Alternating Current Fill Blanks

Here are the answers (key) for the fill-in-the-blanks questions on Alternating Current:

1. The peak value of an alternating current is I_0 (current).
2. The root mean square (RMS) value of AC is **$1/\sqrt{2}$** of the peak value.
3. The unit of frequency is **hertz (Hz)**.
4. The angular frequency of an alternating current is represented as **$\omega = 2\pi f$**.
5. The phase difference between current and voltage in a purely resistive circuit is **0** degrees.
6. The voltage across a capacitor leads the current by **90** degrees.
7. The impedance of an AC circuit is given by the formula **$Z = \sqrt{R^2 + (X\_L - X\_C)^2}$**.
8. In a series LCR circuit, resonance occurs when the reactance of the inductor is equal to the reactance of the **capacitor**.
9. At resonance, the impedance of a series LCR circuit is equal to **R (resistance)**.
10. The power factor of an AC circuit is defined as the ratio of **real power** to the apparent power.
11. The average power consumed in an AC circuit is given by **P = Vrms * Irms * cos(φ)**.
12. The power factor of a purely resistive circuit is **1**.
13. The power factor of a purely inductive or capacitive circuit is **0**.
14. In a transformer, the primary and secondary coils are connected in **magnetic coupling**.
15. The efficiency of a transformer is given by the ratio of **output power** to the input power.
16. The voltage across the secondary coil of a transformer is proportional to the **turns ratio (N_2/N_1)**.
17. In an ideal transformer, the power output is **equal to** the power input.
18. The energy losses in a transformer are mainly due to **eddy currents** and **hysteresis**.
19. The RMS value of voltage is related to the peak voltage by **V_rms = $V_0/\sqrt{2}$**.
20. The resonant frequency of a series LCR circuit is given by **$f_0 = 1/(2\pi\sqrt{LC})$**.
21. The instantaneous value of an alternating current is given by the equation **$I = I_0 \sin(\omega t)$**.
22. The phase difference between voltage and current in a purely inductive circuit is **+90** degrees.
23. The phase difference between voltage and current in a purely capacitive circuit is **-90** degrees.
24. The average value of a sinusoidal alternating current over one complete cycle is **0**.
25. In a parallel LCR circuit, the admittance is the reciprocal of **impedance (Z)**.
26. The quality factor of a series resonant circuit is given by the ratio of **ωL** to resistance.
27. The current in a purely inductive circuit is given by **$I = V_0/\omega L$**.
28. In a step-up transformer, the output voltage is **higher** than the input voltage.
29. The efficiency of an ideal transformer is **100%**.
30. The symbol for a capacitor in an AC circuit diagram is **two parallel lines (| |)**.

These answers follow standard principles of AC theory and transformers covered in the Class 12 NCERT Physics textbook.