

Code No: 134CC

**R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

**PULSE AND DIGITAL CIRCUITS**

(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

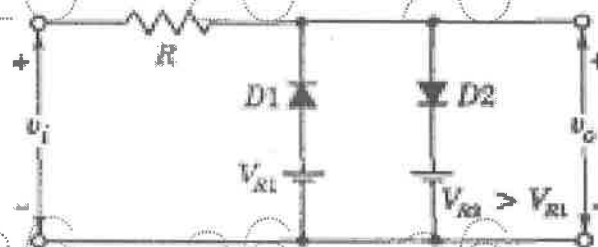
Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A**

**(25 marks)**

- 1.a) Show how an RC circuit works as a high pass filter. [2]
- b) Illustrate the output voltage and loop current waveform of a RC low pass circuit for a step input and indicate the time constant. [3]
- c) The input to the clipper circuit is  $V_m \sin \omega t$ . Illustrate the input and output waveform with respect to transfer characteristics shown in figure 1. [2]



**Figure: 1**

- d) Explain the working of an emitter coupled clipper. [3]
- e) Illustrate the capacitive load transistor switch circuit and explain its working. [2]
- f) Illustrate the circuit of transistor non-saturating switch and explain. [3]
- g) What is bistable multivibrator? What are the different names of it? [2]
- h) Define Sweep speed error and displacement error. [3]
- i) Illustrate the diode OR circuit for negative logic and give its truth table. [2]
- j) What is sampling gate? How it is different from logic gate? [3]

**PART-B**

**(50 Marks)**

2. A symmetrical square wave whose average value is zero has a peak to peak amplitude of 20V and a period of  $2\mu\text{sec}$ . This waveform is applied to a low-pass RC circuit whose 3-dB frequency is  $1/2\pi \text{ MHz}$ . Determine and sketch the steady state output waveform. In particular, what is the peak-to-peak output amplitude? [10]

**OR**

3. A square wave whose peak-to-peak amplitude is 2V extends  $\pm 1\text{V}$  wrt ground. The duration of the positive section is 0.1 sec and that of the negative section is 0.2 sec. If this waveform is impressed upon an RC integrating circuit whose time constant is 0.2 sec, Evaluate the steady state maximum and minimum values of the output waveform. [10]

4. The diodes are ideal.
- Write the transfer characteristic equation.
  - Plot  $v_o$  against  $v_i$  indicating all intercepts, slopes and voltages.
  - Determine and sketch  $v_o$  if  $v_i = 40\sin\omega t$ . Indicate all voltage levels. (Figure 6)

[10]

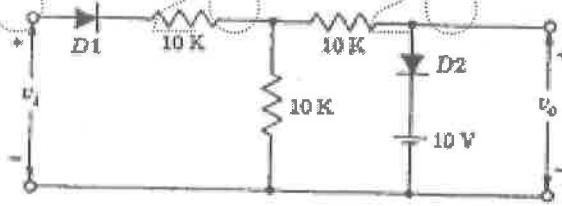


Figure: 2

OR

5. The ramp type signal is applied to the circuit shown in figure 3 which has  $R_f=100\Omega$ ,  $V_r=0$ ,  $R_f=\infty$  and  $R=10K\Omega$ . The capacitor  $C$  is arbitrarily large. Develop the output waveform, calculate all voltage levels and voltage across the capacitor, if  $R_s=0$  and  $100\Omega$ .

