UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: MPU 3332
COURSE	: RUBBER INDUSTRY IN MALAYSIA
SEMESTER/SESSION	: SEMESTER I 2024/2025
DURATION	: 1.5 HOURS

Instructions:

1. This booklet contains questions. Answer **60** questions.
2. All answers should be written in **OMR sheet**. Only use **2b** pencil.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 14 PRINTED PAGES INCLUDING COVER PAGE

1. Explain the importance of Malaysia's rubber industry to its economy.
   A. It creates a demand for foreign labor
   B. It significantly contributes to the nation's GDP
   C. It is no longer relevant
   D. It affects only small-scale farmers

2. Explain the process of rubber compounding means.
   A. Treatment to retard its deterioration due to oxidation
   B. Depression of its freezing point
   C. Selecting and combining elastomers and additives
   D. Improving its curing rate

3. Classify the most important rubber compounding ingredient which is used to retard the deterioration of rubber compounds initiated by oxygen, heat, ozone and light.
   A. Additive
   B. Antidegradant
   C. Softener
   D. Activator

4. Interpret the **WRONG** statement regarding the compound development process.
   A. Estimate cost of compound selected for further evaluation
   B. Use compound to make a product sample
   C. Test product sample against performance specification
   D. Scrap and reject of these materials can be recycled-environmental friendly behavior

5. Classify the specific type of Polyisoprene.
   A. Synthetic rubber
   B. Natural rubber
   C. Filler
   D. Softener

6. Find the copolymer among the following options.
   A. SBR
   B. BR
   C. PVC
   D. Polystyrene

7. Describe the method used to extract latex from a rubber tree.
   A. Rubber tapping
   B. Rubber waxing
   C. Rubber mixing
   D. Rubber calendaring

8. Classify the criterion that is **NOT** a factor in selecting plasticizers.
   A. Compatibility
   B. Efficiency
   C. Cost
   D. Selectivity

9. Uncured rubbers have a high viscosity, which can cause their temperature to rise during mechanical processing. Estimate the temperature increase that can occur.
   A. 80
   B. 100
   C. 150
   D. 300

10. Describe the role of fillers like zinc oxide and carbon black in enhancing the properties of natural rubber during vulcanization.
    A. Plasticity
    B. Viscosity
    C. Weathering characteristics
    D. Scorch

11. Explain the meaning of "premature vulcanization".
    A. To secure certain properties in the finished product to satisfy service requirements
    B. not thoroughly mixed with the base rubber
    C. To attain processing characteristics necessary for efficient utilization of available equipment
    D. To achieve the desirable properties and processability at lowest possible cost

12. Describe the scientific name for rubber tree.
    A. Hevea Brasiliensis
    B. Hevea Guianensis
    C. Hevea Benthamiana
    D. Hevea Microphylla

13. Explain the form in which synthetic rubbers are delivered to rubber processing facilities.
    A. Pellet
    B. Resin
    C. Powder
    D. Bale

14. Indicate the component that is **NOT** used in the tire manufacturing process.
    A. Tread
    B. Plies
    C. Bead coil
    D. Chain

15. Describe the method to prevent premature vulcanization.
    A. Two roll mill
    B. Banbury-type internal mixer
    C. Two stage mixing
    D. Carcass

16. Explain the main use of filament reinforcement.
    A. In the manufacture of synthetic rubber
    B. As a plasticiser for unsaturated polyester
    C. As an anti-skimming agent in paint
    D. To reduce extensibility but retain the other desirable properties

17. Classify the 3 layers of reinforced tube.
    A. Sidewall, reinforcement layer, plies
    B. Tread, bead, drum
    C. Outer layer, reinforcement layer, inner tube
    D. Curing, vulcanized, mixing

18. Explain the process which rubber stock is passed through a series of gaps of decreasing size by a stand of rotating rolls.
    A. Extrusion
    B. Calendering
    C. Coating
    D. Molding and casting

19. Classify which of the following processes is **NOT** involved in the production of finished rubber goods.
    A. Rubbing
    B. Mixing
    C. Shaping
    D. Compounding

20. Describe the range elongation and flexibility of natural rubber compared to other elastomers.
    A. 2000-2500
    B. 1500-2000
    C. 1-1000
    D. 1000-1500

