

NATURAL POLYMERS QUESTIONS FOR EXAMINATION TEST 09022018

One and only one Question is right in all the

Student (Name & Surname):

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Učo:

1. What is that of BIOMASS?

2. What is that of MODIFIED NATURAL PRODUCTS?

3. Check what is the MODIFIED NATURAL PRODUCTS

- a. **POLYETHYLENE** manufactured by such Way, that Crude oil is drilled, Gasoline is produced from it, the Ethylene is manufactured from this and finally **POLYETHYLENE** is manufactured
- b. CELLULOSE is earned from the Hemp and this is further transformed by the Nitration to **NITROCELLULOSE**
- c. The Starch **Particle** is extracted from Potato

4. What is the chemical Difference between NATURAL OILS extracted from the Plants or animal Sources and so called MINERAL OILS?

5. Write the GENERAL CHEMICAL FORMULA of the NATURAL OILS extracted from the Plants or animal Sources

6. What is that of NATURAL OILS, e.g. Linseed/flaxseed oil Drying?

7. What is the chemical Difference between WAXES and OILS?

- a. WAXES contain usually saturated fat Acid or Acids
- b. WAXES are not Esters but Ethers
- c. WAXES contain aromatic Parts

8. Check what is the temperature Range of the NATURAL WAXE'S Melting Point?

- a. 50 – 90 °C
- b. 30 – 50 °C
- c. 90 – 120 °C

9. What is the Use of the Beeswax in the Work of a Conservator - Restorer?

10. NATURAL GUMMS are from the chemical Point of View:

- a. Esters with aromatic Acids
- b. Polyterpene containing Double bonds between Carbon Atoms in the Backbone and are vulcanizable by Sulphur
- c. Polysaccharide

11. What is the Use of NATURAL GUMMS in the Food Industry?

- a. Preservative
- b. Acidity (pH) Regulator
- c. Thickener

- 12. Name individually at least two NONFOOD USES of the NATURAL GUMMS**
- a.
 - b.
- 13. The Backbone of the NATURAL POLYTERPENES is**
- a. Linear
 - b. Branched
 - c. Branched on the aromatic Parts
- 14. Do contain the NATURAL POLYTERPENES any unsaturated Bonds? If YES, then what Kind are they?**
- 15. What the NATURAL POLYTERPENE is the most important and why?**
- 16. Describe by WORDS what is that of LIGNIN AND WHAT IS ITS Function in the WOOD**
- 17. Describe by WORDS what are the TANINS and what is their Use**

18. What is the chemical Reaction, on which is based IRON GALL INK, what are the Reasons of its Fading and which are the Reactions of the Iron by this Fading and what is the Possibility to “Refresh” the original Appearance of the written Text?

19. STARCH is:

- a. Polysaccharide
- b. Polypeptide
- c. Polyester
- d. Polyurea

20. STARCH contains the Macromolecules:

- a. Linear only
- b. Branched only
- c. It is the Mixture of the Linear and branched Macromolecules

21. What of the following Plants contains, if it is optimal created a Breed, has the highest Starch content:

- a. Potato
- b. Wheat
- c. Corn (Maize)
- d. Plantain

22. CELLULOSE contains the Macromolecules

- a. Linear only
- b. Branched only
- c. It is the Mixture of the Linear and branched Macromolecules

- 23. What is the Difference between Starch and CELLULOSE as to the PRIMARY STRUCTURE?**
- 24. What Solvents are suitable for the Dissolving of the CELLULOSE without fundamental (radical) Decrease of the Molecular Weight**
- 25. What is that of α _AMINO ACID AND write its GENERAL FORMULA**
- 26. What is that of PEPTIDE BOND and write its GENERAL FORMULA**
- 27. Describe by WORDS what is, what are for PROTEINS:**
- a. Primary Structure
 - b. Secondary Structure
 - c. Tertiary Structure
 - d. Quaternary Structure

- 28. What is that of KASEIN and what are its Uses?**
- 29. Name individually at least three SEPARATING METHODS used in the Analysis of the NATURAL SUBSTANCES and the NATURAL POLYMERS especially**
- 30. ELECTROPHORESIS is especially suitable for the Analysis of which the following NATURAL SUBSTANCES and the NATURAL POLYMERS especially?**
- Amino acids and Proteins
 - Waxes and Fats
 - Saccharides and Polysaccharides
 - Natural Gumms
- 31. What spectroscopic Method is the most suitable and universal for the Analysis of the NATURAL SUBSTANCES and the NATURAL POLYMERS especially: NMR, FTIR, UV or RAMAN? Why?**
- 32. What is the Principle of the Nitrogen Determination by KJELDAHLA Method?**
- Volumetric Determination of the atomic Nitrogen as the Gas and its Recalculation to the Normal Conditions
 - Conversion to NO_3^- and following photometric Determination

- c. Mineralisation (Conversion) to Ammonium and its Titration

33. Which Metal Cation is reduced in the Reaction of the so called Fehling Reagent and what results from?

34. Reaction with the so called Fehling Reagent is giving:

- a. Aldehydes
- b. Ketone
- c. Aldehydes and Ketone
- d. Carboxylic Groups
- e. Ether's Bonds
- f. Amides

35. Collagen is Protein:

- a. Animal
- b. Vegetable
- c. Can be both Animal and Vegetable

36. Collagen has in its PRIMARY FORM the Secondary Structure:

- a. Helix
- b. Sheet
- c. Globular
- d. Is Amorphous

37. What is the DENATURATION of the Protein's and what is that of COAGULATION of the Protein's? Describe it by WORDS and make a Picture of these both final Structures.

