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KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER
MAIN EXAMINATIONS

FOR THE DEGREE OF BSC (PHYSICS)

COURSE CODE: SPH 422

COURSE TITLE: POLYMER PHYSICS II

DURATION: 2 HOURS

DATE: 13TH NOVEMBER, 2020

TIME: 9:00PM-12:00PM

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of 3 printed pages. Please Turn Over



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Question One (30 marks)

- a) What is a polymer? (1 mark)
- b) What is the purpose of fillers and lubricants in polymers? (2 marks)
- c) Differentiate between a thermoplastic polymer and elastomers. (2 marks)
- d) Name any three applications of natural rubber in industry (3 marks)
- e) What is an elastomer? Name two examples. (3 marks)
- f) Name any three thermoplastics commonly used in injection molding. (3 marks)
- g) What is the effect of increasing crystallinity in polymers? (3 marks)
- h) What is the effect of branching and cross linking on polymer properties? (4 marks)
- i) Name three factors for polymer crystallization. (3 marks)
- j) What is a thermosetting polymer? Give two examples. (3 marks)
- k) Name any three mechanical properties of thermoplastics. (3 marks)

Question Two (20 marks)

- a) Differentiate between polymerization and de polymerization processes. (4 marks)
- b) What are the main properties of elastomers? (4 marks)
- c) What is an additive? Name and state uses of five different additives in polymers. (12 marks)

Question Three (20 marks)

- a) What is a thermoset? (1 mark)
- b) Name any three advantages of reaction injection molding in polymers. (3 marks)
- c) Name and explain the three polymer structures. (6 marks)
- c) What are the general properties of thermoplastics? (10 marks)

Question Four (20 marks)

- a) What are the general properties of polymers? (4 marks)
- b) Name any four limitations of polymers as engineering materials. (4 marks)
- l) Name six advantages of natural rubber (6 marks)

Question Five (20 marks)

- a) By giving examples, describe methods of polymer polymerization. (8 marks)
- b) Explain all the mechanisms of thermal degradation of polymers. (6 marks)
- c) Describe the three general types of polymers. (6 marks)