**Objective Questions on Smart Materials**

**Ques.1.** A substance which can be introduced into a body tissue as part of an implanted medical device or used to replace an organ is called.

1. Polymer (2) Biomaterial (3) Medicine (4) None of these

**Ques.2.** Biomaterials can be derived from.

1. Polymers (2) Ceramics (3) Composite materials (4) All of these

**Ques.3.** Which is not true about biomaterial.

1. It can be natural and synthetic (2) It must be biocompatible to our body

(3) It can undergo chemical reaction with our body tissues (4) Ceramics can be a biomaterial

**Ques.4.** Biomaterials can be used in.

1. Skin repair devices (2) Drug delivery mechanism (3) Artificial heart valve (4) All of these

**Ques.5.** The materials that have the ability to sense external environmental stimuli and respond them in a controlled fashion are called

1. Composite materials (2) Nano materials (3) Smart materials (4) All of these

**Ques.6.** The external stimuli that a smart material can sense are

1. Temperature, Light, stress, magnetic field and electric field, pH, moisture (2) Only magnetic field and electric field (3) Only temperature, magnetic field, pH and stress (4) Only temperature

**Ques.7.** In piezoelectric materials electric charge accumulates by application of

1. Mechanical stress (2) External electric field (3) Change in temperature (4) None of these

**Ques.8.** Piezoelectric effect is used in devices where

1. Chemical energy is to be converted into mechanical energy
2. Mechanical energy is to be converted into chemical energy
3. Mechanical energy is to be converted into electrical energy
4. Electrical energy is to be converted into mechanical energy

**Ques.9.** The world Piezoelectricity means:

1. Electricity resulting from pH (2) Electricity resulting from temperature

(3) Electricity resulting from Magnetic field (4) Electricity resulting from pressure

**Ques.10.** Piezoelectric effect is used in

1. Ultrasonic detectors (2) Gas lighters (3)Microphones (4) All of these

**Ques.11.** Reverse Piezoelectric effect is

(1)Internal generation of electric field by application of pressure

(2) Internal generation of mechanical strain by application of external electric field

(3) Internal generation of mechanical strain by application of temperature

(4)Generation of temporary voltage by application of external electric field

**Ques.12.** Reverse piezoelectric effect is used in devices where

1. Chemical energy is to be converted into mechanical energy
2. Mechanical energy is to be converted into chemical energy
3. Mechanical energy is to be converted into electrical energy
4. Electrical energy is to be converted into mechanical energy

**Ques.13.**Which of them will exhibit piezoelectricity

1. Silk (2) Bone (3) Ceramics (4) All of these

**Ques.14.** Which is not correct about piezoelectricity?

(1)Electric charge is generated by application of mechanical stress

(2) Electrical energy is to be converted into mechanical energy

(3) Piezolecetricity is generated when the static structure of material is deformed

(4) Proteins and DNA are piezoelectric materials

**Ques.15.**  Pyroelectricity is the ability of certain materials to

1. Generation of temporary voltage by application of external electric field
2. Generation of temporary voltage by application of Temperature
3. Generation of temporary voltage by application of mechanical stress
4. Generation of temporary voltage by application of magnetic field

**Ques.16.** Which statement is not correct for pyroelectricity

(1)The change in temperature modifies the position of atoms within crystal structure

(2) Polarization of materials changes by change in temperature

(3) Polarization can be reversed by the application of external magnetic field

(4) Polarization change gives rise to voltage change across crystal

**Ques.17.** Which statement is correct for ferroelectric materials

(1) Spontaneous electric polarization can be reversed by application of an external electric field

(2) Spontaneous electric polarization can be reversed by application of Temperature

(3) All ferroelectrics are not pyroelectrics

(4) Ferroelectric materials must contain iron

**Ques.18.** Which statement is correct

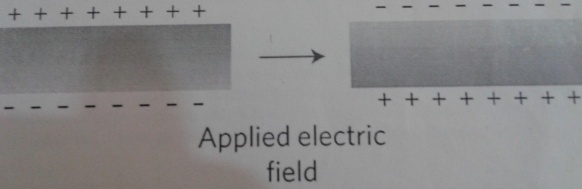
(1) All piezoelectric materials are pyroelectric

(2) All piezoelectric materials are ferroelectric

(3) All pyroelectric materials are ferroelectric

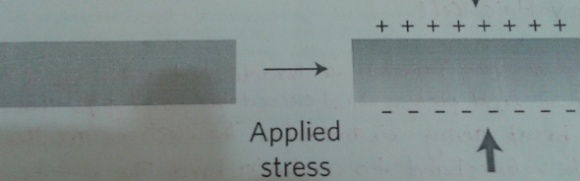
(4) All ferroelectric materials are both pyroelectric and piezoelectric

**Ques.19.** The given figure explains the process of



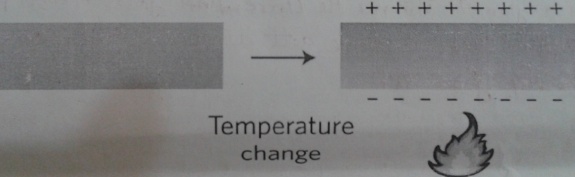
(1) Piezoelectricity (2) Reversepiezoelectricity (3) Pyroelectricity (4) Ferroelectricity

**Ques.20.** The given figure explains the process of



(1) Piezoelectricity (2) Reversepiezoelectricity (3) Pyroelectricity (4) Ferroelectricity

**Ques.19.** The given figure explains the process of



(1) Piezoelectricity (2) Pyroelectricity (3) Reversepiezoelectricity (4) Ferroelectricity

**Ques.22.** Which statement is correct for advanced materials?

1. They are used in high technology applications
2. These materials are of high cost and are less available
3. They are used in information storage devices
4. All of these

**Ques.23.** Photovoltaic cells converts

1. Chemical energy into electrical energy
2. Solar energy into electrical energy
3. Solar energy into mechanical energy
4. Solar energy into magnetic field

**Ques.24.** In photovoltaic cells irradiation of light on p-n junction

1. Generates only electrons
2. Generates only holes
3. Generates both electrons and holes
4. Have no effect

**Answer Key**

**(1) 2**

**(2) 4**

**(3) 3**

**(4) 4**

**(5) 3**

**(6) 1**

**(7) 1**

**(8) 3**

**(9) 4**

**(10) 4**

**(11) 1**

**(12) 3**

**(13) 4**

**(14) 2**

**(15) 2**

**(16) 3**

**(17) 1**

**(18) 4**

**(19) 4**

**(20) 1**

**(21) 2**

**(22) 4**

**(23) 2**

**(24) 3**