- 38. What are the ANIMAL GLUE and GELATINE made from and what structure Change occurs with the original Tertiary Structure of the original Natural Raw Material:**
- a. Denaturation
 - b. Coagulation
- 39. Where be found KERATIN? It is of the Vegetable or the Animal Origin?**
- 40. Suppose the Tertiary Structure of KERATIN. Are there any Bonds between the Primary Backbones? If they are there, describe and make a Picture their Shape (Form).**
- 41. What can be the CHEMICAL PRINCIPLE of the Hair Perm?**
- 42. What is the Difference between NATURAL (GENUINE) SILK and the VISCOSE SILK? State at least two Differences.**
- 43. What is the LANOLIN, how it originating and what is its Use?**
- 44. What is the Unit dtex? Where it used and what is its Definition?**

**45. What is the ELASTIN and which has the special Properties?
By what are these special Properties done – describe by Words
and make a Picture, how it can look like and become operative?**

46. TRANSLATE to Spanish Language:

Fibrillin is a glycoprotein, which is essential for the formation of elastic fibers found in connective tissue. Fibrillin is a major component of the microfibrils that form a sheath surrounding the amorphous elastin

47. TRANSLATE to Spanish Language:

1. Suited for starch and flour
2. Usage for acid and lye
3. Small sample size (5 - 15 g)
4. Short measuring times
5. Speed (0 - 300 min⁻¹)
6. Temperature measurement within the sample
7. Heating / cooling rates of up to 10°C / min
8. No follow-up costs
9. Evaluation in **BU**, mPas, cP or cmg

48. TRANSLATE to Spanish Language:

Nanocellulose can also be obtained from native fibers by an acid hydrolysis, giving rise to highly crystalline and rigid nanoparticles (generally referred to as nanowhiskers) which are shorter (**100s** to 1000 nanometers) than the nanofibrils obtained through the homogenization route. The resulting material is known as nanocrystalline cellulose (NCC).

**49. Name individually at least two Cellulose Derivatives and
state their Uses?**

50. What do you suppose the Future of the NATURAL SUBSTANCES and the NATURAL POLYMERS especially? This Answer is NOT evaluated for Examination and I would like to know your Opinion about it only.

51. What is that of Mutarotation? (Question from the 1st Lecture)

52. Which Structure (Form) of the Monosaccharide's is domination in the Water SOLUTION (Question from the 1st Lecture)

- a) Linear
- b) Cyclic
- c) There is about one Half of each

53. What that is of SICCATIVE (drying Agent) and why are added to the so called drying Oils? (Question from the 2nd Lecture)

- a) They are decreasing initial Viscosity of these Oils
- b) They are increasing initial Viscosity of these Oils
- c) They are improving the Colour of these Oils
- d) They accelerate so called Drying of these Oils
- e) They decrease the Price of these Oils

54. How many double Bonds have USSUALY organic Acids in the NATURAL OILS? (Question from the 2nd Lecture)

- a) Not any
- b) 1 – 3 double Bonds,
- c) 4 and more double Bonds

55. Which Origin is overwhelming Majority of the Resins, (Question from the 2nd Lecture)

- a) Vegetable
- b) Animal

56. What is of SHELACK (Question from the 2nd Lecture)

- a) Synthetic aromatic Oil made of the Crude Oil
- b) NATURAL OILS from the African oil-palm
- c) Vegetable Resin
- d) Animal Resin

57. SHELACK – What is it used in Work of a Conservator - Restorer? (Question from the 2nd Lecture)

- a) Glue
- b) Varnish
- c) Protection against the UV Radiation acting (damaging) Sculptures in the Outdoor Exhibitions
- d) Additive to the boiled linseed Oil (Modified linseed/flaxseed Oil)

58. What is the Difference between Colophon and the Turpentine? (Question from the 2nd Lecture)

- a) Colophon is the Vegetable Product and Turpentine is the Animal Product
- b) Colophon is the solid Material and Turpentine is the Liquid
- c) Colophon is the highly toxic Material and the Turpentine is the Food Additive

59. Carnauba Wax is (Question from the 3rd Lecture):

- a) It is the only another Name for the Beeswax from the Caribbean Region
- b) Vegetable Wax with high Melting Point
- c) Insects' Secret from the tropical Region

60. Lanolin belongs to (Question from the 3rd Lecture):

- a) Triterpene,
- b) Oils of the Vegetable Origin
- c) Waxes,
- d) Resins
- e) Essential/ethereal Oils

