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**UNIVERSITI SAINS MALAYSIA**

First Semester Examination  
Academic Session 2009/2010

November 2009

**BMT 217/3 – Virology**  
**[Virologi]**

Duration: 3 hours  
[Masa: 3 jam]

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Please ensure that this examination paper contains ELEVEN printed pages before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi SEBELAS muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

**Instructions:** Answer **FIVE** (5) out of **SIX** (6) questions, in English or Bahasa Malaysia. Each question carries 20 marks.

**Arahan:** Jawab **LIMA** (5) daripada **ENAM** (6) soalan yang diberikan dalam Bahasa Inggeris atau Bahasa Malaysia. Tiap-tiap soalan bernilai 20 markah.]

In the event of any discrepancies, the English version shall be used.

*[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah diguna pakai].*

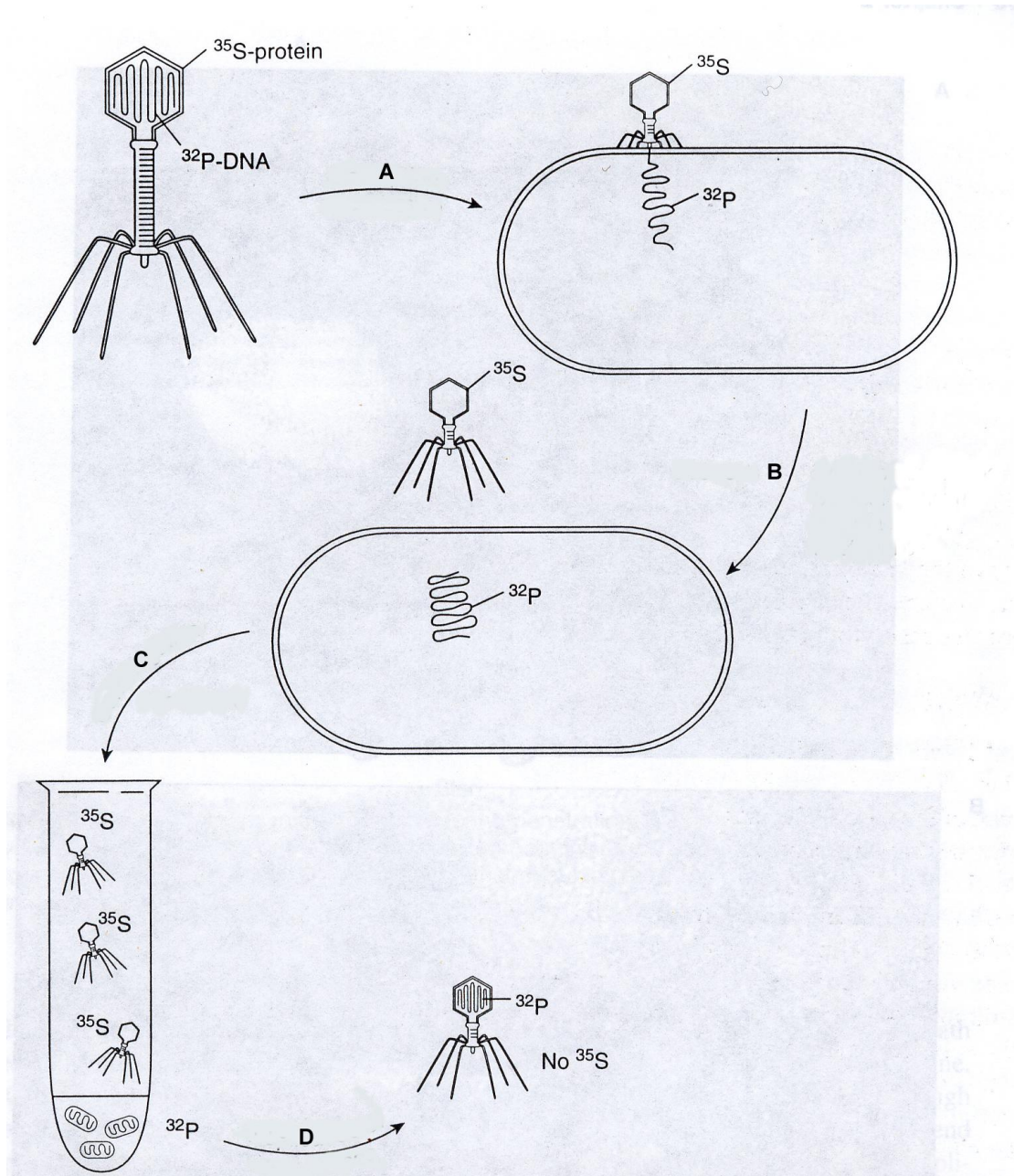


Figure 1

Figure 1 shows a classical experiment to prove the components involved in virus replication cycle.

1. [a] What were the rationale of using the radioactive labeled  $^{32}\text{P}$  and  $^{35}\text{S}$  in the experiment?

(2 marks)

...3/-

[b] **A** is a crucial and essential step in virus replication cycle.

[i] What is **A**?

(1 marks)

