

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH
BRANCH: CIVIL/CHEM/CHEM P & P/BT/MECH/PE

SEMESTER : I
SESSION : MO/19

SUBJECT: EE101 BASICS OF ELECTRICAL ENGINEERING

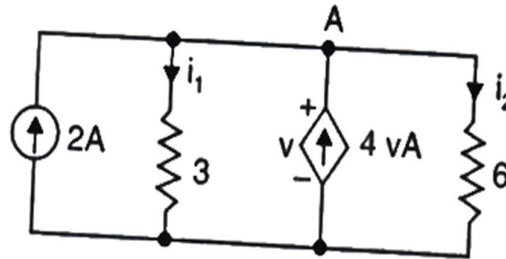
TIME: 3.00Hrs.

FULL MARKS: 50

INSTRUCTIONS:

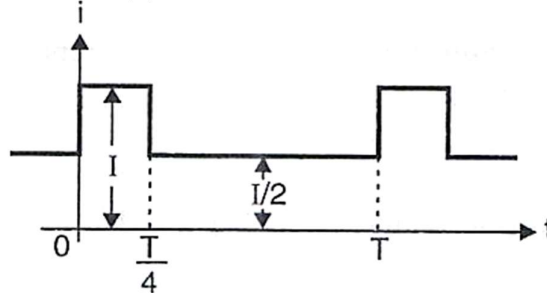
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Find the value of v , i_1 and i_2 in the circuit, resistance values are in ohm. [5]



Q.1(b) A circular iron ring has a mean circumference of 1.5 m and a cross-sectional area of 0.01m^2 . A saw-cut of 4 mm wide is made in the ring. Calculate the magnetizing current required to produce a flux of 0.8 mWb in the air gap if the ring is wound with a coil of 175 turns. Assume relative permeability of iron as 400 and leakage factor of 1.25. [5]

Q.2(a) Determine (i) the average value and (ii) r.m.s. value of the current waveform. [5]

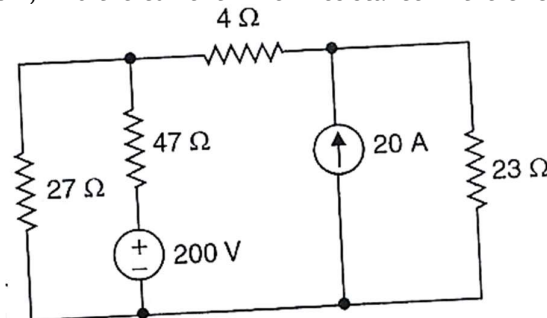


Q.2(b) A coil of resistance $50\ \Omega$ and inductance 318 mH is connected in parallel with a circuit consisting of a $75\ \Omega$ resistance in series with a $159\ \mu\text{F}$ capacitor. The circuit is connected to a 230 V, 50 Hz supply. Determine the supply current and circuit power factor. [5]

Q.3(a) Three similar coils, connected in star, take a total power of 1.5 kW at a p.f. of 0.2 lagging from a 3-phase 400 V, 50 Hz supply. Calculate (i) the resistance and inductance of each coils and (ii) the line current if one of the coils is short circuited. [5]

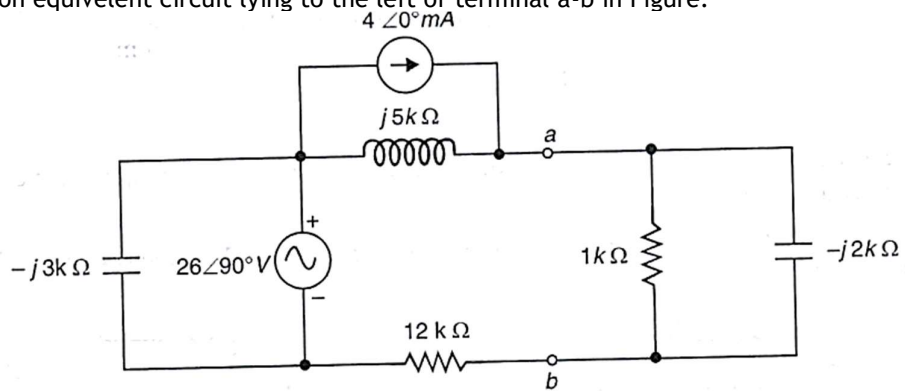
Q.3(b) A 3-phase motor load has a p.f. of 0.397 lagging. Two wattmeters connected to measure power show the input as 30 kW. Find the reading on each wattmeter. [5]

Q.4(a) Using superposition theorem, find the current in $23\ \Omega$ resistance in the circuit shown. [5]



Q.4(b) Find the Norton equivalent circuit lying to the left of terminal a-b in Figure.

[5]



Q.5(a) Describe any two type of digital voltmeter.

[5]

Q.5(b) working principle of induction type wattmeter

[5]

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