21. Describe the term that makes the rubber stiffer and stronger but retain extensibility.
    A. Vulcanization
    B. Extrusion
    C. Antioxidants
    D. Lubricants

22. Explain the Ziegler process.
    A. employs very high pressure
    B. produces low density polythene
    C. uses catalyst
    D. Was developed in 1998

23. Find the **WRONG** statement.
    A. Molded parts for footwear are produced by injection molding, compression molding
    B. Plain hose (no reinforcement) is extruded tubing
    C. Without crosslink, an elastomer may be elongated beyond elastic limit
    D. Normal cross-linked polymers can be recycled

24. Interpret the function of pneumatic tires on vehicle.
    A. Transmit the motor torque to propel the vehicle
    B. Reduce the weight of the vehicle, passengers, and cargo
    C. Expel water of the vehicle when raining
    D. Consists of multiple layers of rubber-coated cords for vibration

25. Classify the functions of sulfur, metallic oxides, and organic peroxides.
    A. Vulcanizing Agents
    B. Accelerators
    C. Activators and Retarders
    D. Antidegradants

26. Explain the important role of carbon black as reinforcing filler.
    A. Carbon black also provides protection from ultraviolet radiation
    B. To secure certain properties in the finished product to satisfy service requirements
    C. To attain processing characteristics necessary for efficient utilization of available equipment
    D. To achieve the desirable properties and processability at lowest possible cost

27. Find the **WRONG** shaping process within the basic category.
    A. Extrusion
    B. Calendering
    C. Swelling
    D. Molding and casting

28. Classify the materials used in the polymerization process to produce SBR.
    A. Butadiene monomer + polystyrene
    B. Polybutadiene + styrene monomer
    C. Acrylonitrile + styrene
    D. Acrylonitrile + butadiene

29. Explain the meaning of "crosslink density".
    A. Total number of crosslink in the system
    B. Increase the time of process and quantity of crosslink
    C. Increase its viscosity to permit easier processing in crosslink
    D. None of these

30. Describe the internal components and their functions within a tire.
    A. Plies
    B. Steel
    C. Nylon
    D. Carcass

31. Compare the production of natural rubber and synthetic rubber in Malaysia.
    A. Synthetic rubber production is higher
    B. Both are produced equally
    C. Natural rubber production is higher
    D. Malaysia does not produce synthetic rubber

32. Locate the two pendant groups (H and CH_3) in the Cis configuration.
    A. Located on the opposite side of the carbon-carbon double bond
    B. Located on the same side of the carbon-carbon double bond
    C. Located on the outer side of the carbon-carbon double bond
    D. Located on the inner side of the carbon-carbon double bond

33. Rubber belts are primarily constructed of rubber due to its flexibility. However, to minimize stretching, rubber belts often incorporate reinforcement materials. Find a suitable reinforcement material for rubber belts.
    A. PVC
    B. Polyamides
    C. Cellulose
    D. Polyester

34. Find the chemical composition of natural rubber from the options provided.
    A. Cis 1,4-polyisoprene
    B. Trans 1,4-polyisoprene
    C. Cis 1,3-polyisoprene
    D. Trans 1,3-polyisoprene

35. Compare the production of rubber gloves in Malaysia to other rubber products.
    A. Tires are produced in higher quantities
    B. Rubber bands are the top product
    C. Rubber gloves are the primary product exported
    D. Rubber gloves are produced less than rubber shoes

36. Concurrently with the development of the rubber industry, great strides were made in the technology of working with rubber, which drove up the demand for latex. One of Vandelay Industries' important customers is an American tire company named for the inventor of the vulcanization process. Find the inventor.
    A. Richard Bridgestone
    B. Charles Goodyear
    C. Harvey Firestone
    D. Harvey Firestein

37. Describe the steps involved in the production of natural rubber from rubber latex.
    A. Tapping-preservation-coagulation
    B. Preservation-tapping-coagulation
    C. Tapping-coagulation-preservation
    D. Coagulation-tapping-preservation

38. Find the tree species that produces latex, the raw material for natural rubber.
    A. Eucalyptus
    B. Hevea Brasiliensis
    C. Anogeissus
    D. Astragalus

39. Classify the different types of rubber products manufactured in Malaysia.
    A. A mix of industrial, medical, and consumer goods
    B. Mainly agricultural products
    C. Mainly medical products
    D. Only raw rubber is produced

