



**Benha University**  
**Faculty of Science**  
**Botany Department**

**2016**  
**Time: 2 hour**  
**Code: 281B**

**Virology exam for 3<sup>rd</sup> & 4<sup>th</sup> level microbiology & chemistry students**  
**The 1<sup>st</sup> paper**

**Answer the following questions:**

**Question (1): write on: (12 marks)**

- 1- Effect of chemical and physical agents on virus.
- 2- Latent infection.
- 3- Transmission of animal and plant viruses.

**Question (2): complete: (6 marks)**

- 1- ..... usually have latent period of 12 hours or more.
- 2- Viruses are classified according to cytopathogenic effect into ..... and .....
- 3- Viscerotropic viruses lead to ..... e.g. ....
- 4- ..... can replicate normally if the cells are infected with another type of viruses, which is known as helper.

**Question (3): put (✓) or (X): (6 marks)**

- 1- Local infection has long lasting immunity ( )
- 2- Amniotic sac inoculation is used for influenza virus ( )
- 3- Non-persistent viruses persist for few hours at about 20°C ( )
- 4- Embryonated eggs have immunological functions ( )
- 5- The systemic infection can be stopped at the viraemic stage ( )
- 6- In chronic infections the virus can be detected with no or mild symptoms ( )

**Best wishes**

**Dr. Sabah Abo Elmaaty**



**Answer the following questions:**

**1. Complete the followi**

**12 mark**

- a) Viroids are.....
- b) Complement fixation reactions perform in two stages  
.....and.....
- c) Nucleic acid hybridization is used to detect .....in  
tissue samples using .....
- d) Tailed phages are classified into ..... ,  
.....and.....
- e) Viroids are classified into two families .....  
and.....
- f) Prions form ..... in the brain.

**2.**

**12 mark**

- a) **Explain** the biological significance of interferon?
- b) **Compare** between the following in diagnosis of viral infections:
  - i. Polymerase Chain Reaction (PCR) and Enzyme Linked Immuno-Sorbent Assay (ELISA).
  - ii. Haemagglutination and Haemagglutination inhibition test.
  - iii. Electron and Immunoelectron microscopy.

**“With my best wishes”**

*Dr. Mohamed Atef*



**Benha University**  
**Faculty of Science**  
**Botany Department**

**2016**  
**Time: 2 hour**  
**Code: 281B**

اجابة امتحان مادة الفيروسات للفرقة الثالثة و الرابعة ميكروبيولوجى و كيمياء  
الاحد ٢٨ / ٨ / ٢٠١٦

**Answer the following questions:**

**Question (1): write on: (12 marks)**

**1-Effect of chemical and physical agents on virus:**

**Agents react with viral capsid:** proteolytic enzymes, temperature (viral capsid denaturation occurs at 55-65°C for 30 min. or at 100°C for few seconds), phenol alters viral capsid and release nucleic acid, U.V. radiation results in denaturation.

**Agents react with viral nucleic acid:** Formaldehyde results in viral nucleic acid denaturation, nitrous acid leads to mistake in the replication process, Ionizing radiation damage viral nucleic acid and phytodynamic effect by dye; methylene blue in presence of light.

**Agents react with viral envelope:** anionic detergents and phospholipases.

2- **Latent infection:** the virus genome persists hidden inside the cell most of time, with periodic reactivating and development of clinical lesions.

3- **Transmission of animal and plant viruses:** **Transmission of animal viruses: Directly** by inhalation, ingestion, contact. **Indirectly** by arthropods and injection. Bite of animal as rabies.

**Transmission of plant viruses** without vectors by contact and through seeds, pollen and organs of vegetative propagation. By vectors:as man animal. By insects as aphid, by nematodes, by mites.

**Question (2): complete: (6 marks)**

1- **Persistent** usually have latent period of 12 hours or more.

2- Viruses are classified according to cytopathogenic effect into **cytopatic** and **noncytopatic**

3- Viscerotropic viruses lead to **localization in liver** e.g. **serum hepatitis**

4- **Defective viruses** can replicate normally if the cells are infected with another type of viruses, which is known as helper.

