%
4. 20-25%

11. Consider the following statements about hydrocarbons of natural rubber and gutta percha.

I. They have same elementary formula.

II. They have same molecular weight.

III. Rubber hydrocarbon has low specific gravity than gutta percha.

Which of the following statements are true?

1. I, III
2. I, II, III
3. II, III
4. I only

12. Which component has the maximum composition in the Hevea rubber latex?

1. rubber hydrocarbon
2. water
3. proteins
4. sugars

13. While producing smoked rubber, the latex and reacted with formic acid, the vertical partition plates are inserted and left undisturbed for _____

1. 13 hours
2. 14 hours
3. 15 hours
4. 16 hours

14. Which of the following represents natural rubber chemically?

1. cis 1,4-polyisoprene
2. trans 1,4-polyisoprene
3. cis 1,3-polyisoprene
4. trans 1,3-polyisoprene

15. The filtered latex is sent into the tanks and treated with

1. Formic acid
2. Formaldehyde
3. Acetaldehyde
4. Poly isoprene

16. To prevent premature coagulation in rubber add

1. Stabilizer
2. Plasticizer
3. Filler
4. None of these

17. Which solvent is used to dissolve rubber pieces in the process of chlorination of natural rubber?

1. carbon tetrachloride
2. acetone
3. benzene
4. toluene

18. Which compounding act as activator in rubber vulcanization?

1. Zinc Oxide
2. Sulfur
3. TMTD
4. Stearic Acid

19. Isoprene in natural rubber exists in _____ geometrical isomeric forms.

1. 2
2. 3
3. 4

4. 5

20. Which solution is used for hydrochlorination of natural rubber with HCl gas?

1. benzene
2. toluene
3. carbon tetrachloride
4. acetone

Part-II Very Short Answer Type Questions

Total Marks 10X2=20

1. Why Mastication is essential before rubber compounding?
2. What are the major characteristic parameters of internal mixer required to be controlled during rubber compounding?
3. What are the basic differences between efficient and conventional curing system?
4. Mention the reason for metal oxide curing for such elastomer.
5. Why is it necessary to have proper heating and cooling devices attached to the two rolls?
6. What are the different classes of V-belt uses commercially?
7. Differentiate between Bias and Radial Tyre
8. What are the major components of conveyer belt?
9. Why does EPDM rubber consider as saturated rubber? Discuss with its chemical structure.
10. How does thermoplastic elastomer differ from general elastomer?

SECTION B - Long Answer Type

Total Marks 4X5=20

1. Briefly explain with diagram how distributive mixing taking place during two roll mixing process.
2. Formulate a tyre tread component with higher abrasion resistance and mention the justifications of selections of all major components.
3. Write down the unique properties of silicone rubber. How properties of nitrile rubber changes with the content of acrylonitrile?
4. Describe the process of tapping of natural rubber latex. How auto-oxidation takes place in natural rubber?
5. Draw the cure characteristic curve obtained from oscillating disc rheometer and mention all relevant point for curing parameter.