

૧. દરેક પ્રશ્નનો [a] અથવા [a(i)] અને [a(ii)] જ લખવાના રહેશે.  
૨. પ્રશ્ન : ૧[a] અથવા ૧[a(i)] અને ૧[a(ii)] તથા ૨[a] અથવા ૨[a(i)] અને ૨[a(ii)] ના 14 માર્ક્સ ના બદલે ૧૮ માર્ક્સ રહેશે.  
૩. પ્રશ્ન : ૩[a] અથવા ૩[a(i)] અને ૩[a(ii)] તથા ૪[a] અથવા ૪[a(i)] અને ૪[a(ii)] ના 14 માર્ક્સ ના બદલે ૧૭ માર્ક્સ રહેશે.  
૪. દરેક પ્રશ્નનો પ્રશ્ન નં ૧(b), પ્રશ્ન નં ૨(b), પ્રશ્ન નં ૩(b) તથા પ્રશ્ન નં ૪(b) (ટુંકા પ્રશ્નો) વિદ્યાર્થીએ લખવાના નથી.

(2) Draw labeled diagram where necessary.

**Q:1 (A)** Explain: Unstability of element as increase in proton number in nucleus. 14

OR

Write on (i) Binding energy and atom formation 07  
(ii) Electromagnetic radiation 07

**(B) Write answer in short (Any four)** 04

- (a) Distinguish between X-Rays and Y-Rays. (d) Name the ore of Uranium.  
(b) Name different isotopes of lead. (e) Define: Elastic Scattering  
(c) Write contribution of Henri Becquerel. (f) What are  $\delta$ - rays?

**Q:2 (A)** Explain: Radiation effects on chromosome with diagram. 14

OR

Write on effects of radiation on : (i) Microorganisms 07  
(ii) Skin and hair 07

**(B) Write answer in short (Any four)** 04

- (a) Which condition causes Dicentric chromosome? (d) What is Osteopenia?  
(b) How much radiation dose is normal to thymus? (e) What is necrosis?  
(c) What effect of radiation on lacuna of bone? (f) What is Cross linkage in DNA?

**Q:3 (A)** Discuss in detail: Structure of an immunoglobulin and antibody mediated effector functions. 14

OR

Write note on : (i) ELISPOT ASSAY 07  
(ii) Classical pathway of complement activation 07

**(B) Write answer in short (Any three)** 03

- (a) What are monoclonal antibodies? (d) What is autoimmunity?  
(b) State two properties of a molecule to be an immunogen. (e) What is haptent?  
(c) Name the lymphocytes involved especially in humoral immunity.

**Q:4 (A)** What are edible vaccines? Discuss their mechanisms, advantages and disadvantages. 14

OR

Write on (i) Erythroblastosis fetalis 07  
(ii) RIST and RAST 07

**(B) Write answer in short (Any three)** 03

- (a) State two characteristics of attenuated vaccines. (c) Name the malaria vaccine.  
(b) Which type of hypersensitivity reactions are cell mediated? (d) Who discovered interferons?  
(e) State two traits of inactivated vaccines.