ROLL NO.	

Code: AE53/AC53/AT53/AE103 Subject: ELECTRONIC DEVICES & CIRCUITS

AMIETE - ET/CS/IT (Current & New Scheme)

Time: 3 Hours

December 2016

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions, answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following:

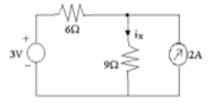
 (2×10)

- a. In a Forward Biased PN junction diode, the sequence of events that best describes the mechanism of current flow is _____
 - (A) Injection and subsequent diffusion and recombination of minority carriers.
 - (B) Injection and subsequent drift and generation of minority carriers.
 - (C) Extraction and subsequent diffusion and generation of minority carriers.
 - **(D)** Extraction and subsequent drift and recombination of minority carriers.
- b. A BJT is a:
 - (A) current controlled & bipolar device
 - (B) voltage controlled & bipolar device
 - (C) current controlled & Unipolar device
 - (**D**) voltage controlled & Unipolar device
- c If Vm is the peak AC voltage of one-half of transformer secondary then PIV of full wave rectifier with centre-tapped transformer is
 - (A) V_m

(B) 3V_m

(C) 2V_m

- (D) 1.11 V_m
- d The current ix in the network shown in fig.1 is:



(A) 1A

(B) 1/2 A

(C) 1/3 A

(D) 4/5 A

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e.	e. If $XL = 100\Omega$ of an R-L circuit, it's quality factor is					
	(A) 100	(B) 10				
	(C) 33.3	(D) 1000				
f	In multistage amplifier					
1.		s (B) Gain decreases and BW increases				
		es (D) Gain increases and BW decreases	2			
	(e) Guill decreases and BW decrease	(b) Guill increases and by decreases	,			
g.	. For an SCR, the two transistor analogy holds good when the SCR is in					
0	(A) Forward blocking state (B) Condition state					
	(C) Both (A) & (B)	(D) None of these				
h.	Resistance of a wire is r ohms. The	wire is stretched to double its length,	then			
	its resistance in ohms is					
	(A) 4r	(B) r/2				
	(C) 2r	(D) r/4				
i.	The common collector circuit is also	known as				
	(A) Push-pull circuit	(B) Emitter follower				
	(C) Voltage gain amplifier	(D) Current gain amplifier				
j.	The Network Theorem used to find t	he equivalent circuit across an open				
	circuited terminal is					
	(A) Thevenin's Theorem	(B) Superposition Theorem				
	(C) Reciprocity Theorem	(D) None of these				
	Answer any FIVE Questions	out of EIGHT Questions.				
	Each question car					
a.	Briefly discuss:	(2+3-	+3)			
	(i) Superposition theorem					
	(ii) Maximum power transfer theore	em				
	(iii) Duality of networks					
h	A DIC : 11 D OF O I COATE TO COATE COATE					
υ.	b. An RLC circuit has $R = 25 \Omega$, $L = 0.04 H$ and $C = 0.01 \mu F$. Calculate the					
	resonance frequency. If 1 V source having frequency same as the resonance frequency is applied to the circuit, calculate the frequencies at which voltage					
	frequency is applied to the circuit, calculate the frequencies at which voltage across L and C are maximum. (8)					
	across L and C are maximum. (8)					
a.	Define drift and diffusion current in	PN junction diode	(4)			
u.	Define diffit and diffusion current in 114 junction diode.					
b.	b. For PN diode, the reverse saturation current at a bias of 20V is 20nA. It is 5μ A					
-•	at 75 volts. Calculate DC resistances at these points. (4)					

Q.2

Q.3

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- c. Draw the circuit diagram of a full wave bridge rectifier and sketch the output waveform across the load resistance, when the input to the rectifier is a sinusoidal voltage $V_m \sin \omega t$. (8)
- Q.4 a. What are four layer devices? Explain the switching action of Silicon Controlled Rectifier (SCR). (9)
 - b. Explain the construction and operation of an n-channel E-MOSFET with suitable diagram and characteristics. (7)
- Q.5 a. Explain collector to base bias or collector feedback biasing method in detail and discuss the stability of the circuit.(8)
 - b. What is h-parameter model? Draw and explain a BJT h-parameter model. (8)
- Q.6 a. Draw ideal and the actual response of tuned amplifier. Compare single tuned and double tuned amplifiers.(8)
 - b. With neat sketches, explain the operation of a single stage RC coupled amplifier. (8)
- Q.7 a. Calculate the peak power dissipated in each transistor of a class B push pull amplifier, if $V_{CC} = 15V$ and $R_L = 5\Omega$. (7)
 - b. Compare Class A, Class B, Class AB and Class C power amplifiers. (9)
- Q.8 a. Derive the expression for the frequency of Wein Bridge Oscillators. (10)
 - b. Deduce the Barkausen Criterion for the generation of sustained oscillations. How are the oscillations initiated? (6)
- Q.9 a. What do you mean by epitaxial growth in IC fabrication? Explain the steps involved in epitaxial growth. (8)
 - b. Write short notes on the following:
 - (i) Integrated resistors
 - (ii) Integrated capacitors

(2x4)