



COLLEGE OF ENGINEERING, PUNE
(An Autonomous Institute of Government of Maharashtra.)

END Semester Examination

Programme: F.Y. B.Tech.

Course Code: EE 19002

Branch: M-Group

Duration: 3 Hours

Student PRN No.

Instructions:

Semester: I

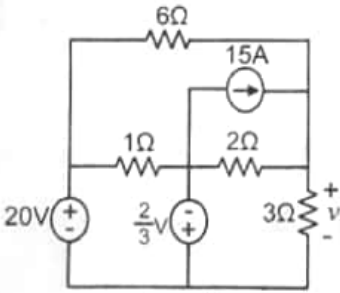
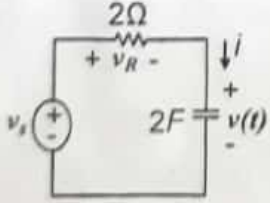
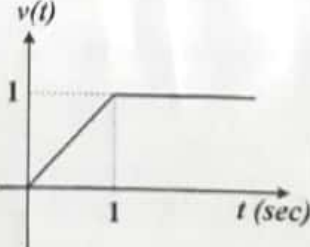
Course Name: Basic Electrical Engineering

Academic Year: 2019-20

Max Marks: 60

1 1 1 9 1 1 0 0 4

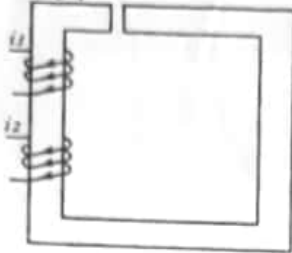
1. Figures to the right indicate the full marks.
2. All questions must be attempted sequentially 1 to 5. Sub-questions of each question must be attempted at one place.
3. Mobile phones and programmable calculators are strictly prohibited.
4. Writing anything on question paper is not allowed.
5. Exchange/Sharing of stationery, calculator etc. not allowed.
6. Write your PRN Number on Question Paper.

			Marks	CO
Q1	A	<p>For the circuit given in Figure-1A, (a) Find the portion of v that is due to 20 V voltage source. (b) Find the portion of v that is due to $\frac{2}{3}$ V voltage source. (c) Find the portion of v that is due to 15 A current source. (d) Find v by using principle of superposition.</p>  <p>Figure-1A</p>	06	1
Q1	B	<p>For the circuit and voltage $v(t)$ as shown in Figure-1B, sketch (a) $i(t)$, (b) energy stored in capacitor ($w_c(t)$), (c) Power $p_R(t)$, (d) $v_R(t)$ and (e) $v_s(t)$.</p> $v(t) = \begin{cases} 0 \text{ V} & \text{for } t \leq 0 \text{ sec} \\ t \text{ V} & \text{for } 0 \leq t \leq 1 \text{ sec} \\ 1 \text{ V} & \text{for } t > 1 \text{ sec} \end{cases}$   <p>Figure-1B</p>	06	1
Q2	A	<p>Three phase star-connected load when supplied from 400 V, 50 Hz, source takes a line current of 10 A at 66.86° lagging w.r.t. its line voltage. Calculate (a) impedance parameters. (b) power factor and (c) active power consumed.</p>	06	1



COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)

Q 2	B	A capacitor of $50 \mu\text{F}$ is connected in parallel with a coil that has a resistance of 20Ω and inductance of 0.05 H . If this parallel combination is connected across 200 V , 50 Hz supply, calculate (a) the line current, (b) power factor and (c) power consumed.	06	1
Q 3	A	An electromagnet having area of cross-section of core 12 cm^2 . It has mean length of magnetic path of 50 cm and air gap of 0.4 cm cut in it. It is excited by two separate coil each having 500 turns when the current in the coils is 1 Amp . The resultant flux density gives relative permeability of 1300 . Calculate the flux in the air gap. 	06	1
Figure-3A				
Q 3	B	A 5 kVA , $400/200 \text{ V}$, single phase transformer has its maximum efficiency of 93% at 90% of its rated output at unity power factor. Estimate its efficiency when delivering full load output at 0.8 lagging power factor.	06	1,2
Q 4	A	Draw equivalent circuit diagram of series, shunt and compound DC motor and write the equations relating voltage and current of each type. Also specify two applications of DC Series Motor and DC Shunt Motor.	04	1,2
Q 4	B	Explain the step down converter with appropriate circuit diagram and suitable waveforms.	04	2
Q 4	C	Draw neat diagram and suitable waveforms of single phase inverter and explain it.	04	2
Q 5	A	Two coils having 150 and 200 turns respectively are wound side by side on a close magnetic circuit of cross-section $1.5 \times 10^{-2} \text{ m}^2$ and mean length of 3 m . the relative permeability of the magnetic circuit is 2000 . Calculate (a) the mutual inductance between the coil. (b) the voltage induced in the second coil if the current changes from 0 to 10 A in the first coil in 20 msec .	03	1
Q 5	B	Draw neat and systematic diagram of 3 phase Induction Motor showing all parts in it. Explain its construction and types.	03	2
Q 5	C	With the help of neat diagram, explain the working of compact fluorescent lamp.	03	3
Q 5	D	The following are the details of load on a circuit connected through a supply meter: (i) six lamps of 40 W each working for four hours a day (ii) two fluorescent tubes 125 W each working for 2 hours per day (iii) one 1000 W heater working for 3 hours per day If each unit of energy costs ₹ 2.85 , what will be the electricity bill for the month of June?	03	3