Register Number:……..

KUMARAGURU
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GENERAL INSTRUCTIONS TO THE CANDIDATES

1. Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K_1 to K_6)
2. Candidates are strictly instructed not to write anything in the question paper other than their roll number.
3. Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.
4. Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.
5. Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

B.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

MECHATRONICS ENGINEERING

U14MCT 201: Electronic Devices and Circuits

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. In a forward biased pn junction diode, the sequence of events that describes the mechanism of current flow is [K_1]

   1. Current flow 2.Injection 3.Recombination of minority carriers 4.Subsequent diffusion

   a) 3-2-4-1 b) 2-3-4-1

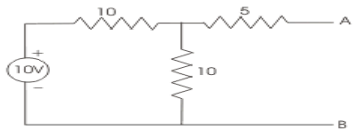
   c) 4-3-2-1 d) 2-4-3-1

2. What is true about the breakdown voltage in a Zener diode? [K_1]

   a) It decreases when current increases. b) It destroys the diode.

   c) It equals the current times the resistance. d) It is approximately constant.

3. For the following circuit find the value of R_{TH} [K_2]



a) 5 Ω b) 10 Ω

c) 15 Ω d) 25 Ω

4. Consider the following statements: [K_1]

In a clamper circuit,

1.adds or subtracts a dc voltage to a waveform

2.does not change the waveform

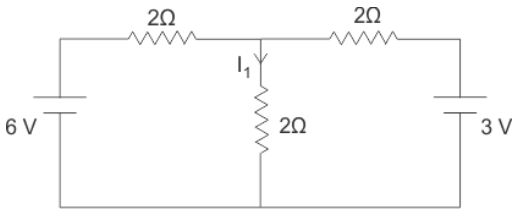
3.amplifies the waveform

Which are correct?

a) 1,2 b) 1,2,3

c) 1,3 d) 2,3

5. What is I_1 value in the given circuit? [K_2]



a) 0.5 A b) 1 A

c) 1.5 A d) 3 A

6. Assertion (A): In a common collector amplifier, voltage gain is greater than unity and this configuration is called as Emitter follower. [K_2]

Reason (R): Common collector stage is used for impedance matching as its input impedance is very large as compared to output impedance.

a) Both A and R are individually true and R is the correct explanation of A b) Both A and R are individually true and R is not the correct explanation of A

c) A is true but R is false d) A is false but R is true

7. Which of the following voltage regulator is preferred for providing large values of load current [K_1]

a) Zener diode shunt regulator b) Transistor shunt regulator

c) Transistor series regulator d) Zener diode series regulator

8. In any amplifier employing a transistor, the collector current I_C is sensitive to _____. [K_1]

a) B b) V_{BE}

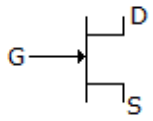
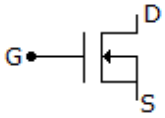
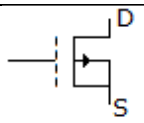
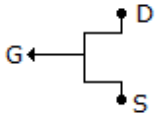
c) I_{CO} d) All the above

9. The major difference between ground and virtual ground in op-amp is that virtual ground is only a [K_1]

a) voltage reference b) current reference

c) power reference d) difference reference

10. Matching type item with multiple choice code [K_1]

List I	List II
A. *n* Channel JFET	i. 
B. *p* Channel JFET	ii. 
C. Depletion MOSFET	iii. 
D. Enhancement MOSFET	iv. 

	A	B	C	D
a)	iv	iii	ii	i
b)	i	iii	iv	ii
c)	i	iv	ii	iii
d)	ii	iv	iii	i

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

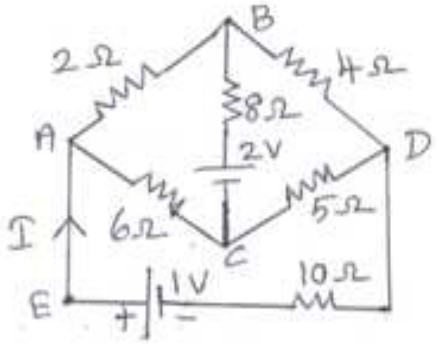
11. Compare Thevenin's theorem and Norton's theorem [K_2]
12. What are the h Parameters? [K_1]
13. Mention the disadvantages of FET compared to BJT. [K_2]
14. Draw one biasing circuit for an enhancement type MOSFET. [K_2]
15. Mention different types of filters. [K_2]
16. List the important characteristics of a Voltage Regulator. [K_2]
17. Which is the most commonly used feedback arrangement in cascaded amplifiers and why? [K_2]
18. Write down the advantages and disadvantages of Hartley Oscillator. [K_2]
19. What are the limitations of the differentiator circuit? [K_2]

20. What is a multivibrator? [K_2]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

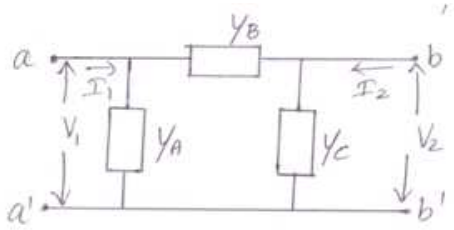
21. (i) Using Superposition theorem, obtain current EI in fig below. (12) [K_3]



(ii) Define Diode dc resistance. (2) [K_2]

22. (i) Discuss about the types of Clipper circuits. (7) [K_2]

(ii) Determine the Y parameters for the circuit shown in fig. (7) [K_3]



23. (i) What are the essential conditions for transistor biasing? and describe about collector feedback biasing method. (10) [K_2]

(ii) Draw the Characteristics of MOSFET. (4)

24. (i) Explain the function of the capacitor filter used in the rectifier. (7) [K_2]

(ii) Explain how a Zener diode can be used as voltage regulator. (7)

25. (i) What are the important characteristics of a cascade amplifier? Write the circuit of cascade amplifier and determine an expression for its voltage gain in terms of its circuit parameters. (7) [K_2]

(ii) Draw the circuit diagram of Colpitts oscillator and explain its working. (7)

26. (i) Explain how Op-amp acts as integrator and derive output voltage equation. (7) [K_2]

(ii) Derive the expression for frequency of oscillation of RC Phase shift oscillator using Op-amp. (7)

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