

Reg.No. _____

**Karunya UNIVERSITY**

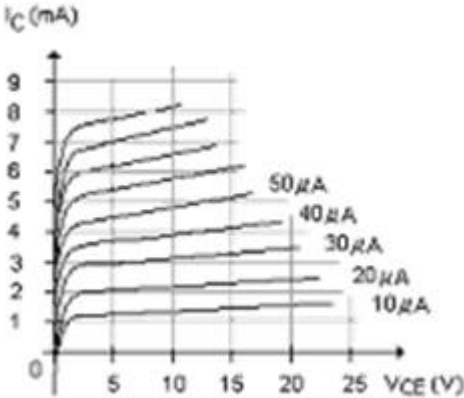
(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 16EC2004
Sub. Name : ELECTRON DEVICES AND CIRCUITS

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

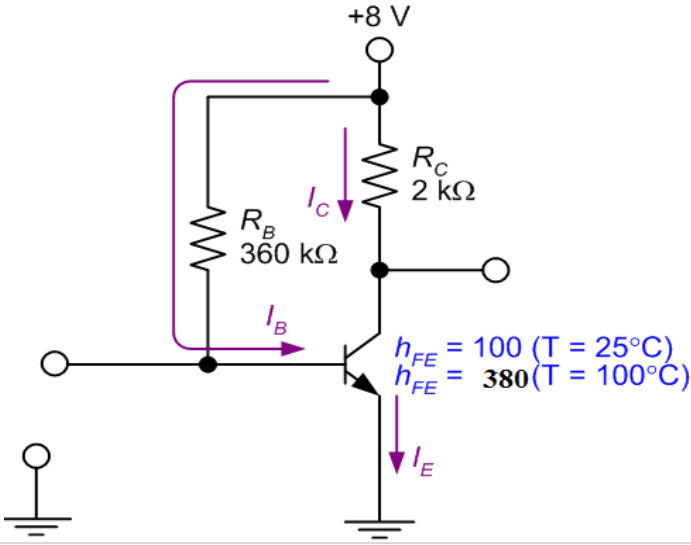
Q. No.	Questions				Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)						
1.	The ratio of which two currents is represented by β ?				CO1	
	a. I_C and I_B	b. I_C and I_E	c. I_E and I_B	d. None of the above		(1)
2.	At what region of operation is the base-emitter junction forward biased and the base-collector junction reverse biased?				CO1	
	a.Saturation	b. active	c. Cutoff	d. None of the above		(1)
3.	For the BJT to operate in the saturation region, the base-emitter junction must be _____-biased and the base-collector junction must be _____-biased.				CO1	
	a. forward, forward	b. forward, reverse	c. reverse, reverse	d. reverse, forward		(1)
4.	Transistors are _____terminal devices.				CO1	
	a.1	b.2	c.3	d.4		(1)
5.	If too large current passes through the diode				CO1	
	a.all electrons will leave	b. Excessive heat will damage the diode	c. All holes will freeze	d.diode will emit light		(1)
6.	For a properly biased pnp transistor, let $I_C = 10$ mA and $I_E = 10.2$ mA. What is the level of I_B ?				CO1	
	a. $200\mu A$	b.200mA	c.0.2A	d.20A		(1)
7.	How much is the base-to-emitter voltage of a transistor in the "on" state?				CO2	
	a. Undefined	b. 0.7V	c.0.7mV	d.7V		(1)
8.	Use this table of collector characteristics to calculate β at $V_{CE} = 15$ V and $I_B = 30 \mu A$				CO1	
						
	a.50	b.106	c. 100	d.400		(1)
9.	Tuned amplifiers are commonly used whenever _____is required.				CO2	
	a. High focus	b.high bandgap	c. High selectivity	d.low light		(1)

				emission		
10.	In a common-emitter configuration _____ is the controlling current while _____ is the controlled current.				CO1	
	a. I_B, I_C	b. I_C, I_E	c. I_C, I_B	d. None of the above		(1)
11.	The circuit that provides the best stabilization of operating point is				CO2	
	a. Base resistor bias	b. collector feedback bias	c. voltage divider bias	d. None of the above		(1)
12.	The disadvantage of base resistor method of transistor biasing is that it				CO2	
	a. Is complicated	b. Is sensitive to changes in β	c. Provides high stability	d. None of the above		(1)
13.	JFET is a _____ controlled device.				CO2	
	a. current	b. power	c. Frequency	d. voltage		(1)
14.	FET has high input resistance than BJT				CO2	
	a. True	b. False	c. Partially True	d. None of the above		(1)
15.	Position of Q point for a class _____ amplifier is in the middle of the active region				CO1	
	a. B	b. C	c. AB	d. A		(1)
16.	In class ----- amplifier the transistor remains active for less than half cycle.				CO2	
	a. B	b. C	c. AB	d. A		(1)
17.	For a differential amplifier the input impedance is _____				CO2	
	a. high	b. low	c. zero	d. infinity		(1)
18.	A majority of the ----- that is drawn from the supply by a class-A amplifier is used up by the amplifier itself				CO2	
	a. current	b. power	c. efficiency	d. voltage		(1)
19.	The equation of drain current for Enhancement type MOSFET				CO1	
	a. $I_D = K(V_{GS} - V_{GS(th)})^2$	b. $I_D = K(V_{GS(th)} - V_{GS})^2$	c. $I_D = K(V_{GS} - V_{GS(th)})$	d. $I_D = (V_{GS} - V_{GS(th)})^2$		(1)
20.	Determine the value of α when $\beta = 100$.				CO1	
	a. 1.01	b. 101	c. 0.99	d. Cannot be solved with the information provided		(1)
21.	The crystal oscillator works on the principle of _____				CO1	
	a. Lenz law	b. electromagnetic induction	c. piezoelectric	d. inverse piezoelectric		(1)
22.	An oscillator always needs an amplifier with				CO2	
	a. Positive feedback	b. Negative feedback	c. Both types of feedback	d. no feedback		(1)
23.	The value of loop gain factor which is equal to 1 produces _____ oscillations				CO3	
	a. growing	b. no	c. decaying	d. sustained		(1)
24.	In a RC phase shift oscillator, each RC circuit produces _____ degree phase.				CO2	

	a. 90	b. 45	c. 60	d. 180		(1)
25.	Sweep oscillators produces _____ waves				CO1	
	a. saw tooth	b. triangular	c. square	d. rectangular		(1)
26.	If the open loop gain is 20 and the beta value is 0.05. Find the closed loop gain				CO2	
	a. 0	b. 20	c. infinity	d. 2		(1)
27.	Find the resonant frequency of RC phase shift oscillator if $R = 8K \text{ ohm}$ and $C = 3 \text{ nano farad}$				CO2	
	a. 3.7 KHz	b. 1 KHz	c. 2.7 KHz	d. 0.7 KHz		(1)
28.	In a crystal oscillator at higher frequencies X_L is high and X_C is low, so the crystal is seen by the circuit as				CO1	
	a. no change	b. resistive	c. capacitive	d. inductive.		(1)
29.	The common Noise of input signal in differential amplifier				CO2	
	a. not affected	b. increases	c. decreases	d. remains the same		(1)
30.	The common-emitter cascade amplifier provides				CO2	
	a. high voltage gain	b. high current gain	c. high power gains	d. all of above		(1)
31.	Class _____ amplifiers are normally operated in a push-pull configuration in order to produce an output that is a replica of the input.				CO1	
	a. B	b. C	c. AB	d. D		(1)
32.	Class A operation can achieve power efficiency of over _____.				CO1	
	a. 50%	b.) 25%	c. 78.5%	d. 90%		(1)
33.	MOSFET can be operated with				CO2	
	b. Positive voltage	c. Negative voltage	c.NO voltage	d.none of the above		(1)
34.	MOSFET is sometimes called as _____ FET				CO1	
	a. Insulated gate	b. isolated gate	c. powered gate	d. depleted gate		(1)
35.	Impedance of tuned circuit				CO3	
	a. $Z_r = L / CR$	b. $Z_r = X / CR$	c. $Z_r = L / C$	d. $Z_r = L / R$		(1)
36.	For a DC analysis of an amplifier				CO2	
	a. Coupling capacitor is open circuited	b. bypass capacitor is open circuited	c. AC source shorted	d. all the above		(1)
37.	For an AC analysis of an amplifier				CO2	
	a. Coupling capacitor is open circuited	b. Coupling capacitor is short circuited	c. Coupling capacitor value is increased	d. Coupling capacitor value is decreased		(1)
38.	In a JFET voltage divider biasing circuit R_1 and R_2 are used to				CO1	
	a. keep the gate-source junction in reverse bias.	b. keep the gate-source junction in forward bias.	c. . keep the gate-source junction in no bias.	d. None of the above		(1)
39.	Self Bias is a JFET Biasing circuit that uses a _____ to help reverse bias the				CO2	

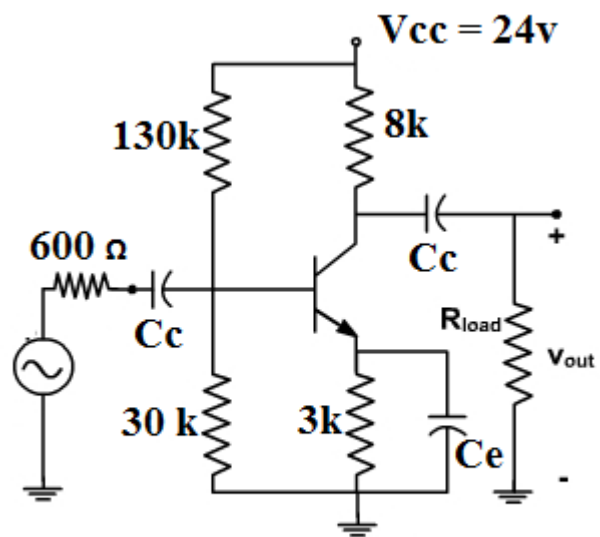
	JFET gate.				
	a. source resistor	b.Drain resistor	c.Gate resistor	d.None of the above	(1)
40.	Important feature of an RC Oscillator is its _____			CO2	
	a. frequency stability	b.Power	c.efficiency	d.voltage gain	(1)

PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)

41.	Using the following data: $I_E = 10 \text{ mA}$, and $h_{FE} = 100$ to 300.Prove that the Q-point of voltage divider bias circuit of a BJT is less dependent on h_{FE}	CO3	(5)
42.	Explain the working of Depletion type MOSFET with necessary equations and graph.	CO2	(5)
43.	Differentiate an ideal diode from a practical diode.	CO2	(5)
44.	Determine the q-point values of I_C and V_{CE} at both of these temperatures. Given $V_{BE} = 0.7 \text{ V}$	CO3	(5)
			
45.	A single tuned amplifier consist of tuned circuits having $R=5\Omega$, $L=10\text{mh}$, $C=0.1\mu\text{f}$. Determine a) resonant frequency b) quality factor of tank circuit c) band width of amplifier	CO3	(5)
46.	Differentiate between class A and class B amplifier.	CO2	(5)
47.	Draw the Electrical Equivalent Circuit Diagram of a Quartz Crystal and state the what does R,L and C represent?		(5)
48.	Draw the block diagram of an oscillator and state the barkhausen criterion.	CO2	(5)
49.	Prove that $G=G_1 \times G_2 \times G_3$ considering the input to first stage as V and the output of first stage = $G_1 V$	CO3	(5)
50.	Derive equations for JFET voltage divider bias.	CO2	(5)

PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)

51.	Illustrate the voltage divider biasing technique in a BJT.	CO2	(10)
52.	Detail out the working of an RC phase shift oscillator with related circuit diagrams and supporting expressions.	CO3	(10)
53.	Perform an AC analysis of the circuit shown below	CO3	(10)



Beta =150

ALL THE BEST