[ii] Differentiate between animal virus, plant virus and bacterial virus of **A**.

(6 marks)

[c] The phase between **B and C** during virus replication cycle is known as an eclipse phase.

[i] Define eclipse phase.

(1 marks)

[ii] Discuss the mechanisms used by the virus to ensure its survival during replication cycle.

(6 marks)

[d] Discuss the requirements needed by the virus to go from **A to D**.

(4 marks)

2. [a] Discuss the reasons why, in general, all DNA viruses would replicate in the nucleuses and all RNA viruses would replicate in the cytoplasm.

(4 marks)

- [b] Some of the information in part (a) contribute to the current situation of H1N1.

- [i] Briefly explain how is this so?

(2 marks)

- [ii] Provide further explanation, in addition to your answer in part (b)(i), that cause to the current problem of H1N1.

(7 marks)

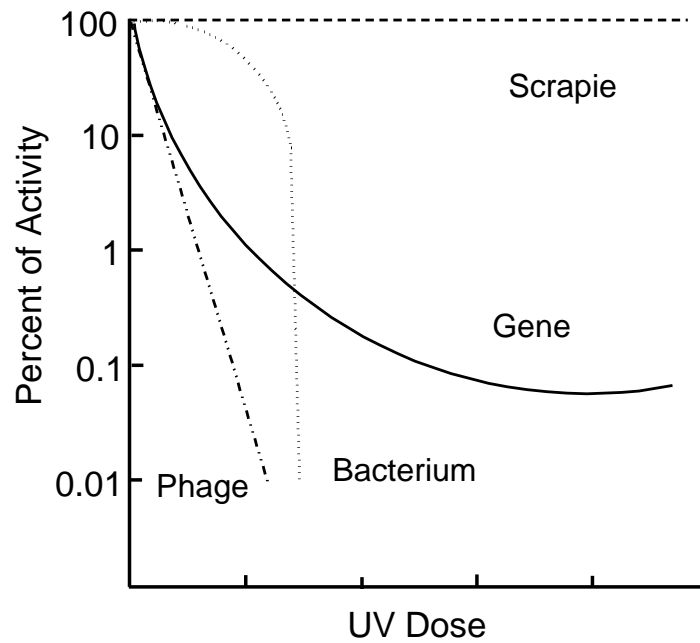
- [c] Discuss the different strategies employed by RNA viruses in replication process.

(7 marks)

3. [a] Discuss the different techniques of viral detection and diagnostic.

(10 marks)

[b] **Figure 2** shows experimental results on a sub-viral agent.



**Figure 2**

[i] Interpret the results as to identify the sub-viral agent.

(5 marks)

[ii] Discuss other evidences to support the identity of the sub-viral agent.

