

**Subject** : Electrical Machines

**Question** : The applied voltage of a certain transformer is increased by 75%, while the frequency of the applied voltage is reduced by 25%. The maximum core flux density will

- (A) Increase by  $7/3$  times
- (B) Increase by three times
- (C) Reduce to one quarter
- (D) Remain the same

**Answer** : Flux density is directly proportional to the  $V/F$  ratio. Here, the voltage is 1.75 times the previous magnitude and frequency is 0.75 times the previous frequency.

Hence, the  $V/F = 1.75 / 0.75 = 7/3$

So, the maximum core flux density will **increase by  $7/3$  times**.

**Question** : A 200/100V, 50 Hz transformer is to be excited at 40 Hz from the 100V side. For the exciting current to remain the same, the applied voltage should be

- (A) 150 V
- (B) 125 V
- (C) 100 V
- (D) 80 V

**Answer** : To maintain a constant excitation current, the  $V/F$  ratio of transformer should be maintained constantly at any condition. In the first case, the value of  $V/F$  is  $100/50=2$ . Hence, the value of  $V/F$  in the second case is 2. Therefore,  $V=2*40$ . This implies that the voltage magnitude must be **80V** for the same excitation current.