COLLEGE OF ENGINEERING & TECHNOLOGY,
SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING **SET-D**

Cycle Test – II -Answer key

Academic Year: 2021-2022 (EVEN SEM)
Program offered: B.Tech
Year / Sem : I/II
Course Code and Title: 18EES101J/ BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
Maximum Marks: 50

Learning Assessment (CLA 1)			
Levels	**Level of Thinking**	**Weightage Required (%)**	**Weightage Provided(%)**
1	Remember Understand	40%	36%
2	Apply Analyze Create	60%	64%

PART A
(**Answer all the questions**) **10x1 MARK=10 MARKS**

Q. No.	Questions	Reference to CO	Reference to PO	Bloom's Taxonomy	Marks Allotted	Marks Scored
1.	If current in a conductor increases then according to Lenz's law self-induced voltage will o aid the increasing current o tend to decrease the amount of current o **produce current opposite to the increasing current** o aid the applied voltage	CO2	1	Understand	1	
2.	The power factor of an AC circuit is equal to o **Cosine of the phase angle** o Sine of the phase angle o Unity for a resistive circuit o Unity for a reactive circuit	CO2	1,2	Understand	1	
3.	The function of pole shoes in the case of D.C. machine is o To reduce the reluctance of the magnetic path o To spread out the flux to achieve uniform flux density o To support the field coil o **To discharge all the above functions**	CO2	1,2	Understand	1	
4.	What is the working principle of a Transformer? o Transformer works on the principle of self-induction o **Transformer works on the principle of mutual induction** o Transformer works on the principle of ampere law o Transformer works on the principle of coulomb law	CO2	1,2	Understand	1	
5.	The current drawn by the armature of DC motor is directly proportional to _____ o **Torque** o Speed o The voltage across the terminals o Cannot be determined	CO2	1,2	Understand	1	
6.	The type of wiring that is highly suitable for a temporary shed is o **Cleat wiring** o Wooden capping and casing wiring o Lead sheathed wiring	CO3	1,2	Understand	1	

	○ Conduit wiring					
7.	..... damping method is common in moving coil instruments ○ **Eddy current** ○ Fluid ○ Spring ○ Air	CO3	1,2	Understand	1	
8.	As the temperature of a semiconductor increases its ○ **Conductivity increases** ○ Resistivity increases ○ Atomic number decreases ○ Temperature co-efficient becomes zero	CO3	1,2	Understand	1	
9.	In a C-E configuration, an emitter resistor is used for: ○ **Stabilization** ○ ac signal bypass ○ collector bias ○ higher gain	CO3	1,2	Understand	1	
10.	Which of the following can be used in series with a Zener diode so that combination has almost zero temperature co-efficient? ○ **Diode** ○ Resistor ○ Transistor ○ MOSFET	CO3	1	Understand	1	

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Date : 03-06-2022
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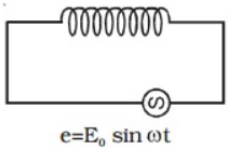
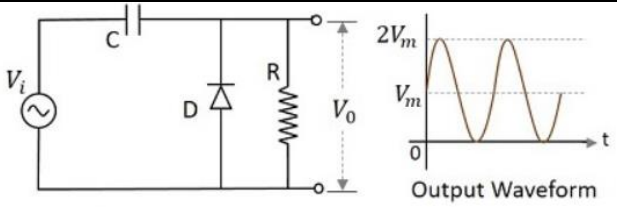
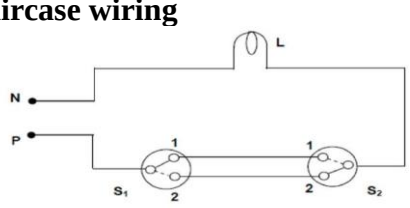
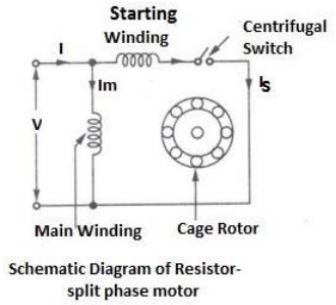
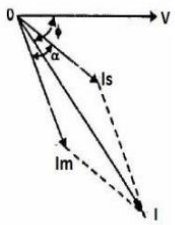
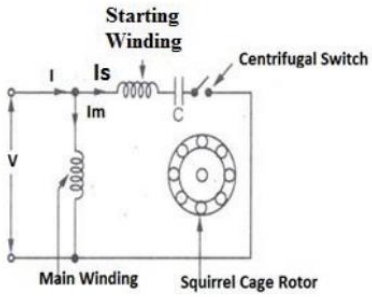
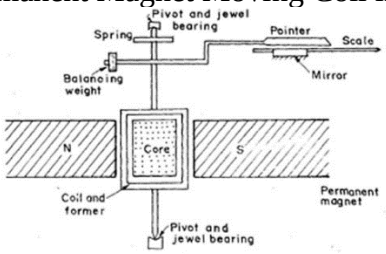
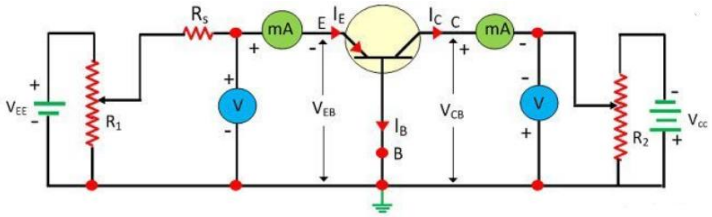
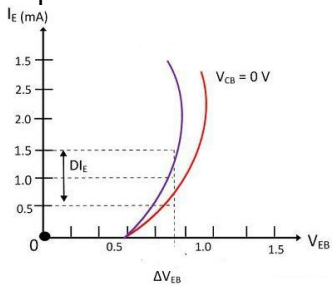
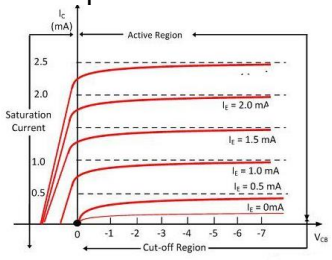
PART B(Answer all the questions) **4x4 MARKS=16 MARKS**

