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B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Third Semester

Biomedical Engineering

#### EC 8353 - ELECTRON DEVICES AND CIRCUITS

(Common to: Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Instrumentation Engineering/ Instrumentation and Control Engineering/Robotics and Automation)

(Regulations 2017)

Time: Three hours

Maximum: 100 marks

Answer ALL questions.

# PART A $\rightarrow$ (10 × 2 = 20 marks) voltage of peak value 20 V is connected in series with a silicon diode and

- load resistance of  $400 \Omega$ . If the forward resistance of the diode is  $12 \Omega$  find the peak output voltage.
- State the advantages of LED over incandescent lamps.
- When V<sub>GS</sub> of a JFET changes from -3.1V to -3V, the drain current changes from 1 mA to 1.3 mA. What is the value of transconductance?
- 4. An unijuncion transistor has 10V between the bases. If the intrinsic stand off ratio is 0.65, find the value of stand off voltage. What will be the peak-to-peak voltage if the forward voltage drop in the pn junction is 0.7V?
- A transistor has the following ratings: I<sub>c(max)</sub> = 500 mA and β<sub>max</sub> = 300. Find the maximum allowable value of I<sub>B</sub> for the device.
- State an application for CC amplifier. Justify the appropriate choice of CC amplifier for the specified application.

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	7.	State any	two advantages of FET over bipolar transistor.	
	8.	State the	difference between Power amplifier and Voltage amplifier	:
	9.	State any	two advantages of negative feedback.	
	10.	State any	two merits of crystal oscillators.	
			PART B — $(5 \times 13 = 65 \text{ marks})$	
	11.	(a) (i)	Explain the working of a bridge rectifier.	(7)
		(ii)	A full-wave rectifier uses two diodes, the internal resistate diode may be assumed constant at $20\Omega$ . The transfer secondary voltage from centre tap to each end of second and load resistance is $980\Omega$ . Find the mean load currently of lead waves to	armer r.m.s ary is 50 V nt and rms
			value of load current.	(6)
		(b) (i)	Or Explain the working of a zener regulater.	
VV	VA	VV	behavior if the zener is working properly she open-cirucited.	orted and (6)
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<ul> <li>13. (a) (i) Explain the working of a common emitter amplifier. Discuss the load line analysis of the transistor.  (ii) In a CE transistor curcuit, collector load in 4kΩ whereas quiescent current in 1 mA. What is the operating point if V<sub>cc</sub> =10V? What will be the operating point if R<sub>C</sub> = 5kΩ?  (6)  Or  (b) Explain the working of a source follower circuit. Explain its characteristics.  (7+6)  14. (a) Explain the working of a differential amplifier. List four applications of differential amplifier.  Or  (b) Explain the working of a single tuned amplifier. Discuss its frequency response.  (7+6)  15. (a) Define Barkhausen criterion for oscillation. Discuss on the different types of feedback in Amplifiers.  Or  (b) State the principle used for oscillation in crystal oscillator and describe its operation.  PART C - (1 × 15 = 15 marks)  16. (a) (i) An amplifier has a voltage amplification A<sub>cc</sub> and a fraction m<sub>cc</sub> of its output is feedback in opposition to the input. If m<sub>cc</sub> = 0.1 and A<sub>cc</sub> = 100, find the percentage change in the gain if A<sub>cc</sub> falls 6 db due to aging.  (7)  (ii) Explain the working of a Colpitts oscillator.  Or  (b) (i) Explain the working of a Wein-bridge oscillator.  (iii) A phase-shift oscillator uses 5pF capacitors. Find the value of R to produce a frequency of 800 kHz.  (iii) Choose the inductor values in a Hartley oscillator so that f = 1mHz and m<sub>cc</sub> = 0.2. Assume that 1 PF capacitors are available.  (5)</li> </ul>	7	, .		
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