



## DPP – 3 (Alternating Current)

Video Solution on Website:-

<https://physicsaholics.com/home/courseDetails/44>

Video Solution on YouTube:-

<https://youtu.be/ZE0CIAePdkU>

Written Solution on Website:-

<https://physicsaholics.com/note/notesDetailis/57>

- Q 1. An ideal step-up transformer's primary coil has 500 turns and its secondary coil has 15,000 turns. The primary EMF is 120 V. What is the EMF of the secondary?  
(a) 5800 V (b) 3600 V  
(c) 2600 V (d) 4600 V
- Q 2. A step-down transformer has 12500 turns on its primary and 125 turns on its secondary. The current in the secondary is 36 A. What current flows in the primary?  
(a) 0.36 A (b) 0.6 A  
(c) 0.9 A (d) 1.2 A
- Q 3. A transformer is employed to \_\_\_\_\_.  
(a) Convert A.C. into D.C. (b) Convert D.C. into A.C.  
(c) Obtain a suitable A.C. voltage (d) None of these
- Q 4. Eddy currents are produced when  
(a) A metal is kept in varying magnetic field  
(b) A metal is kept in the steady magnetic field  
(c) A circular coil is placed in a magnetic field  
(d) Through a circular coil, current is passed
- Q 5. The armature of dc motor has  $20\ \Omega$  resistance. It draws current of 1.5 ampere when run by 220 volts dc supply. The value of back e.m.f. induced in it will be  
(a) 150 V (b) 170 V  
(c) 180 V (d) 190 V
- Q 6. If in a transformer the number of turns of primary coil and secondary coil are 500 and 400 respectively and 240 V is applied to primary coil, then the ratio of current in primary and secondary coil is  
(a) 4 : 5 (b) 5 : 4  
(c) 5 : 10 (d) 8 : 12
- Q 7. Which type of transformer is there in a power station ?  
(a) Step-Up (b) Step-Down  
(c) Any of above (d) None of these
- Q 8. An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac input is 28 V. The r.m.s. secondary voltage is nearest to:  
(a) 70 V (b) 50 V



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# **Written Solution**

**DPP-3 AC : Transformer**

**By Physicsaholics Team**

Q.1) An ideal step-up transformer's primary coil has 500 turns and its secondary coil has 15,000 turns. The primary EMF is 120 V. What is the EMF of the secondary?

(a) 5800 V

(b) 3600 V

(c) 2600 V

(d) 4600 V

$$\frac{V_1}{V_2} = \frac{N_1}{N_2} \Rightarrow \frac{120}{V_2} = \frac{500}{15000}$$
$$V_2 = 3600 \text{ V}$$

Q.2) A step-down ideal transformer has 12500 turns on its primary and 125 turns on its secondary. The current in the secondary is 36 A. What current flows in the primary?

~~(a) 0.36 A~~

(c) 0.9 A

(b) 0.6 A

(d) 1.2 A

$$P_{in} = P_o$$

$$V_{in} I_{in} = V_o I_o$$

$$\Rightarrow \frac{I_{in}}{I_o} = \frac{V_o}{V_{in}} = \frac{N_2}{N_1}$$

$$\frac{I_{in}}{36} = \frac{125}{12500}$$

$$I_{in} = 36 A$$

Q.3) A transformer is employed to \_\_\_\_\_.

(a) Convert A.C. into D.C.  
(c) Obtain a suitable A.C. voltage

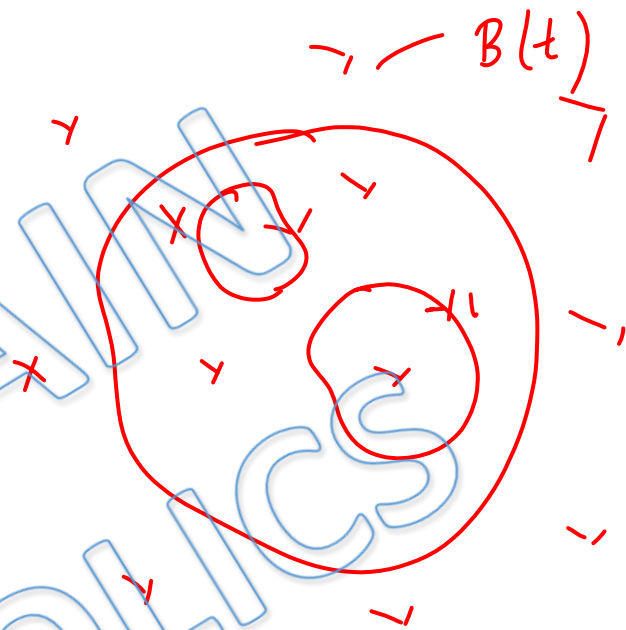
(b) Convert D.C. into A.C.  
(d) None of these

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Q.4) Eddy currents are produced when

