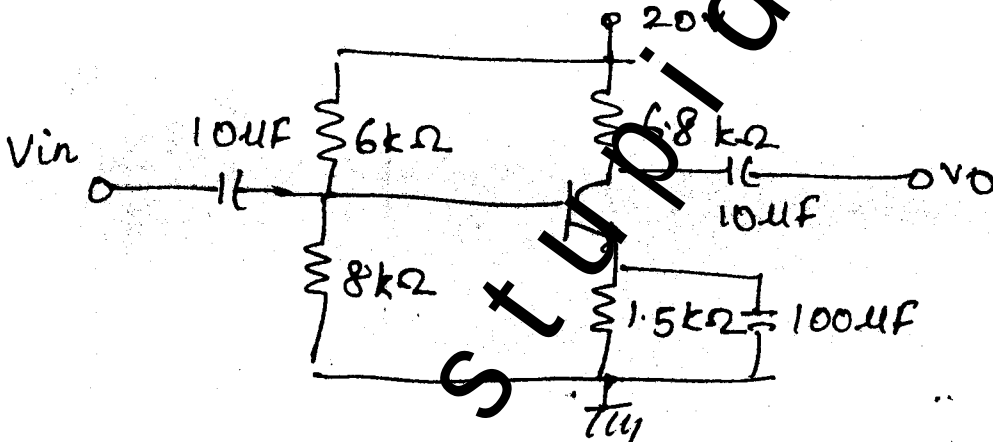


Basic Electronic Circuits (3 Hours) [Total Marks : 100]

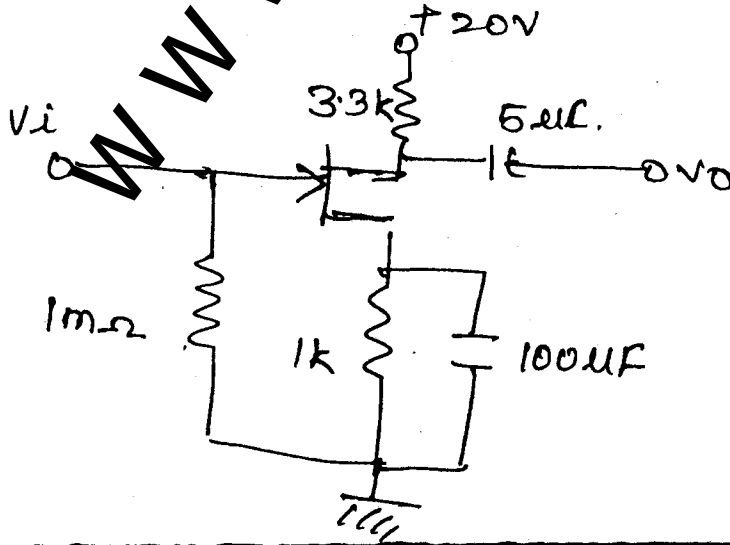
- N.B. : (1) Question No. 1 is compulsory.
 (2) Answer any four out of remaining six questions.
 (3) Assume any suitable data wherever required.

1. (a) What is Maximum reverse voltage across a diode in—
 (i) HWR 5
 (ii) FWR with center tapped transformer
 (iii) Bridge type rectifier ?
 (b) Compare BJT and FET. 5
 (c) Draw and explain Negative clamper circuit. 5
 (d) Explain Thermal stabilization in BJT. 5
2. (a) Design a single stage RC Coupled CE Amplifier to meet the following requirements—
 $z_i \geq 3 \text{ k}\Omega$, $V_o \text{ peak} = 2 \text{ V}$, $|A_V| \geq 100$, $S \leq 8$. 15
 (b) Explain the Construction and Working of VMOS. 5
3. (a) Sketch and Explain the working, Construction and Characteristic of JFET. 10
 (b) For the following circuit determine z_i , z_o , A_V and A_i :— 10



