Q.P. Code: 25528

Duration: 3 hours **Total marks: 80**

Note (1) Question No. 1 is compulsory

(2) Attempt any three questions from remaining questions

(3) Draw suitable diagrams wherever necessary

(4) Assume suitable data, if necessary

Q 1. (a) Find the CFG for the regular expression (10)*(110+01)*. (**05**)

(b) Write short note on Universal Turing Machine. (**05**)

(c) Difference between FA and PDA (**05**)

(d) Design moore machine to convert each occurrence of 111 to 101 (**05**)

Q 2. (a) Construct NFA with epsilon which accept a language consisting the string of any number of a's followed by any number of b's followed by any number of c's. Also convert it into NFA without epsilon. (**10**)

(b) Design a Moore and Mealy machine for a binary input sequence such that if it has a substring 011 the machine outputs A if input has substring 001 it outputs B otherwise it outputs C. (**10**)

Q 3 (a) Minimize the following DFA where A is a start state and B, C and E are final states. (**10**)

∂	0	1
A	D	B
B	C	F
C	C	F
D	A	E
E	C	F
F	F	F

(b) Use pumping lemma prove that whether following language is regular or not (**10**)

$(a^n b^n c^n \mid n>=1)$

Q 4 (a) Define context free grammer. Obtain the CFG for the following refular expression: (**10**)

(110 + 11)* (10)*

(b) Convert given CFG to GNF where V={S,A}, T={0,1} and P is (**10**)

S→AA|0

A→SS|1

Q 5 (a) Design a PDA to accept a string of balanced parentheses. The parentheses (**10**)

to be considered (,), {, }.

(b) Construct TM for L= $\{a^n b^n c^n \mid n>=1\}$ (**10**)

Q 6 Write short notes on (Any two) (**20**)

(a) Pumping Lemma for Regular Languages

(b) Recursive and Recursively enumerable languages

(c) Unsolvable Problems

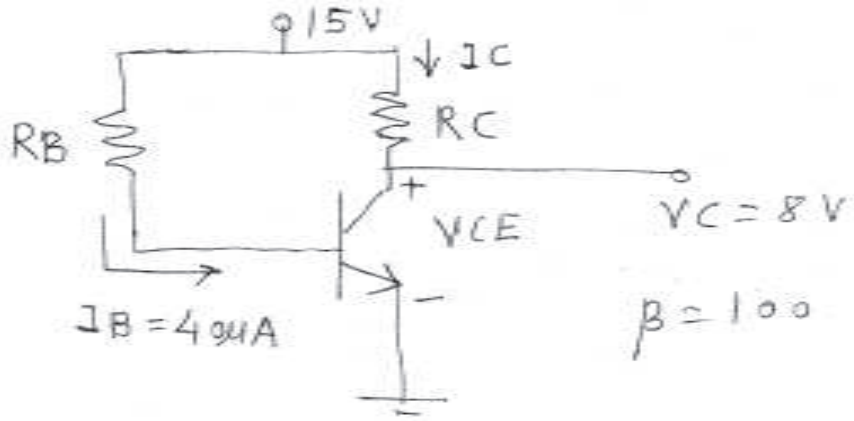
QP Code : 22763

[3 Hours] [Total Marks : 80]

N.B : 1. Question No. 1 is **compulsory** and solve any three questions from remaining questions.
2. Assume suitable data if it is required.

1. Solve all. **20**

(a) For the given circuit find 1C, RC, RB and VCE



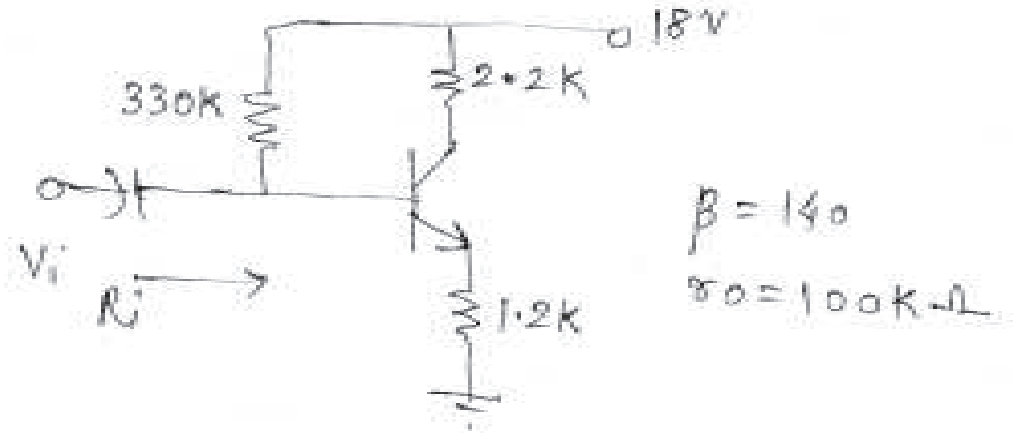
(b) Draw small signal model of E-MOSFET.