(5 marks)

4. Describe Baltimore classification system.

(20 marks)

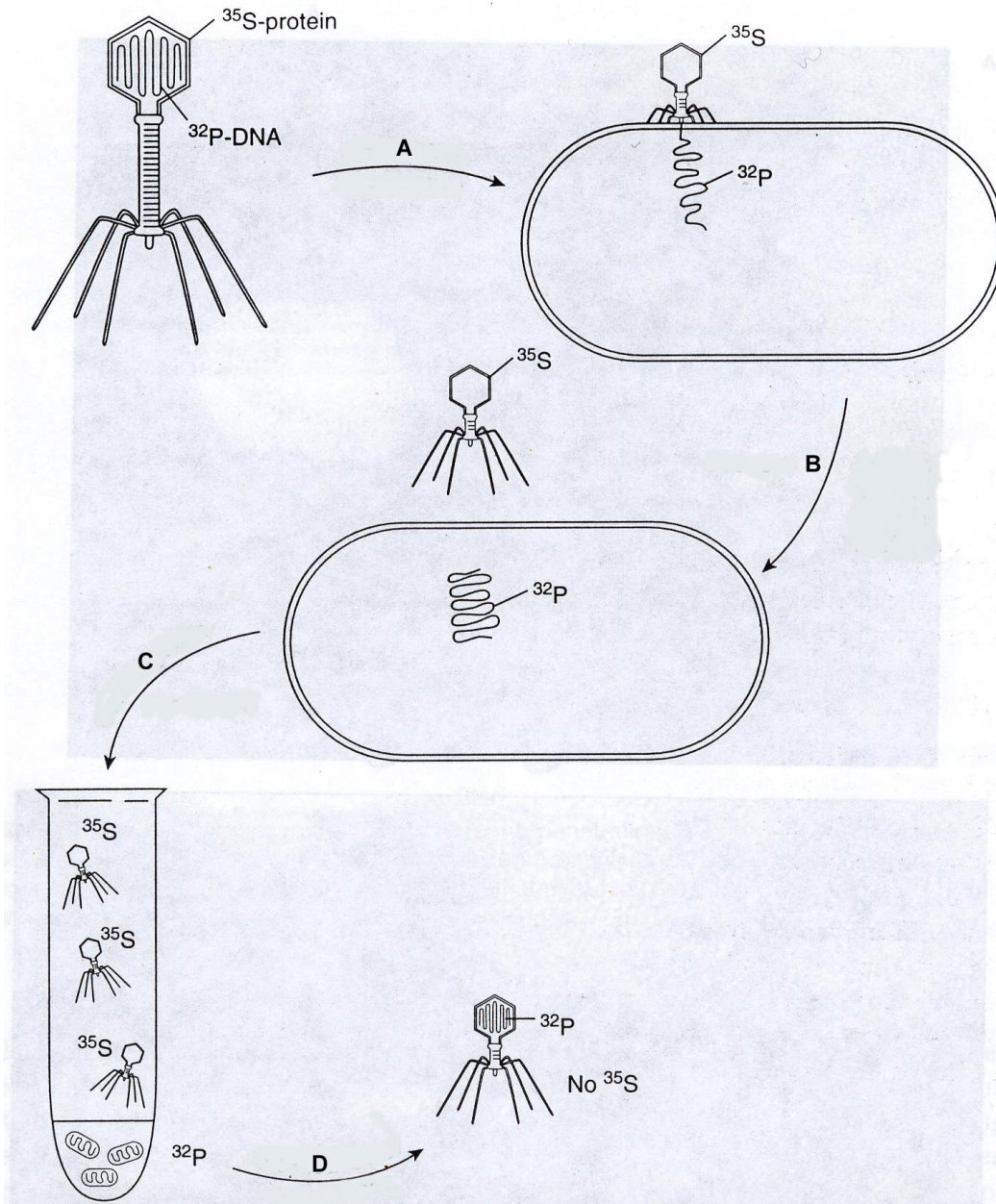
5. Explain **FOUR** (4) distinctive virus types and their fungal-like vectors.

(20 marks)

6. Describe the characteristics of viruses, particularly their cellular body and parasitism, comparing with phytoplasmas, spiroplasmas and rickettsia-like organisms.

