SHORT ANSWER QUESTIONS

Q. 1. *What are the essential parts of an electromechanical energy conversion system ?*

Ans. The three essential parts of electromechanical energy conversion system are (*i*) electrical system (*ii*) mechanical system (*iii*) coupling field (electric or magnetic field).

Q. 2. *What is the significance of coenergy ?*

Ans. The coenergy has no physical significance. However, it can be used to derive expressions for force (or torque) developed in an electromagnetic system.

Q. 3. *What are actuators ?*

Ans. The energy conversion devices that are used to produce translational forces are known as actuators. Examples include solenoids, relays and electromagnets.

Q. 4. *How does electromechanical energy conversion take place ?*

Ans. The process of electromechanical energy conversion takes place through the medium of the electric field or magnetic field. Although the various conversion devices operate on similar physical principles, the structures of the devices depend on their function.

Q. 5. *What is the fundamental principle involved in electromechanical energy conversion ?*

Ans. The electromechanical energy conversion is based on the principle of conservation of energy which states that energy can neither be created nor destroyed; it can only be changed from one form to another.

Q. 6. *What are the dimensions of coenergy ?*

Ans. The dimensions of coenergy are the same as that of energy.

Q. 7. *What is the drawback of electric field as a medium for electromechanical energy conversion ?*

Ans. When electric field is used as a medium for electromechanical energy conversion, the amount of force developed is usually very small.

Q. 8. *What is the advantage of magnetic field as a medium for electromechanical energy conversion ?*

Ans. When magnetic field is used as a medium for electromechanical energy conversion, the amount of force developed is very large as compared to the case when electric field is used as the medium.

Q. 9. *Why do we neglect magnetic non-linearity and core losses in electromagnetic energy conversion devices ?*

Ans. Electromagnetic energy conversion devices are built with air gaps in the magnetic circuit to separate the fixed and moving parts. Most of the m.m.f. of the windings is required to overcome the air-gap reluctance. Therefore, we can neglect the reluctance of the iron part of the magnetic circuit. Moreover, the core losses are very small and can be neglected without affecting too much accuracy. However, these effects may be taken into account if required in the design of the device.

Q. 10. *What are the losses that occur during electromechanical energy conversion ?*

Ans. The losses that occur during electromechanical energy conversion are :

(*i*) i^2R losses in the windings.

(*ii*) friction and windage losses.

(*iii*) core losses.

MULTIPLE-CHOICE QUESTIONS

1. The losses that occur during electromechanical energy conversion are converted into.....
   (*i*) heat (*ii*) sound
   (*iii*) light (*iv*) none of above
2. In a linear magnetic circuit, the relation between energy (W_{fld}) and coenergy (W'_{fld}) is.....
   (*i*) $W_{fld} > W'_{fld}$ (*ii*) $W_{fld} = W'_{fld}$
   (*iii*) $W_{fld} < W'_{fld}$ (*iv*) none of above
3. In a non-linear magnetic circuit, the relation between energy (W_{fld}) and coenergy (W'_{fld}) is.....
   (*i*) $W_{fld} = W'_{fld}$ (*ii*) $W_{fld} > W'_{fld}$
   (*iii*) $W_{fld} < W'_{fld}$ (*iv*) none of above
4. .....is the example of singly excited magnetic field system.
   (*i*) Relay
   (*ii*) D.C. shunt motor
   (*iii*) Synchronous motor
   (*iv*) None of above
5. .....is the example of multiply excited magnetic field system.
   (*i*) Relay
   (*ii*) Solenoid
   (*iii*) D.C. shunt motor
   (*iv*) None of above
6. The examples of continuous energy conversion devices are.....
   (*i*) motors and generators
   (*ii*) relays
   (*iii*) solenoids
   (*iv*) none of above
7. For air, the curve between flux linkages (λ) and current (i) is.....
   (*i*) a parabola (*ii*) a hyperbola
   (*iii*) a straight line (*iv*) none of above
8. Electromagnetic energy conversion devices are built with air gaps in the magnetic circuit to.....
   (*i*) increase reluctance of magnetic path
   (*ii*) decrease reluctance of magnetic path
   (*iii*) separate the fixed and moving parts
   (*iv*) none of above.
9. For iron, the curve between flux linkages (λ) and current (i) is.....
   (*i*) linear
   (*ii*) nonlinear but not circle
   (*iii*) circle
   (*iv*) none of above
10. When electric field is used as the medium for electromechanical energy conversion, the force developed is.....
    (*i*) zero (*ii*) very small
    (*iii*) very large (*iv*) none of above

ANSWERS TO MULTIPLE-CHOICE QUESTIONS

1. (*i*)	**2.** (*ii*)	**3.** (*iii*)	**4.** (*i*)	**5.** (*iii*)
6. (*i*)	**7.** (*iii*)	**8.** (*iii*)	**9.** (*ii*)	**10.** (*ii*)