[10]

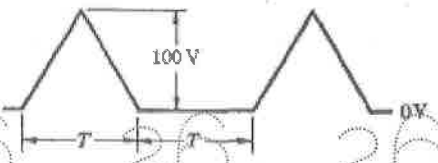
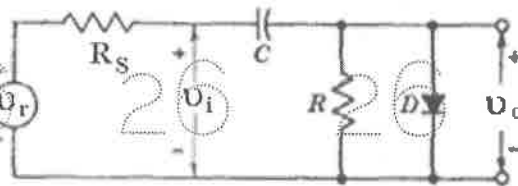


Figure: 3

6. A reverse biasing voltage of 100V is applied through a resistor  $R$  to a type of diode 1N270 diode. The diode operates at  $25^\circ\text{C}$ . Determine the diode current and voltage for the cases  $R=10M\Omega$ ,  $1M\Omega$  and  $100K\Omega$ . (Figure 4)

[10]

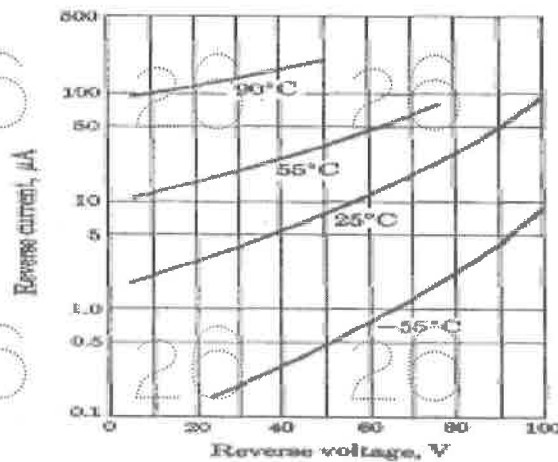


Figure: 4

OR

7. In the below circuit  $V_{CC}=10V$ ,  $R_C=500\Omega$ ,  $R=40K\Omega$ ,  $C=0.1\mu F$ ,  $R_{S1}=R_{S2}=10K\Omega$ ,  $V=10V$  and  $T_2=1.0msec$ . Determine the all the marked voltages assuming  $r_{bb'}=100\Omega$ . (Figure 5)

[10]

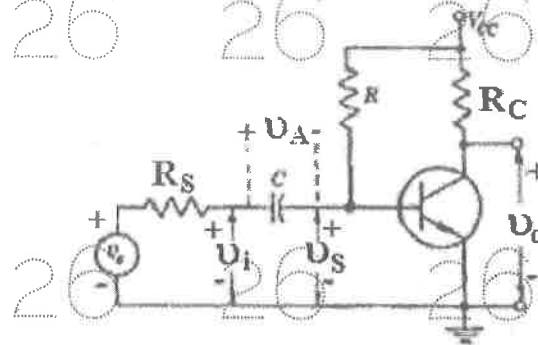


Figure: 5

8. The fixed bias binary shown below figure 6 uses npn silicon transistors with  $h_{FE}=20$ . The circuit parameters are  $V_{CC}=12V$ ,  $V_{BB}=3V$ ,  $R_C=1K\Omega$ ,  $R_1=5K\Omega$  and  $R_2=10K\Omega$ . Test that one transistor is in cut-off and the other is in saturation and evaluate the stable state current and voltages if  $V_{CE(sat)}=0.4V$  and  $V_{BE(sat)}=0.8V$ .

[10]

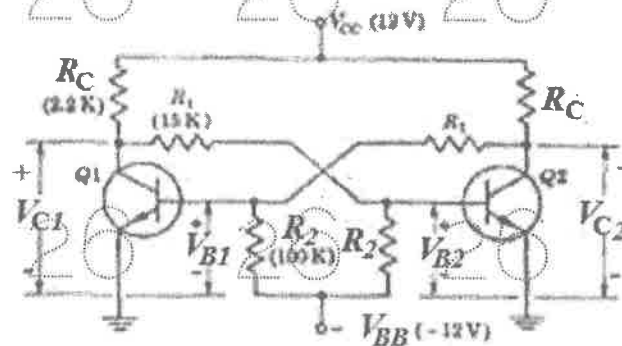


Figure: 6

OR

9. Germanium transistors with  $(h_{FE})_{min}=40$  are used in the fixed bias flip-flop with collector catching diodes. The circuit parameters are  $V_{CC}=18V$ ,  $V=V_{BB}=6V$ ,  $R_C=1.5K\Omega$ ,  $R_1=5K\Omega$  and  $R_2=25K\Omega$ . Neglect the voltage drop across a forward biased junction. Verify that if one transistor is cut-off, the other is in saturation. (Figure 7)