40. The natural rubber industry has seen a resurgence due to advancements in a transportation-related product that requires natural rubber. Find this product.
    A. Boot soles
    B. Tires
    C. Balloons
    D. Rubber bands

41. Classify the impact of government regulations on the rubber industry.
    A. Supportive of growth and innovation
    B. Restrictive, limiting the industry's expansion
    C. Focused on promoting raw rubber exports
    D. Focused on reducing rubber production

42. Interpret the impact of technology on Malaysia's rubber tapping process.
    A. Increased efficiency and productivity
    B. Reduced need for labor
    C. No significant impact
    D. Increased manual labor requirements

43. Explain the process of rubber tapping.
    A. Harvesting fruit from rubber trees
    B. Extracting latex from rubber trees
    C. Replanting rubber trees
    D. Exporting raw rubber

44. Describe the role of the Malaysian Rubber Board.
    A. It imports rubber from other countries
    B. It regulates the rubber industry
    C. It manufactures rubber products
    D. It only conducts rubber research

45. Explain the chemical formula for polyisoprene.

A. $(C_5H_8)_n$

B. C_6H_6

C. C_5H_8

D. $(C_4H_7)_n$

46. Compare natural rubber quality and synthetic rubber quality.

A. Natural rubber is more flexible

B. Synthetic rubber is stronger

C. Synthetic rubber is less durable

D. Natural rubber has less elasticity

47. Justify the effect of climate on rubber production in Malaysia.

A. Drier weather increases production

B. Heavy rainfall affects latex yield

C. Climate has no impact

D. Lower temperatures improve latex quality

48. Describe the role of government policies in regulating the rubber industry in Malaysia.

A. Import tariffs on synthetic rubber

B. Investment in research and sustainable practices

C. Promotion of foreign investment in rubber

D. Privatization of rubber plantations

49. Classify the labor force in Malaysia's rubber industry.

A. Primarily foreign labor

B. Mainly local labor

C. A mix of local and foreign workers

D. Automated and technology-driven

50. Describe the conditions that cause an increase in the price of rubber.

I. Declining world natural rubber production
II. Uncertain oil prices
III. Tighter natural rubber supply
IV. Increasing natural rubber production

A. I, IV
B. I, III
C. I, II
D. II, III

51. The Malaysian Rubber Board (MRB), founded on January 1, 1998, oversees three established agencies. Describe these three agencies.

I. RRIM (Rubber Research Institute of Malaysia)
II. MRRDB (Malaysian Rubber Research and Development Board)
III. MRELB (Malaysian Rubber Exchange and Licensing Board)
IV. PRIM (Polymer Rubber Industry in Malaysia)

A. I, III, IV
B. III, IV
C. I, II, III
D. II, IV

52. Explain the function of rubber accelerators.

I. Reduce vulcanization time
II. Increasing speed of vulcanization
III. Xanthates is a type of accelerator
IV. Transmit the motor torque to propel the vehicle

A. I
B. I, II
C. I, II, III
D. I, III, IV

53. Rubber belts are typically composed of rubber for its flexibility. However, they often require minimal extensibility. Find a suitable reinforcing material to enhance this property.

I. PVC
II. Nylon
III. Cellulose
IV. Polyester

A. I, IV
B. II, IV
C. II, III
D. IV

54. Compare other elastomeric materials and natural rubber.

I. Natural rubber has higher tensile strength
II. Natural rubber has higher tear strength
III. Natural rubber has higher resilience
IV. Natural rubber has higher resistance to wear

A. I, II, III, IV
B. I, III
C. I, II, IV
D. II, III, IV

55. Discuss the factors contributing to the widespread use of natural rubber.

I. Because of its low cost

II. Increase needs for elastomeric materials-

III. Highly elastomeric

IV. High temperature stability

A. II, IV

B. I

C. III

D. I, II, III, IV

Indicate whether each statement is TRUE or FALSE from Question 56 until Question 60:

56. A weaker ringgit makes a nation's exports more competitive, thus making rubber price increase.

A. True

B. False

57. Tighter natural rubber supply will make rubber price increase.

A. True

B. False

58. Scientific name for rubber tree is *Hevea Brasiliensis*.

A. True

B. False

59. Rubber is a natural polymer.

A. True

B. False

60. The latex used in making rubber is not the sap of a rubber tree.

A. True

B. False

----------End of questions----------