Q = BC 547A

4. (a) Design for a fullwave rectifier, an L type LC filter which gives a dc output voltage of 10 V at a load current of 100 MA. The allowable ripple factor is 0.02. 10
 (b) Determine the equation for A_V , Z_i and Z_o and determine A_V , Z_i and Z_o for a given network. 10

 $I_{DSS} = 10 \text{ mA}$ $V_P = -4 \text{ V}$

5. (a) Explain different biasing technique for EMOSFET.
(b) Explain with neat diagram Zener as regulator.
6. (a) Explain hybrid Model of BJT.
(b) Draw the voltage doubler circuit and explain its working.
7. Write short notes on the following :—
(a) Photodiode and photo-voltaic cell
(b) Transistor as a constant current source
(c) LC filter
(d) E and D MOSFET.

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DBEC DATA SHEET

Transistor type	P_{max} @ 25°C Watts	I_{max} 2°C amps	$V_{ce}^{(sat)}$ volts	V_{ceo} volts	V_{ceo} (S_{US}) volts d.c.	V_{cea} (S_{US}) volts d.c.	V_{ceX} volts	V_{beo} volts	T_j °C	D.C. current			gain			Small Signal			h_e	V_{BE} max.	θ_{jc} °C/W	Derrate above 25°C W/°C
										min	typ.	max.	min.	typ.	max.							

2N 3055	115.5	15.0	1.0	100	60	70	90	7	200	20	50	70	15	50	120	1.8	1.5	0.7
ECN 055	50.0	5.0	1.0	50	50	55	60	5	200	25	50	100	25	50	125	1.5	3.5	0.4
ECN 149	30.0	4.0	1.0	50	50	—	—	8	150	30	50	110	33	60	115	1.2	4.0	0.3
ECN 100	5.0	0.7	0.6	70	60	65	—	6	200	50	90	280	50	90	280	0.9	35	0.05
BC147A	0.25	0.1	0.25	50	45	50	—	6	125	115	180	220	125	220	260	0.9	—	—
2N 525(PNP)	0.225	0.5	0.25	85	30	—	—	—	100	35	—	65	—	—	—	—	—	—
BC147B	0.25	0.1	0.25	50	45	50	—	6	125	200	290	450	240	330	500	0.9	—	—

Transistor type	h_{ie}	h_{oe}	h_{re}	θ_{ja}
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BC 147A	2.7 K Ω	18 μ Ω	1.5 $\times 10^{-4}$	0.4°C/mw
2N 525 (PNP)	1.4 K Ω	25 μ Ω	3.2 $\times 10^{-4}$	—
BC 147B	4.5 K Ω	30 μ Ω	2 $\times 10^{-4}$	0.4°C/mw
ECN 100	50 Ω	—	—	—
ECN 149	15 Ω	—	—	—
ECN 055	12 Ω	—	—	—
2N 3055	6 Ω	—	—	—

BFW 11-JFET MUTUAL CHARACTERISTICS

-V _{GS} volts	I _{DS} mA															
	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.6	2.0	2.4	2.5	3.0	3.5	4.0	—	—
I _{DS} max. mA	10	9.0	8.3	7.6	6.8	6.1	5.4	4.2	3.1	2.2	2.0	1.1	0.5	0.0	—	—
I _{DS} typ. mA	7.0	6.0	5.4	4.6	4.0	3.3	2.7	1.7	0.8	0.2	0.0	0.0	0.0	0.0	—	—
I _{DS} min. mA	4.0	3.0	2.2	1.6	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	—	—

N-Channel JFET

Type	V_{DS} max. Volts	V_{DG} max. Volts	V_{GS} max. Volts	P_d max. @25°C	T_j max.	I_{SS}	g_{mo} (typical)	$-V_p$ Volts	Derrate above 25°C	θ_{ja}
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2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ Ω	6	50 K Ω	2 mW/°C	0.59°C/mW
BFW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5600 μ Ω	2.5	50 K Ω	—	0.59°C/mW