**Question (3): put (✓) or (X): (6 marks)**

- 1-Local infection has long lasting immunity (X)  
2-Amniotic sac inoculation is used for influenza virus (✓)  
3-Non-persistent viruses persist for few hours at about 20°C (✓)  
4- Embryonated eggs have immunological functions (X)  
5-The systemic infection can be stopped at the viraemic stage (✓)  
6- In chronic infections the virus can be detected with no or mild symptoms (✓)

**The model answer for Virology Exam (281B) (28/8/2016).**

**The second paper**

**1. Complete the following: 12 mark**

- a) Viroids are very small (200- to 400-nt), rod-like RNA molecules with a high degree of secondary structure.  
b) Complement fixation stage and indicator stage.  
c) Virus nucleic acid, DNA probe.  
d) *Myoviridae*, *Siphoviridae* and *Podoviridae*.  
e) *Pospiviroidae* and *Avsunviroidae*.  
f) Insoluble deposits.

**2. 12 mark**

**a) Explain the biological significance of interferon?**

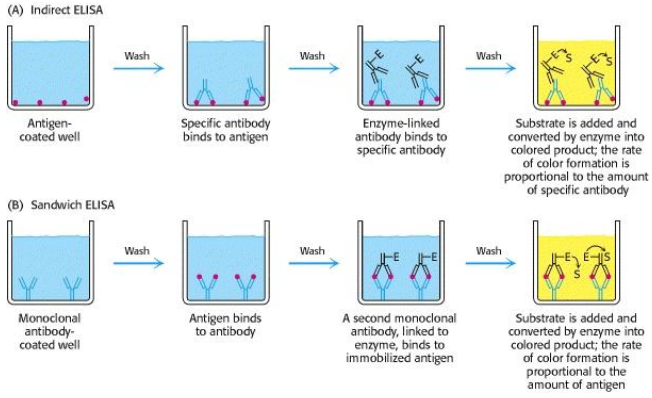
Interferons (INFs) are a large family of proteins secreted by most cells of vertebrates in response of viral infections or other selected stimuli.

- They are small protein (145-166 amino acids long) with low molecular weight (25-45000 Da).
- They are sensitive to photolytic enzymes as trypsin and pepsin and can be concentrated by precipitation by ammonium sulphate.
- They are weakly antigenic.
- They are thermo-stable (4.5 to 50.5°C).

- They are stable under pH (2-10).
- Interferon activity is not specific.
- Interferon can penetrate living cells and can therefore prevent intracellular viral multiplication.
- Interferon is species specific.
- It is used in treatment of HBV, HCV and severe cases of rabies
- It is used as anticancer agent.

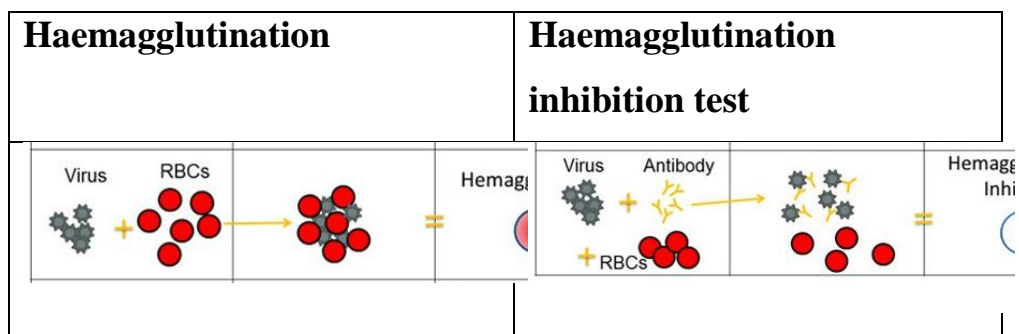
**b) Compare between the following in diagnosis of viral infections:**

- i. Polymerase Chain Reaction (PCR) and Enzyme Linked Immuno-Sorbent Assay (ELISA).

<b>Polymerase Chain Reaction (PCR)</b>	<b>Enzyme Linked Immuno-Sorbent Assay (ELISA)</b>
<p>The polymerase chain reaction (PCR) is a technique used in molecular biology to amplify a single copy or a few copies of a piece of DNA across several orders of magnitude, generating thousands to millions of copies of a particular DNA</p>	<p>Enzyme-linked immunosorbent assay (ELISA), is a biochemical technique used mainly in immunology to detect the presence of an antibody or an antigen in a sample.</p> 

sequence. This dramatic increase allows the detection of minute quantities of DNA or RNA easily by electrophoresis.	
---	--

ii. **Haemagglutination and Haemagglutination inhibition test.**



iii. **Electron and Immunoelectron microscopy.**

Electron microscopy	Immunoelectron microscopy
Electron microscopy is used to demonstrate virus particles in fluid or tissue extracts treated with specific stains.	Immunoelectron microscopy is used to detect virus but with addition of specific antisera to clinical materials leads to aggregation of virus.

*Dr. Sabah Abo Elmaaty  
Dr. Mohamed Atef*