(c) Draw circuit diagram of Darlington Pair and hence derive equation of its input resistance.

(d) State the characteristics of negative feedback amplifier.

(e) Justify, differential amplifier rejects common mode signal and hence give different types of differential ampifier.

2. (a) Determine AV, AI, Ri and Ro for the given circuit. **10**



(b) Derive equation of ID_Q and VDS_Q for voltage divider baised JFET circuit. **10**

3. (a) Derive equation of upper cut off frequency for CS D MOSFET amplifier. **10**

(b) Draw circuit diagram of colpitt oscillator and explain its working. **10**

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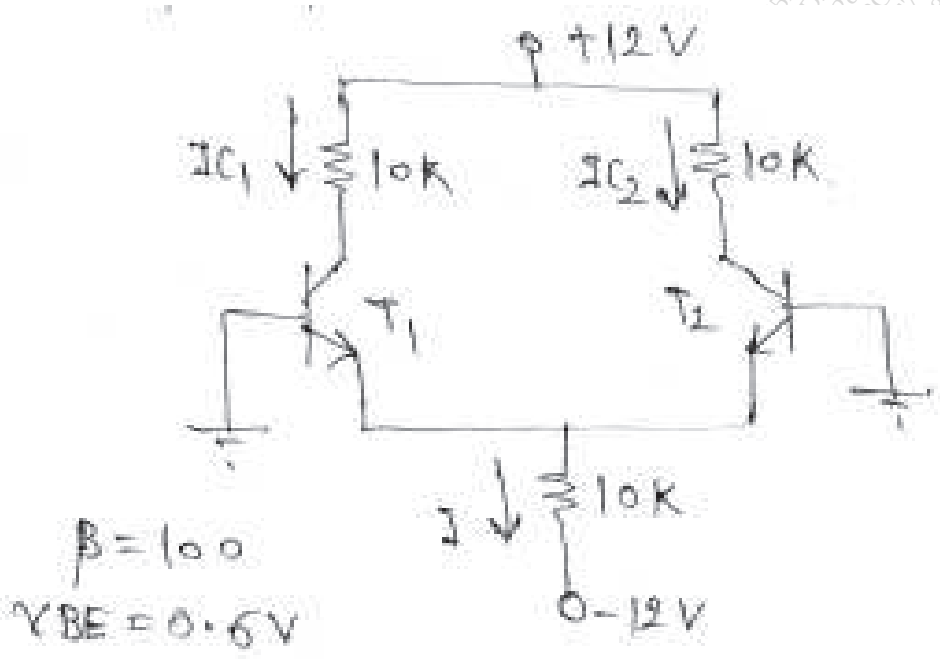
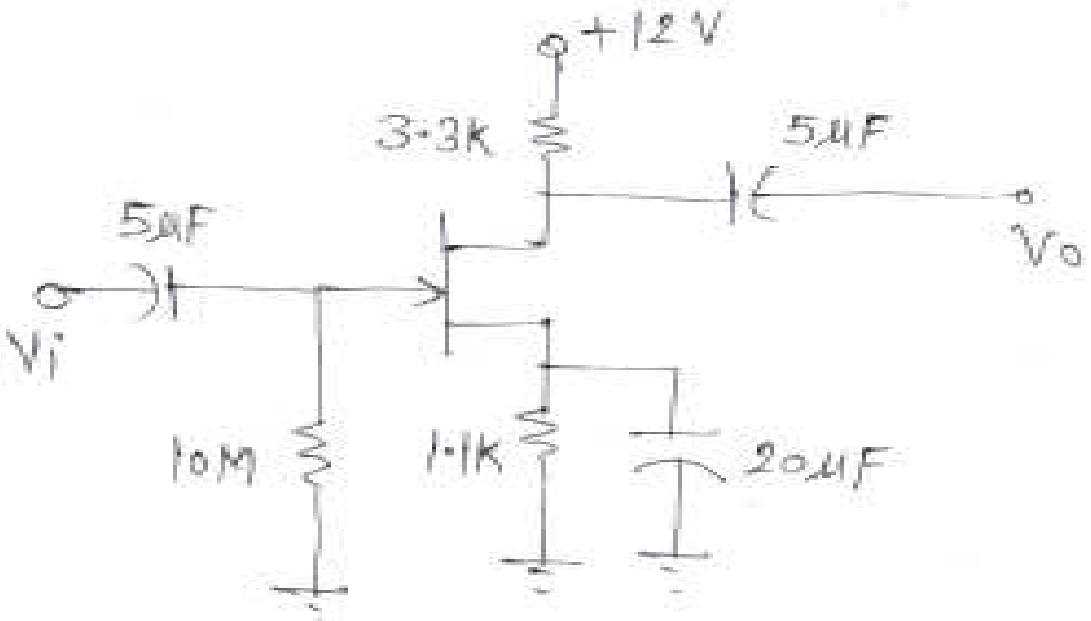
4. (a) For the circuit shown find IC1, IC2, I, VCE and VC. **10**



(b) Explain the procedure to find lower cutoff frequency for the CS JFET amplifier. **10**

5. (a) Explain series fed class A power amplifier and derive its power efficiency. **10**
(b) Determine Zi, Zo and Av for the given circuit. **10**



Given : g_m = 3000 μs and rd = 20 kΩ.

