# Diploma in Electrical and Mechanical Engineering

## Term - End Examination

00902

## December, 2011

## BEE-041 : APPLIED ELECTRICAL TECHNOLOGY

*Time : 2 hours* *Maximum Marks : 70*

***Note :*** *Question No.1 is* ***compulsory****. Attempt* ***any four*** *questions from the remaining questions. Assume any missing data, use of* ***scientific*** *calculator is allowed.*

**1.** (a) Select the appropriate answer of the following questions from the given options. **7x1=7**

(i) Which type of transformer is most economical for small current and high voltage ?

(A) Delta-Delta connection

(B) Star-Star connection

(C) Star-Delta connection

(D) Delta-Star connection.

(ii) Which of the following power plant has highest running cost ?

(A) Nuclear plant

(B) Steam plant

(C) Gas plant

(D) Hydro plant

(iii) For a delta - star 3-phase transformer the primary winding has $N_1$ turns/phase and a secondary has $N_2$ turns/phase. The single phone equivalent circuit will have turns ratio :

(A) $\frac{N1}{N2}$ (B) $\frac{N1.\,N2}{\sqrt{3}}$

(C) $\frac{N1.\sqrt{3}}{N2}$ (D) $\frac{N2}{N1}$

(iv) Which of the following has the highest efficiency ?

(A) de shunt motor

(B) Transformer

(C) Induction motor

(D) Synchronous motor

(v) Increased motor resistance in rotor circuit of induction motor is related with :

(A) High starting torque

(B) More speed variation

(C) Low starting torque

(D) None of the above

(vi) Which of the following is an AC motor ?

(A) Slip ring motor

(B) Synchronous motor

(C) Squirrel cage induction

(D) All of the above

(vii) A - 3 phase 4 - wire system is commonly used for :

(A) Primary distribution

(B) Secondary distribution

(C) Primary transmission

(D) Secondary transmission

(b) Indicate *'True'* or *'False'* for the following :

(i) In case of transformers, with increasing frequency copper losses increases. **7x1=7**

(ii) Transformer oil is flammable, 2nd sludging type oil.

(iii) For liquid insulating materials the die electric strength increases with rise in temperature.

(iv) In dc machines, the choice of number of poles directly depends upon the speed and supply frequency.

(v) Extra High Tension cable (E.H.T) is used for operating voltage up to 132 kV

(vi) Polytetra - flouroethylene (PFFE) or Teflon is high resistant to oxidation.

(vii) A gas turbine power plant operates peak load plant.

2. (a) Discuss the cooling in transformer and write function of transformer oil. 7

(b) Explain the specifications of Transformer and write their significance. 7

3. (a) Explain the troubleshooting of transmission line and their remidies. 7

(b) Why earthing is needed ? Explain the different earthing method. 7

4. (a) Explain the stair-case wiring using diagram and draw fluorescent tube connections. 5+5

(b) Write name of the various cables used for internal wiring for domestic purpose. 4

5. (a) Explain the faults in underground cables and causes of failure of underground cables. 7

A overhead line has the following data.

(b) Span length 150 meters, conductor diameter 0.90cm, weight per meter length of conductor 0.65 kg, ultimate stress 4000 kg/cm$^2$, wind pressure 40kg/cm$^2$ of projected area factor of safety5. Calculate the sag. 7

6. Draw the layout of Nuclear Power Plant, write features of nuclear reactor. Discuss function of various components of plant. 14

7. (a) Explain the working principles of hysteresis motor and write its applications. 7

(b) Explain the various components, of overhead transmission lines and Discuss its maintenance. 7

8. Write short notes on ***any two*** of the following : **7x2=14**

(a) Repulsion motor

(b) Different types of Relays

(c) Installation of motors

(d) Phasor groups of 3-phase transformers.