

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION-2022

B.Tech- II Semester (ECE)

COURSE CODE (CREDITS): 18B11EC211 (4)

MAX. MARKS: 35

COURSE NAME: Electrical Science

COURSE INSTRUCTORS: Lt. Pragya Gupta

MAX. TIME: 2 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. Explain the construction and working of single phase Induction motor with the diagram. [2+2+3]

Q2. State the principle of operation of a transformer. What is the purpose of conducting open circuit and short circuit tests in transformers? A 1100/400 V, 50 Hz single phase transformer has 100 turns on the secondary winding. Calculate the number of turns on its primary. [2+3+2]

Q3. A circuit is composed of a resistance of 8Ω and a capacitive reactance of 6Ω in series. A voltage, $v = 141.4 \sin(314t)$ V is applied to the circuit.

(a) Find the complex impedance and draw the impedance triangle.

(b) Determine the rms and instantaneous values of the current.

(c) Calculate the power delivered to the circuit.

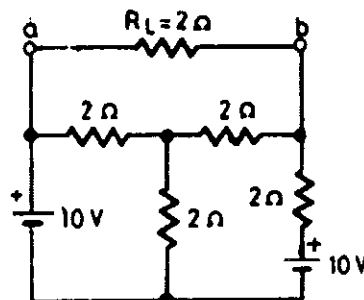
(d) Find the equation for the voltage appearing across the capacitor.

(e) Find the value of the capacitance.

[2+2+1+1+1]

Q4. Solve the load current, by applying Norton's theorem.

[7]



Q5. An inductor coil has an inductance of 15 H and a resistance of 10Ω . It is suddenly connected to a dc supply of 20 V. Calculate (a) the time constant of the circuit, (b) the initial rate of change of current, (c) the current after 2 seconds, (d) the rate of change of current after 2 seconds, and (e) the energy stored in the magnetic field in 2 seconds. [2+1+1+1+2]