61. Gutta-percha is (Question from the 4th Lecture):

- a) Polyterpene
- b) Diterpene
- c) Wax

- d) Oil
- e) Vegetable Gum

62. Gutta-percha is gained from (Question from the 4th Lecture):

- a) Rubber tree, as it is for the Natural Rubber done
- b) It is gained from another Plant
- c) It is the Animal Product

63. Natural Rubber and Gutta-percha are two isomers of the Polyterpenes, which is the Nature synthesizing from one Monomer – Isoprene (2-methylbutadien) (Question from the 4th Lecture)

- a) Natural Rubber is in the Backbone Isoprene **trans** isomer
- b) Natural Rubber is in the Backbone Isoprene **cis** isomer
- c) Natural Rubber is in the Backbone Isoprene both **trans** isomer and **cis** isomer

64. Vulcanisation uses as the principal Element creating the Cross Bonds between Macromolecules (Question from the 4th Lecture):

- a) Sulphur
- b) Selene
- c) Magnesium
- d) Phosphor

65. The most dangerous Element (Substance) for the Durability of the vulcanised Rubber (it is the Vulcanised Rubber) is (Question from the 4th Lecture):

- a) Nitrogen
- b) NO_x,
- c) Sulphur Oxides
- d) Oxygen
- e) Ozone
- f) Helium

66. The TANNINS are usually gained from (Question from the 5th Lecture):

- a) Broad-leaved Trees' Wood
- b) Spruce needles
- c) Wood Bark,
- d) Beechnuts or Acorns

67. The Starch Particles (Grains) have the Diameter USUALLY of Range (Question from the 6th Lecture):

- a) Units of Millimetres
- b) Under 1 μm
- c) Units up to Tens of μm

68. What is that of DEXTRIN (Question from the 6th Lecture):

- a) Agglomerate of the Starch Particles (Grains)
- b) Starch Linear Molecule cleaved to shorter Molecules
- c) Modified Starch Molecule, highly branched, with lower Molecular Weight
- d) Starch Modified by Proteins,
- e) Starch Modified by Oils

69. DEXTRIN is used MAINLY as (Question from the 6th Lecture):

- a) Glue for Paper,
- b) Glue for Wood,
- c) Violin Varnish,
- d) Diluent for the Drying Oils

70. What is that of AGAR from the chemical Point of View (Question from the 6th Lecture):

- a) Polysaccharide
- b) Polyterpene
- c) Protein
- d) Wax

71. Which Plant is the Source of the most valuable Cellulose for the textile Industry (Question from the 7th Lecture):

- a) Clover
- b) Cotton
- c) Linen
- d) Hemp

e) Kapok

72. What is that of VISCOSE FIBER (Question from the 7th Lecture):

- f) Long Fibre from the Hemp
- g) Thread of the fine Titre made of Cotton Fibres
- h) Celluloses Fibre, which is at first dissolved and then precipitated from this Solution as the continuous (!Endless") Filament

73. VISCOSE FIBER has the resulting (final) Molecular Weight, relatively to the original Fibre, from that it was manufactured, (Question from the 7th Lecture):

- i) Higher,
- j) Lower,
- k) The same,
- l) Higher, but has the branched Chain

74. Write AT LEAST TWO Starch Derivatives and its Use (Question from the 6th Lecture):

75. What is that of CELLULOID and for what have been used (Question from the 7th Lecture)?

76. What is the PRINCIPLE of the TANNING of the Hide to the LEATHER (Question from the 9th Lecture):

77. How can you identify (recognise) using Microscope (optical or SEM) the Fibre taken from the Animal Hair and the Cellulose Fibre (Question from the 10th Lecture):

- a) Cellulose Fibre has a Twist (is coiled)
- b) Fibre from the Animal Hair (Fur) has a Flakes (small Scales) the Circumference round
- c) Celluloses Fibre is more long

78. What is that of FELT and how is it Manufactured (Question from the 10th Lecture):

- a. Cellulose Fibre is treated by concentrated H₂SO₄
- b. Fibres from the Animal Hair (Fur) are woven and then processed at Wet Conditions
- c. Fibres from the Animal Hair (Fur) are cleaned by HNO₃ and then densely woven

79. What is that of FIBROIN (Question from the 10th Lecture):

- a) Cellulose Fibre
- b) Vegetable Fibre Protein based
- c) Animal Fibre Protein based

80. How could you recognise by chemical Analysis after total Hydrolysis (Solvolysis) NATURAL SILK and the SYNTHETIC POLYAMIDE SILK (RAYON) (Question from the 10th Lecture):

- a) NATURAL SILK contains the one Kind of the Amino acid only
- b) NATURAL SILK contains more than one Kind of the Amino acids

Evaluation of the EXAMINATION

A - At least 61 Questions are right

B - 50 - 60 Questions are right

C - 40 - 49 Questions are right

D - 30 - 39 Questions are right

E - 20 - 29 Questions are right

F - Less than 20 Questions are right