6. Write short notes on :— **20**
(a) Voltage series negative feedback amplifier
(b) Wilson current source
(c) Cross over distortion in class B power amplifier
(d) Clipping circuit.

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[Time: 3 Hours] **[Marks:80]**

N.B:
1. Question 1 is compulsory.
2. Attempt any three out of remaining questions.
3. Figure to the right indicates full marks.

Q.1	a)	Explain Cross Browser Compatibility issues.	**05**
	b)	Write JavaScript program to change background color continuously.	**05**
	c)	Differentiate between HTML and XML.	**05**
	d)	Explain PHP string functions.	
Q.2	a)	Write a HTML code which includes Table, Hyperlink, Image, Ordered and Unordered list, text formatting tags to design Resume.	**10**
	b)	Explain servlet life cycle in detail.	**10**
Q.3	a)	What is jQuery? Illustrate the use of jQuery for form validation.	**10**
	b)	Explain JDBC API and JDBC drivers in detail.	**10**
Q.4	a)	Explain java script built-in object with method and description.	**10**
	b)	What is session management? Explain the various approaches to session management.	**10**
Q.5	a)	What is CSS? Explain the way by means CSS is included in the web page.	**10**
	b)	Explain the different ASP objects in detail.	**10**
Q.6		Write a short note on a) URL b) Web Services c)JSP d)Cookies	**20**

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(3 Hours) **[Total Marks: 80]**

Note : Q1 is compulsory.
Attempt any THREE out of the remaining questions.
Assume suitable data if necessary.

Q1. Attempt any 4 sub questions

a) Differentiate between computer architecture and organization. (5 M)
b) What is instruction pipelining? Explain. (5 M)
c) Draw the flowchart of unsigned binary restoring division algorithm. (5 M)
d What is a micro-program? Give suitable example. (5 M)
e) Explain computer memory hierarchy. (5 M)

Q2. a) What is stored program concept? Explain Von-Neumann architecture. (10 M)
b) Differentiate between hardwired and microprogrammed approach. (10 M)

Q3 a) Represent the number $(- 0.0625)_{10}$ in single and double precision IEEE 754 binary floating point representation formats. (10 M)
b) What are Pipeline Hazards? Explain different types of Pipeline Hazards. (10 M)

4 a) Explain addressing modes with suitable examples. (10 M)

b) Draw the flowchart of Booths algorithm and multiply (-7)*(3) using Booths algorithm. (10 M)

Q5. a) Explain Interrupt driven I/O. (10 M)
b) Explain different cache memory mapping techniques. (10 M)

Q6 Write notes on (**any two**) (20 M)
a) Interleaved and Associative memory.
b) DMA.
c) Instruction execution cycle with interrupt processing.

(3 Hours) **[Total Marks: 80]**

N.B. : (1) Question No.1 is compulsory
(2) Answer any 3 questions from Q.No. 2 to Q.No. 6
(3) Figures to the right indicate full marks
(4) Assume suitable data if required

1. (a) Explain Digital signature 5
(b) Compare Lossy and Lossless compression. 5
(c) Explain Security goals. 5
(d) Compare Symmetric and Asymmetric key cryptography 5

2. (a) Explain convolution code with example. Draw code tree, code trellis and state diagram. 10
(b) What is Entropy? What are its types? 5
(c) Explain JPEG encoder. 5

3. (a) 10

For a (6,3) linear block code, the coefficient matrix [p] is as follows:

$$P = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

The received code words at the receiver are :
1) 0 0 1 1 1 0 2) 1 1 1 0 1 1
Check whether they are correct or contains some errors.

(b) Explain RSA algorithm with example 5
(c) Explain BCH codes. 5

4. (a) Consider the symbols {1,1,1,1,1,1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,6,6,7} 10
i. Find efficient fixed length code.
ii. Find Huffman code.
iii. Compare 2 codes.

(b) Explain Cyclic and Prefix code 5
(c) Compare MD5 and SHA-1 5

5. (a) Explain Diffie- Hellman algorithm. Which attach, is it vulnerable to? 10
(b) Explain Chinese Remainder theorem. 5
(c) Explain Speech compression. 5

6. (a) Explain DES in detail. 10
(b) Explain Channel capacity 5
(c) Use Euclidean's algorithm to find GCD (1819,3587) 5
