Q. Code:167067

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Third Semester

EE22309– ELECTRON DEVICES AND CIRCUITS: THEORY AND PRACTICES

(Electrical and Electronics Engineering)

(Regulation 2022)

TIME:2 HOURS **MAX. MARKS: 60**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Apply the concepts of PN junction devices and analyse its various electronic circuits	**4**
CO 2	Analyse the various configurations of bipolar junction transistors and amplifiers.	**4**
CO 3	Analyse the various configurations of field effect transistors and amplifiers.	**4**
CO 4	Analyse the performance of multistage and feedback amplifier circuits.	**4**
CO 5	Understand the operation of oscillators and Optoelectronic devices and analyse its behaviour	**4**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	The reverse saturation current of a silicon pn junction diode is 10μA.Calculate the diode current for the forward bias voltage of 0.7V at 2**5°**C.	**1**	**3**
2.	Give the effect of Temperature on PN Junction diode.	**1**	**2**
3.	Which of the BJT configuration is suitable for impedance matching application? Why?	**2**	**3**
4.	When the drain voltage increases beyond the pinch off voltage, What will happen to the drain current?	**3**	**2**
5.	The data sheet of JFET indicates that it has I_{DSS}=14mA and V_{GS}(off)=-5V.Calculate the value of I_D when V_{GS} is (i) 0V and (ii) -5V.	**3**	**3**
6.	Which MOSFET is called as normally ON MOSFET? Why?	**3**	**2**
7.	How to protect the MOSFET from stray voltages?	**3**	**2**
8.	Draw the equivalent circuit of UJT.	**3**	**2**
9.	Single stage amplification is not sufficient to meet the power requirement in particular application, Mention the method to meet the power requirement?	**4**	**3**
10.	Mention the application of Photodiode and phototransistor.	**5**	**2**

PART- B (3x 10=30Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	With the necessary diagrams,analyze forward and reverse characteristics of PN diode.	**(5)**	**1**	**3**

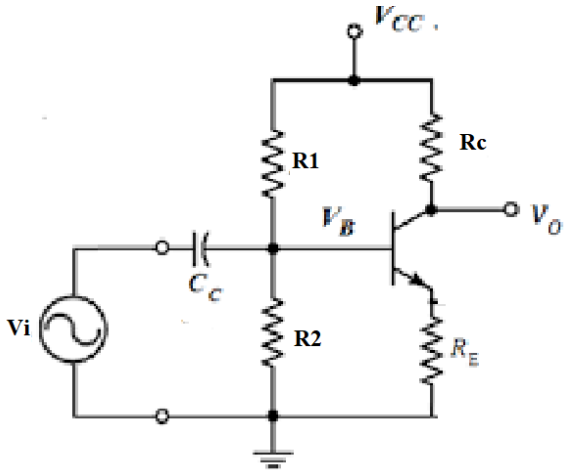
	(ii)	Derive the expression for diffusion capacitance in PN diode.	**(5)**	**1**	**3**

(OR)

(b)	In an application which needs the output voltage to be regulated. Choose the appropriate device, that would ensure this operation with appropriate circuit. Also discuss how it regulates the voltage.		**(10)**	**1**	**3**
12. (a)	Design a Voltage divider bias circuit for transistor to establish the quiescent point as V_{CE}=12V, I_C=1. 5mA, stability factor S≤3, β=50, VBE=0.7V, VCC=22. 5V, R_C=5. 6KΩ.		**(10)**	**2**	**4**

(OR)

(b)	Using the small signal model, Derive the expression for voltage gain, input and output impedance of the figure shown below.		**(10)**	**2**	**4**



13. (a)	Discuss the principle and operation of a Colpitts oscillator and also derive the frequency of oscillations.		**(10)**	**5**	**3**

(OR)

(b)	Design an oscillator to operate at a frequency of 1KHz which gives an extremely pure sine wave output and good frequency stability. Discuss the operation of this oscillator as an audio signal generators.		**(10)**	**5**	**3**

PART- C(1x 10=10Marks)

(Q.No.14 is compulsory)

			Marks	CO	RBT LEVEL
14.	Identify the feedback topology used in emitter follower circuit. With the help of h parameter equivalent circuit, derive the expression for voltage gain, input impedance and output impedance.		**(10)**	**4**	**4**

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