Second Semester Examination
2020/2021 Academic Session

July/August 2021

EBP 212/3 – Latex Processing
[Pemprosesan Lateks]

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains SEVEN printed pages before you begin the examination.
[Sila pastikan bahawa kertas peperiksaan ini mengandungi TUJUH muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

This paper consists of SEVEN questions.
[Kertas soalan ini mengandungi TUJUH soalan.]

Instruction: Answer **FIVE** questions. Answer **ALL** questions from PART A, **TWO** questions from PART B and **TWO** questions from PART C. If a candidate answers more than five questions only the first five questions answered in the answer script would be examined.
*[**Arahan**: Jawab **LIMA** soalan. Jawab **SEMUA** soalan dari BAHAGIAN A, **DUA** soalan dari BAHAGIAN B dan **DUA** soalan dari BAHAGIAN C. Jika calon menjawab lebih daripada lima soalan hanya lima soalan pertama mengikut susunan dalam skrip jawapan akan diberi markah.]*

The answers to all questions must start on a new page.
[Mulakan jawapan anda untuk semua soalan pada muka surat yang baru.]

You may answer a question either in Bahasa Malaysia or in English.
[Anda dibenarkan menjawab soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]

In the event of any discrepancies in the examination questions, the English version shall be used.
[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah digunapakai.]

PART A / *BAHAGIAN A*

(1). (a). Discuss ISO tests for the determination of tensile properties of natural rubber latex gloves before and after accelerated aging.

Bincangkan ujian ISO untuk penentuan sifat tensil sarung tangan lateks getah asli sebelum dan selepas penuaan terpecut.

(10 marks/*markah*)

(b). Well preserved field latex will have typical mechanical stability time (MST) minimum value of 650s. The latex received from AZ Latex Sdn Bhd showed the MST value of 750s.

(i). Explain the importance of the MST obtained towards the quality of received latex and suggest how to increase the latex colloid stability.

(ii). If the recieved latex from AZ Latex Sdn Bhd is used in your latex compounding, predict what will be expected during compounding process and the obtained mechanical properties of the latex films.

Lateks ladang yang diawetkan dengan baik akan memberikan nilai minimum masa kestabilan mekanikal (MST) ialah 650s. Lateks yang diterima daripada kilang AZ Latex Sdn Bhd menunjukkan nilai MST ialah 750s

(i). Jelaskan kepentingan MST. yang diperolehi terhadap kualiti lateks yang diterima dan cadangkan cara untuk meningkatkan kestabilan koloids lateks tersebut.

(ii). Jika lateks yang diterima dari AZ Latex Sdn Bhd latex telah digunakan dalam penyebatian lateks anda, jangkakan apa yang akan berlaku semasa proses penyebatian dan kekuatan mekanikal lateks filem yang diperolehi.

(10 marks/*markah*)

PART B / *BAHAGIAN B*

(2). (a). Top Latex (M) Sdn. Bhd received three samples of latex from the suppliers with the characteristics:

(i). Field latex with 0.2% ammonium content
(ii). New stock of HA latex
(iii). Carboxylated nitrile butadiene latex

As compounding engineer, explain how you can differentiate these three samples.

Top Latex (M) Sdn. Bhd menerima tiga jenis sampel lateks dari pembekal yang mempunyai ciri-ciri berikut:

(i). Lateks ladang yang mengandungi 0.2% ammonia
(ii). Stok baru Lateks HA
(iii). Karbosilated lateks nitril butadiena

Sebagai jurutera penyebatian, jelaskan bagaimana anda dapat membezakan ketiga-tiga sampel ini.

(12 marks/*markah*)

(b). Provide the flow chart for concentration process for natural rubber latex concentrate and suggest the suitable preservation for natural rubber latex concentrate for foam industry.

Berikan carta alir untuk proses pemekatan bagi lateks getah asli pekat dan cadangkan proses pengawetan yang sesuai untuk pemekatan lateks getah asli bagi industri penghasilan busa.

(8 marks/*markah*)

(3). (a). Provide the formulation to produce blue latex compound. Based on your knowledge, identify the classification and function of each compounding ingredients used.

Berikan formulasi untuk menghasilkan sebatian lateks biru. Berdasarkan pengetahuan anda, kenalpasti klasifikasi dan fungsi setiap ramuan penyebatian yang digunakan.

(12 marks/*markah*)

(b). Discuss the repulsive forces that exist in between latex particles that give colloidal stability of natural rubber latex.

Bincangkan tenaga-tenaga penolakan yang wujud antara partikel-partikel lateks yang memberikan kestabilan koloid bagi lateks getah asli

(8 marks/*markah*)

(4). (a). Briefly describe the preparation method of sulphur pre-vulcanized natural rubber latex compound at 75^{o}C using swelling method to assess the degree of optimum vulcanization of the prepared compound.

Bincangkan secara ringkas langkah-langkah penghasilan pra-pemvulkanan sulfur bagi sebatian lateks getah asli pada 75^{o}C *dengan menggunakan kaedah pembengkakan bagi mengukur darjah pemvulkanan optima bagi sebatian yang disediakan.*

(12 marks/*markah*)

(b). Illustrate theories that explain the mechanism of film formation for pre-vulcanized natural rubber latex and suggest the suitable theory for sago filled natural rubber latex films.

Huraikan teori-teori yang menerangkan mekanisma pembentukan filem lateks getah asli pra pemvulkanan dan cadangkan teori yang sesuai bagi filem lateks getah asli terisi sago.

(8 marks/*markah*)

PART C / *BAHAGIAN C*

(5). (a). Discuss a test to detect pinhole in medical gloves.

Bincangkan satu ujian untuk mengesan "pinhole" dalam sarung tangan perubatan.

(10 marks/*markah*)

(b). Explain a test for the determination of powder content of natural rubber latex gloves.

Jelaskan satu ujian bagi penentuan kandungan serbuk sarung tangan getah asli.

(10 marks/*markah*)

(6). (a). Discuss how to produce powder-free latex gloves (specification: blue, XL size, and length 240 mm). The discussion must be supported by a suitable flow chart.

Bincangkan bagaimana menghasilkan sarung tangan lateks tanpa serbuk (spesifikasi: warna biru, saiz XL dan panjang 240 mm). Perbincangan mesti disokong dengan carta aliran yang sesuai.

(10 marks/*markah*)

(b). Compare the surface modification of latex gloves between chlorination and coating with hydrogel materials.

Bandingkan pengubahsuaian permukaan sarung tangan lateks di antara pengklorinan dengan penyalutan bahan hidrogel.

(10 marks/*markah*)

(7). (a). Discuss the effects of stained former on the quality of latex gloves.

Bincangkan kesan pencemaran pembentuk terhadap kualiti sarung tangan lateks.

(10 marks/*markah*)

(b). Compare type I and type IV latex allergy. Give your idea to solve both type I and type IV latex allergy problem for the natural rubber latex gloves.

Bandingkan alahan lateks jenis I dan jenis IV. Berikan idea anda untuk menyelesaikan masalah alahan jenis I dan jenis IV bagi sarung tangan lateks getah semulajadi.

(10 marks/*markah*)

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