What is the virus capsid form generally used to package a virus with a linear genome of variable length? (1) _________________

Which of the following is not a description of a virus (1)?
  a) An infectious particle that can pass through a filter that retains all Bacteria (and Archaea).
  b) A non-metabolizing protein and nucleic acid mixture
  c) An infectious agent that requires a host organism in order to replicate.
  d) An infectious protein
  e) An infectious nucleic acid

Why were bacteriophage (viruses of bacteria) the last to be discovered but the most studied in the early 20th century? (2)

What part of the virion do virus genomes not encode? (2) _________________

Why is it sometimes hard to detect viral infection when a continuous cell culture is used? (1)
  a) The cells are already cancerous so they can’t replicate the virus.
  b) The cytopathic effects are hard to determine.
  c) The host cells don’t make nice mono-layers on plates
  d) Antibodies do not bind to cancer cells
  e) There are very few cell lines that can be infected with any virus

What are two reasons why 1 virus particle does not necessarily equal one PFU? (2)

Why do low dilutions in hemagglutination assays not show hemagglutination but higher dilutions do? (1)
  a) There is not enough virus to be detected
  b) There is too much virus and the red blood cells all lyse so no agglutination is observed
  c) Another viral enzyme “de-agglutinates” the red blood cells
  d) The red blood cells at that concentration do not agglutinate

How many virus particles are present in an infected cell at the end of the eclipse period of a virus whose burst size is 100? (1)
How many capsid proteins does the large (150nm diameter) naked (EEK!) Adenovirus have (T = 25)? (1)
   a) ca 5
   b) ca 10
   c) ca 50
   d) 1
   e) 2

Glycoproteins in viral envelopes are; (1)
   a) Derived from modified host proteins
   b) Viral proteins with no trans-membrane segment
   c) Often present as oligomeric structures
   d) Always attached to sugar residues
   e) Never involved in viral fusion

What is the oligomeric structure of influenza hemagglutinin?
   a) Monomer
   b) Dimer
   c) Trimer
   d) Tetramer
   e) Pentamer

Why is cap snatching blocked by alpha-amanitin for influenza virus but not for Bunyaviruses?(2)

Why are RNA- dependent RNA polymerases called “DNA polymerases” (by the lecturer).

What kind of viruses HAVE to package a polymerase for replication and why?

Why and how do RNA viruses change their RNA- dependent RNA polymerase specificity?

How does poliovirus differentiate between viral template and cellular RNAs?
   a) Secondary structures in the viral RNA
   b) Secondary structures in the cellular RNA
   c) Sequences in the viral RNA
   d) Sequences in the cellular RNA

How are nested subgenomic mRNAs proposed to be formed?
   a) By template switching
b) By splicing
c) By header jumping
d) By body jumping
e) By degradation of the template

How does influenza virus switch from mRNA synthesis to genome (and anti-genome) replication?
   a) It turns on the cap endonuclease
   b) It switches catalytic subunits of the polymerase complex
   c) It stops binding to the 5’ end of the segmented genome
   d) It reads through stuttering poly-A tail sites

Name (describe) three ways that RNA viruses create diversity. (3)

Define quasispecies and describe why it is important. (2)

Why is hantaan virus infection good for mice and bad for humans?

Retroviruses are involved in (1)
   a) Cancers
   b) AIDS
   c) Repeated elements in the human genome
   d) Flu epidemics
   e) Bovine Spongiform Encephalitis (Mad cow disease)

How is reverse transcriptase similar to cellular DNA polymerases.
   a) It needs a protein primer
   b) It needs a 3’OH provided by an RNA to initiate replication
   c) It needs a template
   d) It requires a clamp-loading complex
   e) It is highly processive

What are the two functions of the RNase H domain of Reverse transcriptase in Retroviral replication?

About how many LINE retro-elements with Reverse Transcriptase genes are present in the human genome?
   a) 1
   b) 10
   c) 100
d) 10000

e) 1000000

How are “hot-spots” (locations in the genome where many integrated retroviruses are found) probably determined?
   a) By host DNA sequences
   b) By host DNA structure
   c) By viral DNA sequence
   d) By viral DNA structure

Why do you always get a directly repeated sequence flanking the retroviral provirus genome? How is it made?

How was it shown that hepadnaviruses had reverse transcriptase activity?
   a) Resistance to alpha-aminitin
   b) Resistance to actinomycin D
   c) By cloning the genes of the viral genome
   d) It was shown that the viral genome did not replicate in the cellular nucleus

What is the primer for replication by the hepadnavirus P-protein (reverse transcriptase).
   a) The epsilon structure in the pre-genomic RNA
   b) A cellular tRNA
   c) A cellular protein
   d) The P-protein itself
   e) The P-protein does not need a primer

What activity does SV-40 large T antigen NOT have?
   a) DNA helicase activity
   b) Species Specificity determination
   c) RNA helicase activity
   d) Interaction with cellular replication proteins
   e) Origin binding activity

What are major components of DNA virus origins of replication?
   a) A-T rich region
   b) Binding site for ORC
   c) Transcriptional Enhancers
   d) Inverted repeat sequences
   e) Nucleosome binding sites