

**Common to EEE, ECE, Mechanical, Mechatronics and CSE**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

**ANSWER KEY** Academic Year: 2021-22 (EVEN)

**SET-B**
**Test: CLAT-2**
**Date: 03/06/2022**
**Course Code & Title:** 18EES101J – Basic Electrical and Electronics Engineering

**Duration:** 100 Mins

**Year & Sem:** I & II – Prepared By :Dr.S.Shanmugapriya

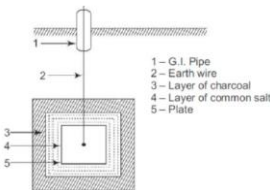
**Max. Marks:** 50

**Course Articulation Matrix:**

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H	M	L	L	M	-	M	M	M	M	-	M	-	-	-
CO2	H	M	L	L	M	-	M	M	M	M	-	M	-	-	-
CO3	H	-	L	L	M	-	M	M	M	M	-	M	-	-	-
CO4	H	-	L	M	M	-	M	M	M	M	-	M	-	-	-
CO5	H	M	M	M	M	-	M	M	M	M	-	M	-	-	-
CO6	-	-	L	2	M	-	M	M	M	M	-	M	-	-	-

**Part - A**  
**(10 x 1 Marks = 10 Marks)**

Q. No	Answer all the questions	Marks	BL	CO	PO	PI Code
1	The maximum positive or negative value of an alternating quantity is termed as <b><u>O Amplitude</u></b>	1	1	2	1,2	
2	In a circuit with purely inductance <b><u>O Current lags the voltage by 90 degree</u></b>	1	1	2	1,2	
3	----- is the source of producing the magnetic flux in a magnetic circuit. <b><u>O Magneto Motive Force</u></b>	1	1	2	1,2	
4	In D.C generator lamination of core material are generally made up of <b><u>O Silicon Steel</u></b>	1	1	2	1,2	
5	The interaction of armature flux with field flux is called as <b><u>O armature reaction</u></b>	1	1	2	1,2	
6	Zener diode is generally used in <b><u>O Voltage regulators</u></b>	1	1	3	1,2	
7	Moving Iron instruments can be used for the	1	1	3	1,2	

	measurement of <b><u>O Both AC and DC</u></b>					
8	The transformer ratings are usually expressed in terms of <b><u>O KVA</u></b>	1	1	3	1,2	
9	In a BJT, <b><u>O Emitter current – Base Current = Collector Current</u></b>	1	1	3	1,2	
10	A circuit with predetermined DC level is added to output voltage is called <b><u>O Clamper</u></b>	1	1	3	1,2	
<b>Part - B</b> <b>(4 x 4 Marks = 16 Marks)</b>						
11	Calculate Average value of sinusoidal waveform. $\text{Area of the curve} = \int_0^{\pi} I_m \sin \theta d\theta = I_m (-\cos \theta)_0^{\pi}$ $= I_m (1+1) = 2 I_m$ $I_{av} = \frac{2 I_m}{\pi} = 0.6366 I_m \text{ -----} \rightarrow \quad (4 \text{ Marks})$	4	1	2	1,2	
12	Why the single phase induction motor is not self starting and how to start the motor? Single Phase winding –alternating flux is developed. No RMF .It is achieved by using two windings, main winding and starting winding .	4	2	2	1,2	
13	Earthing - plate earthing - neat sketch . The process of connecting metallic bodies of all the electrical apparatus and equipment to huge mass of earth by a wire having negligible resistance is called Earthing.  In plate Earthing system, a plate made up of either copper with dimensions 60cm x 60cm x 3.18mm (i.e. 2ft x 2ft x 1/8 in) or galvanized iron (GI) of dimensions 60cm x 60cm x 6.35 mm (2ft x 2ft x 1/4 in) is buried vertical in the earth (earth pit) which should not be less than 3m (10ft) from the ground level. 	4	1	3	1,2	
14	What is Clamper? Explain positive clamper with suitable circuit. <b>Positive clamper:</b> Consider the clamper circuit shown in Fig. A sine wave with maximum amplitude of 10 V is given as the input to the network. During the negative half cycle, the diode conducts, i.e. it acts like a short circuit. The capacitor charges to 10 V volts. During this interval, the output which is taken across the short circuit will be $V_o = 0$	4	2	3	1,2	

