1) **Which of the following substances can be recognized by T cells?**

a- Carbohydatres

b- Polysaccharides

c- Peptides

d- Steroids

e- Lipids

2) **Which of the following can influence immunogenicity**

a- < 10 KD are more immunogenic

b- Simple peptides contain more epitopes than complex peptides

c- Protein is poor immunogenic

d- Hapten them selves are not immunogenic

e- Amino acids and steroids are not immunogenic

3) **What is the special character of teolerogen ?**

a- Small antigen can bind to receptor and induce immune response

b- Conjugate with carrier to induce immune response

c- No self antigen can induce immune response

d- Self antigen not stimulate immune response

4) **What is the factors that can`t induce immune response**

a- Chemical nature can affect

b- It must be seen by immune system

c- Can`t be present in accessible site

d- Size > 10 KD

e- The substance is large and capable of binding to a receptor

1	2	3	4
C	D	D	C

What is the cell that responsible for antibody production?

a- T Cells

b- Plasma cells

c- Macrophages

d- Fibroblasts

e- Stem cells

6) **The following are properties of IgA:**

a- Cross the placenta

b- Dimer

c- B cell receptor

e- Activate complement

7) **What are antibodies that expressed on the surface on B cells**

a- Ig M , Ig E

b- IgM , IgA

c- Ig E , IgG

d- IgM, IgD

e- IgD, IgA

8) **How many polypeptide chains present in Antibody structure**

a- 2

b- 4

c- 6

d- 8

e- 10

5	6	7	8
B	B	D	B

9) **Which of the following correctly describe Antibody structure?**

a- Contain 4 identical heavy chains

b- 2 identical heavy chains 1 variable and 1 constant domain

c- Each variable domain contain 6 hypervariable regions

d- Disulfide bond connect heavy chain with light chain

e- There are four types of light chains

10) **What is the function of fragment of Ag binding in Ab structure?**

a- Effector mechanisms

b- Biological functions

c- Mobility of other structure of antibody

d- Antigen recognition and binding

e- Tend to crystallize in solution

11) **Immunoglobulins isotypes are based on differences in the structure of**

a- Light chain variable domains

b- Heavy chain variables domians

c- Fragment of antigen binding

d- Heavy chain c regions

e- Hinge region

12) **Which of the following immunoglobulin has role in mucosal immunity?**

a. Ig M

b. IgA

c. Ig E

d. IgD

e. IgG

9	10	11	12
D	D	D	B

What is the use of polyethylene glycol in vitro?

a- It is ued to fuse B cells with another b cells

b- Used for formation of polycloncal antibodies

c- Ab producing cells can fuse with myeloma cells through it

d- Obtained from blood of immunized host

14) **Which of the following is responsible for biological activity and effector functions in antibodies?**

a- Fab

b- Fc

c- Hinge region

d- Variable domain of heavy chain

e- Constant domain of light chain

15) **All of the following are properties of Fab except:**

a- Contain whole light chain + VH + CH2.

b- 2 in number.

c- Part for Ag recognition.

d- Part for Ag binding.

16) **The following are properties of Fc except:**

a- Tend to crystallize in solution

b- One in number

c- Contain remaining of both light chains C domain

d- Give effector & biological function of antibody

13	14	15	16
C	B	A	C

17) **The following are properties of IgD:**

a) Cross the placenta

b) Dimer

c) B cell receptor

d) Activate complement-

18) **The following are properties of IgE:**

a. Cross the placenta

b. Dimer

c. allergic reactions

d. Activate complement

19) **Monoclonal antibodies are produced by**

a- Biotechnology

b- Hybridoma technology

c- Molecular biology

d- Fermentation biology

20) **What determine the class of immunoglobulin molecule?**

a- Clasas I, II MHC proteins

b- Carbohydrate attach to light chain

c- Antigen

d- Heavy chain type

17	18	19	20
C	C	B	D

Which of the following immunoglobulin is present normally in higher concentration

a- IgG

b- IgM

c- IgA

d- IgE

e- IgD

22) **Which of the following immunoglobulins are present in pentamer manner**

a- IgG

b- IgM

c- IgA

e- IgE

f- IgD

23) **which of the following antigens must be carried by proteins to induce immunogenicity?**

a- immunogen

b- tolerogen

c- any antigen

d- hapten

e- cytokine

21	22	23
A	B	D

WRITTEN QUESTIONS

1) **Define monoclonal antibodies and mention two applications**

2) **Enumerate IgG subclasses and enumerate its functions**

3) **Mention immunoglobulin regions according to proteolytic fragments**

Mention 3 factors the influence immunogenicity

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5) Define haptens and mention the difference with Tolerogen.

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6) About Fragment crystalline region of immunoglobulin , mention the

- **Number:** ……
- **Nomenclature:**……
- **Content:**……
- **Function :**……