- (a) A metal is kept in varying magnetic field
- (b) A metal is kept in the steady magnetic field
- (c) A circular coil is placed in a magnetic field
- (d) Through a circular coil, current is passed





Q.5) The armature of dc motor has  $20 \Omega$  resistance. It draws current of  $1.5$  ampere when run by 220 volts dc supply. The value of back e.m.f. induced in it will be

(a) 150 V

(b) 170 V

(c) 180 V

(d) 190 V

$$20 \times 1.5 = \underline{\underline{30V}}$$

$$220 - \mathcal{E} = 30$$

$$\underline{\underline{\mathcal{E} = 190V}}$$

Q.6) If in a transformer the number of turns of primary coil and secondary coil are 500 and 400 respectively and 240 V is applied to primary coil, then the ratio of current in primary and secondary coil is

- (a) 4 : 5  
 (c) 5 : 10

- (b) 5 : 4  
 (d) 8 : 12

$$\frac{V_{1h}}{V_0} = \frac{N_1}{N_2} = \frac{l_0}{l_{1h}}$$

$$\frac{l_{1h}}{l_0} = \frac{N_2}{N_1} = \frac{400}{500}$$

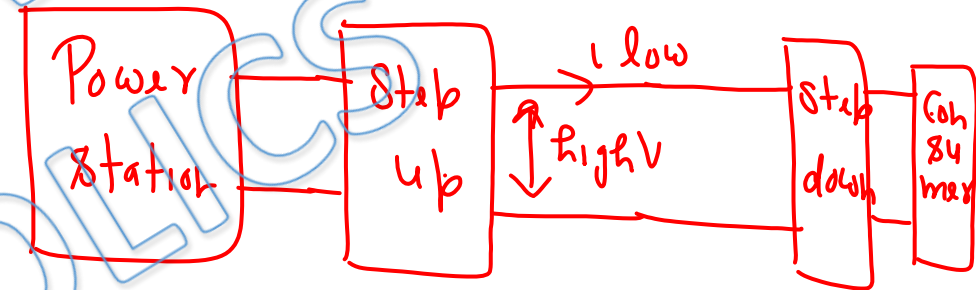
Q.7) Which type of transformer is there in a power station ?

~~(a) Step-Up~~

(c) Any of above

(b) Step-Down

(d) None of these



Q.8) An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac input is 28 V. The r.m.s. secondary voltage is nearest to:

$$\downarrow \\ V_{\text{rms}} = \frac{28}{\sqrt{2}} \text{ V}$$

(a) 70 V

~~(b) 50 V~~

(c) 38 V

(d) 44 V

$$\frac{V_{\text{in}}}{V_0} = \frac{N_1}{N_2}$$
$$\frac{28}{\sqrt{2} V_0} = \frac{100}{250}$$

$$V_0 = \frac{70}{\sqrt{2}} = \underline{50 \text{ V}}$$

Q.9) The efficiency of a transformer is 98%. The primary voltage and current are 200V and 6A. If the secondary voltage is 100V, the secondary current is :

~~(a) 11.76 A~~

(c) 3.06 A

(b) 12.25 A

(d) 2.94 A

$$\eta = \frac{V_0 I_0}{V_{in} I_{in}} \times 100$$

$$98 = \frac{100}{200} \times \frac{I_0}{6} \times 100$$

$$I_0 = \frac{98 \times 12}{100} \\ = 11.76 \text{ A}$$

Q.10) A power transformer is used to step up an alternating e.m.f. of 220 V to 11 kV to transmit 4.4 kW of power. If the primary coil has 1000 turns, what is the current rating of the secondary ? Assume 100% efficiency for the transformer

(a) 4 A

(c) 0.04 A

~~(b) 0.4 A~~

(d) 0.2 A



$$P_{out} = V_o i_o$$

$$4.4 \text{ K} = 11 \text{ K} i_o$$

$$i_o = 4 \text{ A.}$$

Q.11) If a transformer develops 400V in secondary coil for an input of 200V A.C, then the current in the transformer is :

(a) Stepped up

(b) Stepped down

(c) Same

(d) Same but with reversed direction



Q.12) In a step up transformer, primary power is 500 W and output voltage is 100V. If the current in the primary is 1A. What is the primary voltage ?

(a) 100 V

(b) 200 V

(c) 500 V

(d) 650 V

$$P_{in} = V_{in} I_{in}$$
$$500 = V_{in} \times 1$$

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Q.13) A transformer is employed to reduce 220 V to 11 V. The primary draws a current of 5 A and the secondary 90 A. The efficiency of the transformer is

(a) 10 %

(b) 50 %

(c) 75 %

(d) 90 %

$$\eta = \frac{V_0 I_0}{V_1 I_1} \times 100$$

$$= \frac{11 \times 90}{220 \times 5} \times 100$$

$$= 90$$

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