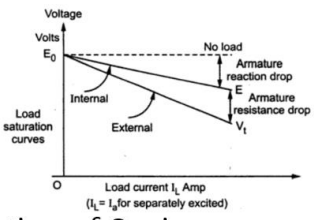
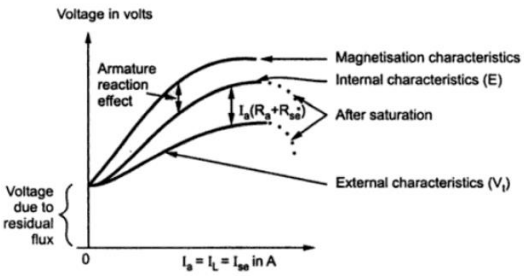
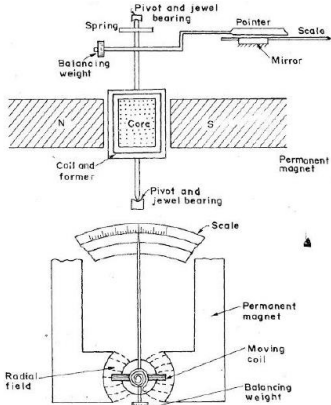
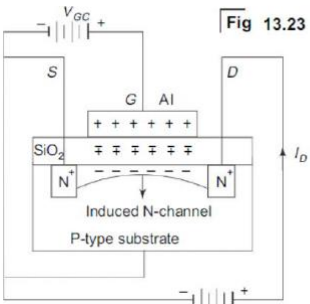
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**Part – B**  
(2 x 12 Marks = 24 Marks)

15(a) )	<p>Given <math>N_1 = 250</math>; <math>I_1 = 2</math> A; <math>\phi_1 = 0.3 \times 10^{-3}</math> Wb.; <math>dI_1 = 2</math> A ; <math>dt_1 = 2</math> m sec; <math>e_2 = 63.75</math> V; <math>k = 0.75</math></p> $L_1 = N_1 \frac{d\phi}{dI} = 250 \times \frac{0.3 \times 10^{-3}}{2} = 0.0375 \text{ H}$ <p>( 2 M)</p> $e_2 = M \frac{dI_1}{dt_1} = M \times \frac{2}{0.002} = 63.75 \text{ v}$ <p><math>M = 63.75 \text{ mH}</math> ( 3 M)</p> <p>Since <math>M = k \sqrt{L_1 L_2}</math> , <math>L_2 = 0.1927 \text{ H}</math> ( 2 M)</p> <p>Flux <math>\phi_2 = k\phi_1 = 0.225 \times 10^{-3} \text{ Wb}</math> (2 M)</p> $\text{Also, } e_2 = N_2 \times \frac{d\phi_2}{dt} = N_2 \times \frac{0.225 \times 10^{-3}}{2 \times 10^{-3}} = 63.75$ <p><b>Thus <math>N_2 = 567</math> Turns ( 3 M)</b></p>	12	2	2	1,2	
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(OR)

15(b) )	<p><b>Shunt Generator: ( Open Circuit char and .External Char (any One Type )” ----→ ( 10 Marks)</b></p> <p>Open circuit characteristics-Self excited</p> <p>External Characteristics of Self excited dc generator</p>	12	2	2	1,2	
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	<p>External Characteristics of Separately excited</p>  <p>Characteristics of Series generator</p>  <p><b>** Applications: ( Any Two = Two Marks)</b></p> <p>Shunt generators are used in supplying nearly constant loads. They are used for charging batteries and supplying the fields of synchronous machines.</p> <p>Series generators are used to boosters for adding voltage to transmission lines to compensate for the line drop.</p> <p>Cumulative compound generators are used for drives which require constant dc voltage supply.</p> <p>Differential compound generators are used in arc welding.</p>					
<p><b>16(a)</b> )</p>	<p>To measure DC quantity only.PMMC Operation with Neat Diagram</p> 	12	2	3	1,2	
<b>(OR)</b>						
<p><b>16(b)</b> )</p>	<p>Construction of MOSFET and its operation . ( 10 Marks)</p>  <p style="text-align: center;">Fig 13.23 N-Channel Enhancement MOSFET</p>	12	2	3	1,2	

	<p><b>Mention its applications.( Any Two)</b></p> <ul style="list-style-type: none"> <li>- (i)used for switching and amplifying electronics signals in the electronic devices. (ii) as an inverter(iii)It can be used in digital circuit(iv) used as a high frequency amplifier.</li> </ul> <p><b>(ii)Compare BJT and FET.Any Two .</b></p> <ol style="list-style-type: none"> <li>1. FET operation depends only on the flow of majority carriers—holes for P-channel FETs and electrons for N-channel FETs. Therefore they are called Unipolar devices. Bipolar transistor (BJT) operation depends on both minority and majority current carriers.</li> <li>2. FETs are less noisy than BJTs.</li> <li>3. FETs exhibit a much higher input impedance (<math>&gt; 100 \text{ M}\Omega</math>) than BJTs.</li> </ol>					
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*S. Shanmugapriya*

**Question Paper Setter**  
**(Dr.S.Shanmugapriya)**

**Approved by Audit Professor/  
Course Coordinator**