



- l) The distance between the stars of two consecutive coils is measured in terms of coil sides is called  
 (A) Front pitch (B) Winding pitch  
 (C) Commutator pitch (D) Back pitch
- m) The Pole shoes of a DC machine  
 (A) Are always laminated  
 (B) Are never laminated  
 (C) Are sometimes laminated  
 (D) Are partially laminated
- n) Disc windings are primarily used in  
 (A) Short capacity transformers  
 (B) Medium capacity transformers  
 (C) High capacity transformers  
 (D) Any of the above

**Attempt any four questions from Q-2 to Q-8**

- Q-2 Attempt all questions (14)**  
 (a) What are the factors which limit the design of an electrical machine? (07)  
 (b) Determine the main dimensions of the core, the number of turns and the cross-section of the conductor for a 5 kVA, 11000/400 V, 50 Hz, single phase core type distribution transformer. The net conductor are in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for the core. Maximum flux density is 1 Wb/m<sup>2</sup>, current density is 1.4 A/mm<sup>2</sup> and a window space factor is 0.2. The height of window is 3 times its width. (07)
- Q-3 Attempt all questions (14)**  
 (a) Derive the KVA rating of the three phase transformer and show the emf per turn  $E_t = K\sqrt{KVA}$ . (07)  
 (b) Explain conducting and magnetic materials. (07)
- Q-4 Attempt all questions (14)**  
 (a) A design is required for a 50 kW, 4 pole, 600 r.p.m. d.c. shunt generator, the full load terminal voltage being 220 V. If the maximum gap density is 0.83 Wb/m<sup>2</sup> and the armature ampere conductors per metre are 30,000, calculate suitable dimensions of armature core to give a square pole face. Assume that the full load armature voltage drop is 3 per cent of the rated terminal voltage, and that the field current is 1 percent of rated full load current. Ratio of pole arc to pole pitch is 0.67. (07)  
 (b) Define the term: (07)  
 (a) Front pitch (b) Back pitch (c) Commutator pitch (d) Dummy coil (e) Equalizer connection (f) Average pitch (g) Pole pitch
- Q-5 Attempt all questions (14)**  
 (a) Explain the design procedure in the design of field windings for a D.C. shunt machine. (07)  
 (b) Derive the condition for the optimum design of transformer for the minimum cost and minimum losses. (07)



