Assignment 11

Q1: Fill in the gap or, Write True/False. If False, write the proper answer and if True, write the mechanism/specific example of a material:

a) Growth factors as defined as
……

b) As discussed in the class, intercellular flux via gap junctions is in the order of …… molecules/Cell boundary/second

c) Typical time constant for signal propagation is i) 20 seconds, ii) 20 minutes, iii) 20 µs, iv) 20 ms.

d) ECM composition is constant and can not be modified.

e) Focal contacts are assemblies of ……and facilitate binding of ……..to ……..
f) The process of interconversion of fibroblast to chondrocytes is known as ……..
g) Typically, [Ca^{+2}] concentration in cytoplasm is ……than that in ECM and is around…….
h) The doubling time for human cells is about i) 12 minutes, ii) 12 hours, iii) 12 seconds, iv)12 miliseconds. Differentiation in Eukayotic cell is reversible in nature

i) Gene is defined as …….
j) A human cell contains long DNA of length – i) 2 m, ii) 2 km, iii) 2 cm, iv) 2 µm

k) Lymphocytes are one of the cell type of _____ (name of tissue), responsible for _____ _____response.

l) Normally, the friction coefficient of any biomaterial in synovial fluid or in vitro medium is _____ than that in dry/ambient environment.

m) Pourbaix diagram is a plot of _____ vs. _____.

n) The staining used for histopathological testing of implant/bone interface is _____

o) MTT is a _____ assay, used to assess the _____ . MTT reacts with. _____ of live cells to form _____ crystals.
p) Stem cells are defined as ----------
q) qRT – PCR means ----------

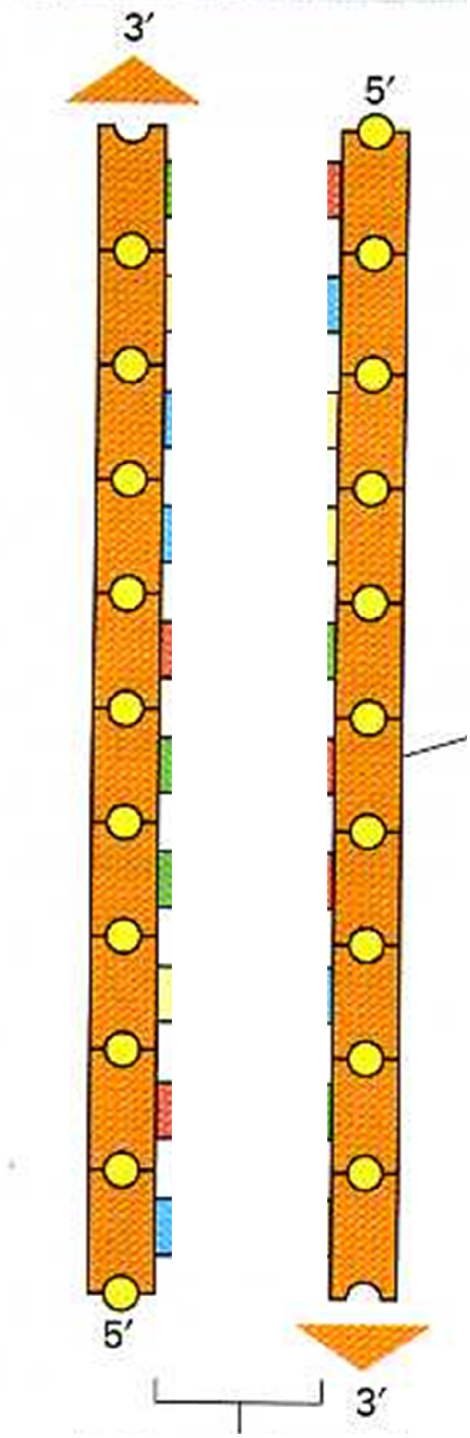
r) Comet assay is used to ----------
s) FACS stands for ----------
t) Annexin – V couples with ----------molecules of ----------
u) An example of housekeeping gene is ----------
v) Higher the Bcl-xL/Bax ratio, ----------will be the cell viability

w) Osteocalcin gene is responsible for ----------
x) A natural bone is defined as ----------composite

y) Collagen has a characteristic ----------structure with a characteristic length scale of ……..
z) While short term implantation tests are carried out for ----------, the long term implantation tests are performed for ----------(maximum test duration)

Q2. Given the nucleotide sequence of Bcl-xL, draw the DNA structure below.

Gene of Interest	Nucleotide sequence (Forward)	Nucleotide sequence (Reverse)
Bcl-xL	CTG GTG GTT GAC TTT CTC TCC	GCT GCT GCA TTG TTC CCA TAG



Q3. Identify the following biological structure/ microstructural features: