0172

GOVERNMENT OF KARNATAKA

KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD

II YEAR PUC EXAMINATION 2017

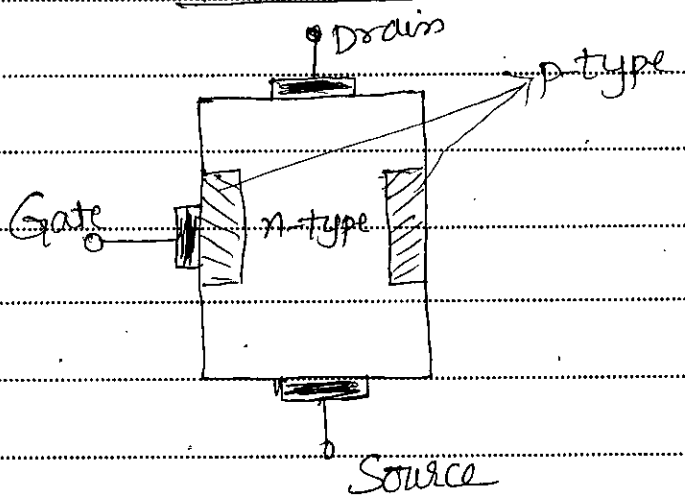
SCHEME OF VALUATION

Subject Code : 40 Subject : ELECTRONICS

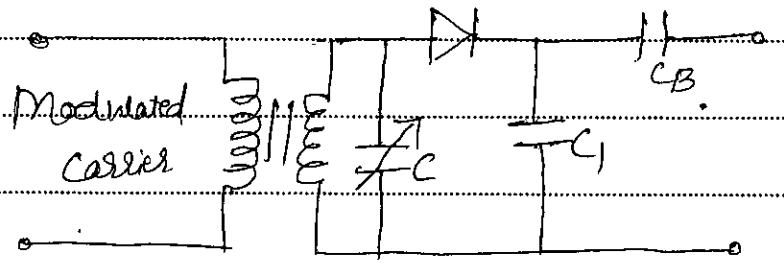
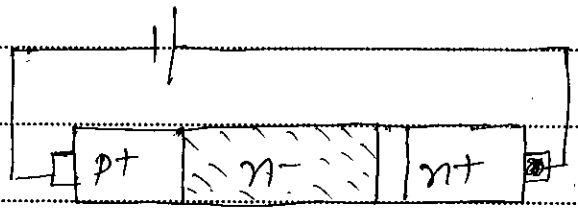
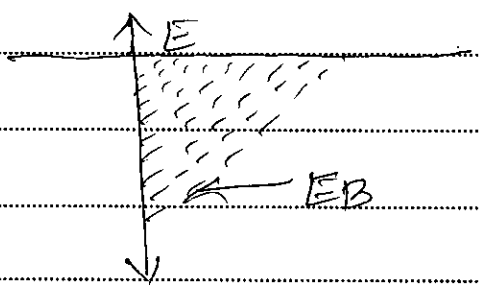
Qn. No.	PART-A	(NS) Marks
1.	It is defined as the ratio of small change in V_{DS} to the corresponding change in V_{GS} for a constant drain current I_D.	(1)
2.	It is the ratio of differential mode gain to the common mode gain or CMRR $= \frac{A_d}{A_c}$	(1)
3.	3×10^8 m/s	(1)
4.	455 KHz	(1)
5.	$M.I = \frac{\Delta f}{f_m} = \frac{12 \times 10^3}{6 \times 10^3} = 2$	(1)
6.	Drift layer or Epitaxial layer or $\bar{n}$	(1)
7.	An octet is a group of eight adjacent 1's in K-map.	(1)
8.	$\overset{6}{\underset{(1001)}{+3}}$ $\overset{9}{\underset{(1100)}{+3}}$ $(69)_{10} = (1001\ 1100)_{Ex-3}$	(1)
9.	Because as it can process only 8-bits data at a time.	(1)
10.	2 bytes.	(1)

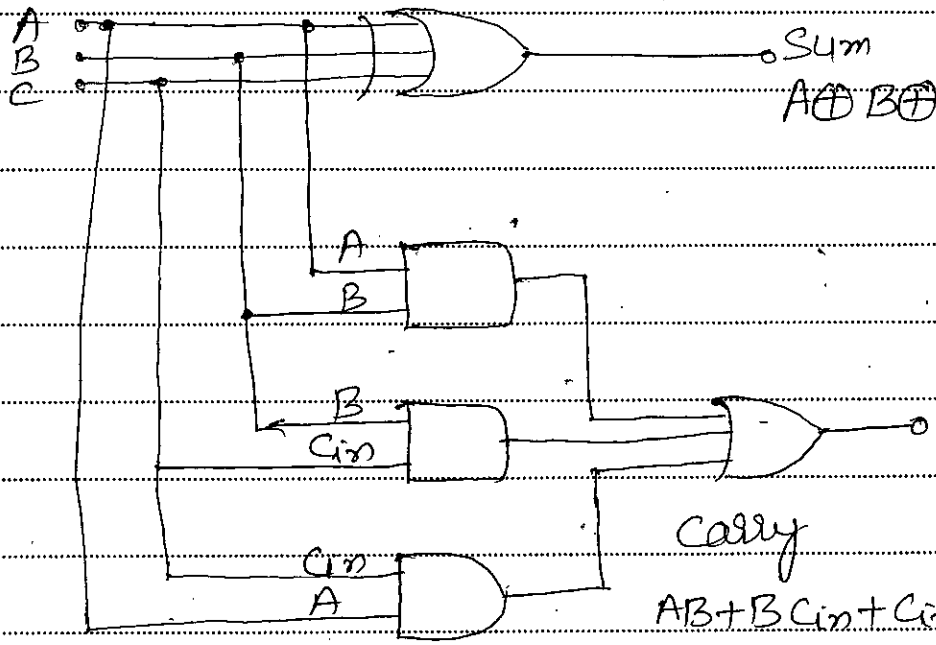
SM10

Qn. No.	PART-B	Marks
11.	1) Reducing all the ac sources to zero	(1)
	2) opening all the capacitors	(1)
12.	$A_f = \frac{A}{1+A\beta}$	(1)
	$\beta = 0.008$ or 0.8%.	(1)
13.	Sinusoidal oscillator produce an output having Sinewave Ex: LC oscillator, RC oscillator Crystal oscillator	(1)
	Non-Sinusoidal oscillator produce an output having traingular, Square, Sawtooth etc wave form Ex: Multivibrator, Relaxation oscillator	(1)
14.	1) AC to DC Rectifier	
	2) AC to AC Voltage controller } Any (2)	(2)
	3) DC to DC choppar	
	4) DC to AC inverter	
15	$V_{AK} = V_j + V_{RD}$	(1)
	$= V_j + R_{ON} I_F$	
	$= 0.4 + 0.002 \times 75 = 0.55V$	(1)
16.	Accumulator :- Accumulator is an 8-bit Register in 8051 microcontroller. Accumulator is used by all arithmetic & logical instructions. In accumulator one of the operands is stored in it before the execution of an instruction and it also stores the result after the execution of an instruction.	(1)

Qn. No.		Marks
	program Counter : It holds the address of a byte in memory. It also specifies the address of the next instruction to be fetched and executed.	(1)
17.	(i) == → Equal to	(1)
	(ii) && → Logical AND	(1)
18.	1) Radars are used in defence weapon systems 2) Safety navigational applications 3) Location of enemy missiles, planes & Ships. 4) Landing of planes in bad weather conditions 5) Used as altimeters to measure height. 6) Special terrain - following radars allow high speed jets to fly very close to the ground to avoid detection by the enemy radars. (Write any 2 applications)	2
	PART - C	
19.		(1)
	Explanation	(2)

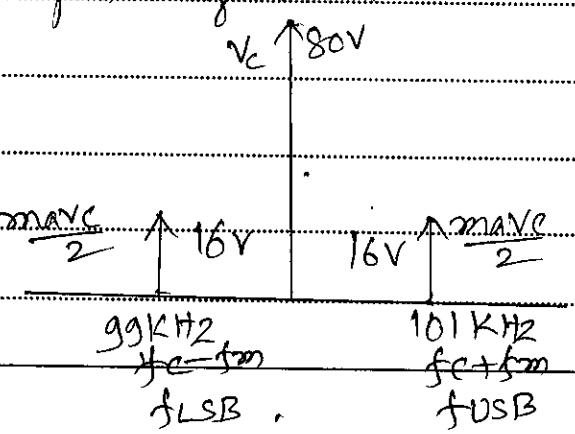
Qn. No.		Marks
20.	Thermal Runaway :- Self destruction of a transistor due to increase in temperature and hence leakage current is called thermal runaway.	(1)
	Leakage current :- The flow of current through the device due to the motion of minority charge carriers under reverse bias condition is called leakage current.	(1)
	Heat Sink :- The device which absorbs unnecessary heat generated in the working device and radiates to the surroundings & safeguards the working device is called heat sink.	(1)
21	For Block diagram	(1)
	Derivation (Steps)	(1)
	$Z_{if} = Z_i(1+AB)$	(1)
22.	Critical angle :- It is the maximum angle of incidence of a Radio wave under Ionospheric propagation that gets returned to the earth	(1)
	Critical frequency :- It is the highest frequency of a beamed radio wave that will be returned to the earth.	(1)
	Skip distance :- It is the Shortest or minimum distance measured between the transmitting antenna & the first receiving antenna measured along the surface of the earth after ionospheric propagation	(1)

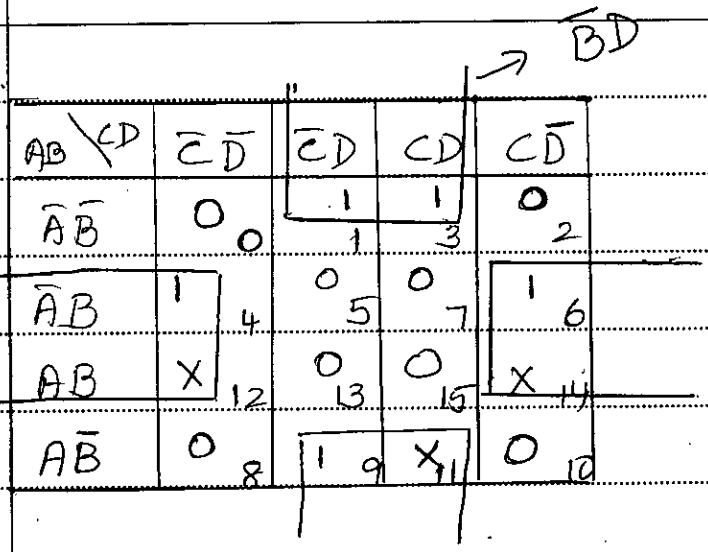
Qn. No.		Marks
23.	The process of recovering a modulating or baseband signal from the modulated wave is known as demodulation or detection	(1)
		(2)
24.	In "non-punchthrough" diodes the depletion layer boundary doesn't reach the end of the drift layer. The electric field strength is maximum at the p+ n− and decrease to zero at the end of the depletion region.	(1)
	Fig(a) 	(1)
	Fig(b) 	(1)
	Fig(a) Non-punch through in reverse biased power diode. (b) Electric field strength in non-punch through power diode.	

Qn. No.		Marks
25.		
	Sum = A⊕B⊕Cin	(1)
	Carry = AB+BCin+CinA	(1)
26.	Additional features of 3G and 4G cell phone systems are 1) colour LCD Screens. 2) Digital cameras 3) E-mail, Games. 4) GPS, Bluetooth 5) Internet access & (6) Video conferencing. (Any 3)	(3)

Qn. No.	PART-D	Marks
27.		
	$V_{10K\Omega} = V_2 = \frac{V_{CC} \times R_2}{R_1 + R_2}$	(1)
	$= 15 \times \frac{10 \times 10^3}{100 \times 10^3 + 10 \times 10^3}$	
	$= \frac{15 \times 10^3 \times 10}{10^3 (100+10)} = \frac{150}{110} = 1.36V$	(1)
	$I_E = \frac{V_2 - V_{BE}}{R_E}$	
	$= \frac{1.36 - 0.32}{220} = 0.00454A$	
	$= 4.54mA.$	(1)
	$r_e' = \frac{52mV}{I_E} = \frac{52 \times 10^{-3}}{4.54 \times 10^{-3}} = 11.45\Omega$	(1)
	$A_V = \frac{R_C}{r_e'} = \frac{2.2 \times 10^3}{11.45} = \frac{2200}{11.45} = 192$	(1)
		(1)
28.	For the first op-amp acting as an inverting amplifier	
	$A = \frac{V_O}{V_{in}} = -\frac{R_f}{R_{in}}$	(1)
	$\frac{V_{O1}}{300 \times 10^3} = -\frac{500}{250} \times \frac{10^3}{10^3}$	
	$V_{O1} = -600 \times 10^{-3} V$	(1)

Qn. No.		Marks
	For the second op-amp acting as non-inverting op-amp adder.	
	$V_0 = -R_f\left[\frac{V_1}{R_1} + \frac{V_2}{R_2}\right]$	
	$= -R_f\left[\frac{V_{01}}{R_1} + \frac{V_2}{R_2}\right]$	(1)
	$= -500\times10^3\left[\frac{-600\times10^{-3}}{100\times10^3} + \frac{700\times10^{-3}}{50\times10^3}\right]$	
	$= -500\times10^3\times10^{-3}\left[\frac{-600}{100} + \frac{700}{50}\right]$	(1)
	$= -500\times10^{-3}[-6+14]$	
	$= -500\times10^{-3}\times8$	
	$= -4000\times10^{-3}V$	
	$= -4V$	(1)
29.	Given $f = 1.13MHz$	
	$= 1.13\times10^6Hz$	
	$L = 20\mu H$	
	$= 20\times10^{-6}H$	
	$C_1 = 0.1\mu F$	
	$= 0.1\times10^{-6}F$	
	$f = \frac{1}{2\pi\sqrt{LC_s}}$	(1)
	$f^2 = \frac{1}{4\pi^2LC_s}$	

Qn. No.		Marks
	$C_s = \frac{1}{4\pi^2 f^2 L}$	
	$= 0.00099\mu F$	3
	$C_s = \frac{C_1 C_2}{C_1 + C_2}$	
	$C_2 = 0.001\mu F$	1
30.	Given $V_c = 80V$, $V_m = 32V$.	
	Modulation index $m_a = \frac{V_m}{V_c}$	
	Modulation Index $m_a = \frac{32}{80}$	
	$m_a = 0.4$	1
	Amplitude of each sideband	
	$= \frac{m_a V_c}{2} = \frac{0.4 \times 80}{2} = 16V$	1
	AM wave equation $= V_c(1 + m_a \sin w_m t) \sin w_c t$	
	$V_{AM} = 80(1 + 0.4 \sin 2\pi \times 10^3 t) \sin 2\pi \times 10^6 t$	
	$f_m = \frac{w_m}{2\pi} = \frac{2\pi \times 10^3}{2\pi} = 1KHz$	1
	$f_c = \frac{w_c}{2\pi} = 100KHz$	1
	Lower side band frequency $= 99KHz$	
	Upper side band frequency $= 101KHz$	
	Frequency Spectrum of AM wave	
		1

Qn. No.		Marks
31.	 Entering K-map Looping	② ①
	$Y = \bar{B}D + B\bar{D} \Rightarrow$ XOR Gate	(1+1)
32.	Direct coupled amplifier is an amplifier in which the output of one stage (collector) is connected directly to the input (base) of the next amplifier stage.	①
	circuit diagram	①
	Working	②
	Frequency response curve	①
33.	An amplifier whose output voltage is proportional to difference of the input voltages is called difference amplifier or Subtractor	①
	circuit diagram	①
	Derivation	②
	final Expression	①

Qn. No.		Marks
34.	Block diagram	(3)
	Working	(2)
35.	Logic circuit	(1)
	Working	(2)
	Truth-table	(1)
	Timing diagram	(1)
36.	MOV A, #1FH	(1)
	MOV R0, #B4H	(1)
	ADD A, R0	(1)
	MOV R7, A	(1)
	Data: 1FH = 0001 1111	
	+ B4H = 1011 0100	
	Soln: = 1101 0011 = D3H	(1)
37.	The process of identifying and correcting the errors in the program is called as debugging. Naming the errors	(1)+(1)
	Explanation of different types of error	(3)

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