(20 marks)

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Rajah 1

**Rajah 1** menunjukkan satu ujikaji klasik untuk membuktikan komponen yang terlibat dalam kitar replikasi virus.

1. [a] Apakah rasional menggunakan penglabelan radioaktif  $^{32}\text{P}$  and  $^{35}\text{S}$  dalam ujikaji tersebut?

(2 markah)

[b] **A** adalah penting dan langkah yang perlu dalam kitar replikasi virus.

[i] Apakah **A**?

(1 markah)

[ii] Bezakan **A** antara virus haiwan, virus tumbuhan dan virus bakteria.

(6 markah)

[c] Fasa antara **B dan C** semasa kitar replikasi virus dikenali sebagai fasa gerhana.

[i] Berikan maksud fasa gerhana.

(1 markah)

[ii] Bincangkan mekanisme yang digunakan oleh virus untuk memastikan kemandirian virus semasa kitar replikasi .

(6 markah)

[d] Bincangkan keperluan virus untuk bergerak dari **A ke D**.

(4 markah)



2. [a] Bincangkan mengapa, pada amnya, semua virus DNA bereplikasi di dalam nukleus dan semua virus RNA bereplikasi di dalam sitoplasma.

(4 markah)

- [b] Sebahagian maklumat daripada bahagian (a) menyumbang kepada keadaan semasa H1N1.

- [i] Jelaskan secara ringkas bagaimana ia berlaku?

(2 markah)

- [ii] Berikan penjelasan lanjut sebagai tambahan kepada jawapan pada bahagian (b) (i) yang menyebabkan masalah semasa H1N1.

(7 markah)

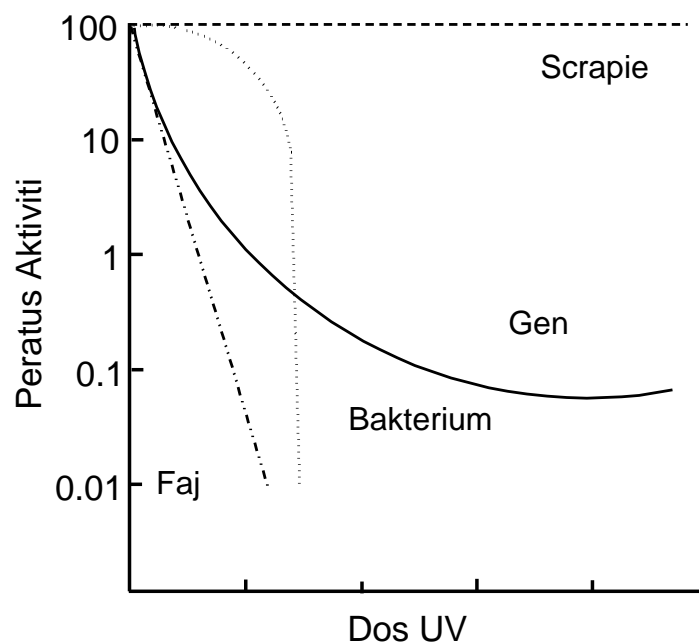
- [c] Bincangkan pelbagai strategi yang digunakan oleh virus RNA dalam proses replikasi.

(7 markah)

3. [a] Bincangkan pelbagai teknik untuk mengesan dan mendiagnosis virus.

(10 markah)

- [b] **Rajah 2** menunjukkan hasil ujikaji terhadap agen sub-virus.



**Rajah 2**

- [i] Lakukan interpretasi keputusan diatas bagi pengenalpastian agen sub-virus tersebut.

(5 markah)

- [ii] Bincangkan bukti-bukti lain untuk menyokong identiti agen sub-virus.

(5 markah)

4. Huraikan sistem pengelasan Baltimore.

(20 markah)

5. Terangkan **EMPAT** (4) jenis sifat tersendiri virus dan vektor bak-kulatnya.

(20 markah)

6. Huraikan ciri-ciri virus, khususnya sel badan dan parasitisme, bezakan dengan phytoplasma, spiroplasma dan organisma bak-rickettsia.

(20 markah)