Q. No.	Questions	Reference to CO	Reference to PO	Blooms Taxonomy	Marks Allotted	Marks Scored
11.	**Derive the average and RMS value of sinusoidal AC waveform.** Average value of AC waveform $I_{av} = \frac{1}{\pi}\int_0^{\pi} I_m sin\theta \, d\theta$ $\quad \underline{I_{av} = \frac{2}{\pi} I_m = 0.637 I_m}$ RMS value of AC waveform $I_{rms} = \sqrt{\left(\frac{1}{2\pi}\int_0^{2\pi} I_m^2 sin^2\theta \, d\theta\right)}$ $I_{rms} = \sqrt{\frac{I_m^2}{2}} = 0.707 I_m$	CO2	1,2	Apply	4	
12.	**Obtain the expression for the current through the pure inductor, with the voltage across it is V = V_m Sinωt**  $e=E_o \sin \omega t$ $i = \frac{E_o}{L}\int \sin \omega t \, dt$ $= \frac{E_o}{L}\left[-\frac{\cos \omega t}{\omega}\right] = -\frac{E_o \cos \omega t}{\omega L}$ $i = \frac{E_o}{\omega L} \sin(\omega t - \frac{\pi}{2})$ $i = I_o . \sin(\omega t - \frac{\pi}{2})$ where $I_o = \frac{E_o}{\omega L}$ Phasor Diagram  	CO2	1	Apply	4	
13.	**Outline the operation of Clamper circuit along with circuit diagram** A Clamper circuit can be defined as the circuit that consists of a diode, a resistor and a capacitor that shifts the waveform to a desired DC level without changing the actual appearance of the applied signal.	CO3	1	Understand	4	

						
14.	**Using circuit diagram, Demonstrate the working of staircase wiring**  Position of switch S_1 / Position of switch S_2 / Condition of lamp 1 / 1 / ON 1 / 2 / OFF 2 / 1 / OFF 2 / 2 / ON	CO3	1	Understand	4	

PART C(Answer all the questions) **2x12 MARKS=24 MARKS**

Q. No.	Questions	Reference to CO	Reference to PO	Blooms Taxonomy	Marks Allotted	Marks Scored
15. a	Develop a circuit to make the single-phase AC induction motor self-starting with phasor diagram. Types • Split phase motors The stator of a split-phase induction motor is provided with an auxiliary or starting winding S in addition to the main or running winding M. The starting winding is located 90° electrical from the main winding and operates only during the brief period when the motor starts up. The two windings are so designed that the starting winding S has a high resistance and relatively small reactance while the main winding M has relatively low resistance and large reactance  Schematic Diagram of Resistor-split phase motor  • Capacitor start and run motors  (or)	CO2	1,2	Apply	12	
15. b	A ferromagnetic core with mean path length is 40cm. Cross sectional area of the core is 12cm^2, the relative	CO2	1,2	Apply	12	

	permeability of the core is 4000, and the coil of wire on the core has 400 turns. There is a small gap of 0.05cm in the structure of the otherwise whole core. Assume that fringing effect is neglected. Utilize the above values and Find (a) The total reluctance of the flux path (iron plus air gap). (b) The current required to produce a flux density of 0.5T in the air gap. $R_1 = \frac{40 \times 10^{-2}}{4000 \times 4\pi \times 10^{-7} \times 12 \times 10^{-4}} = 66314.5596 \ \ At/Wb$ $R_2 = \frac{0.05 \times 10^{-2}}{1 \times 4\pi \times 10^{-7} \times 12 \times 10^{-4}} = 331572.7981 \ \ At/Wb$ The two reluctances are connected in series $R_{total} = R_1 + R_2 = 397887.3577$ At/Wb ## $\Phi = B \times A_g = 0.5 \times 12 \times 10^{-4} = 6 \times 10^{-4}$ Wb $N \times I = \Phi \times R_{total} = 6 \times 10^{-4} \times 397887.3577 = 238.7324$ At $I = 238.7324 / 400 = 0.5968$ A					
16. a	With neat sketch, Explain the working principle of Permanent Magnet Moving Coil instrument.  A light rectangular coil wound on an aluminum frame is pivoted within the air gaps between the two poles of a permanent magnet and a cylindrical soft iron core. This light rectangular coil carries the current to be measured. Soft iron core provides formation of uniform magnetic field. The aluminum frame supports the coil as well as provides eddy current damping. Two phosphor bronze springs coiled in opposite directions serve as leads for the current in the coil. The springs also provide controlling torque. (or)	CO3	1,2	Apply	12	
16. b	Describe the operation of Common Base configuration of BJT with necessary circuit diagram and characteristics.  Input Characteristics  Output Characteristics 	CO3	1,2	Apply	12	