[10]

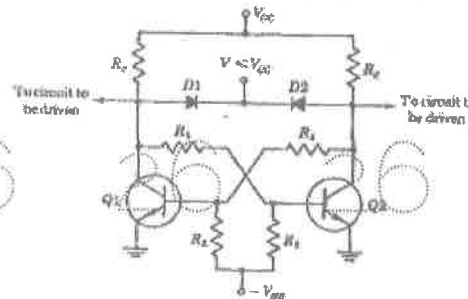


Figure: 7

10.a) Explain unidirectional sampling gate.

b) In the gate circuit shown below figure 8,  $R_L = 10K\Omega$  and is shunted by a capacitance  $C_1 = 10pF$ . The gate signal is a symmetrical square wave of frequency 1MHz which makes excursions between -35 to 0V. The output impedance of the square wave source is  $500\Omega$ . If no more than 2V of the input signal is to be fed back into the control-signal source, what is  $R_1$ ? [5+5]

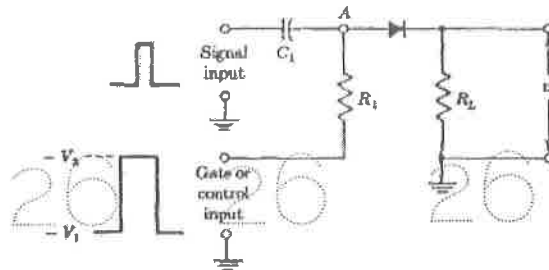


Figure: 8  
OR

11.a) Design the circuit of three input positive NAND gate and explain.

b) Consider a two input positive-logic diode OR gate with the diodes reversed and  $V_i = 0$ . The inputs are the square waves  $v_1$  and  $v_2$  indicated. Determine and sketch the output waveform if the ratio of the amplitude of  $v_1$  and  $v_2$  is: i) 2 ii) 0.5. Assume ideal diodes. (Figure9) [5+5]

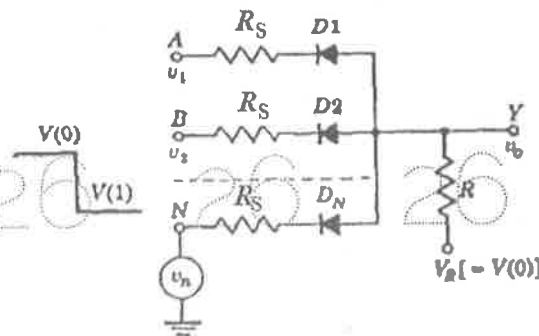
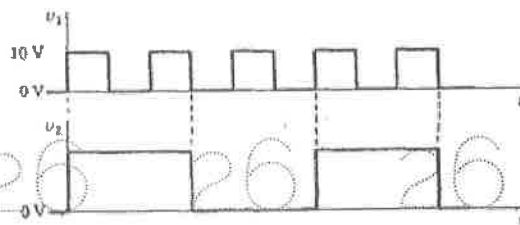


Figure: 9

Code No: 134BD

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

FORMAL LANGUAGES AND AUTOMATA THEORY

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

**PART - A**

(25 Marks)

- 1.a) Define Kleene Closure and Positive Closure? [2]
- b) Define Moore Machine? [3]
- c) Define a Regular Expression. [2]
- d) Find the simplified regular expression for the following regular expression  $r(r^*r + r^*) + r^*$ ? [3]
- e) Define Context Free Grammar. [2]
- f) Define Push Down Automata. [3]
- g) Define Turing machine. [2]
- h) What is Chomsky Normal Form? [3]
- i) What is undecidable problem? [2]
- j) Compare recursive and recursively enumerable languages. [3]

**PART - B**

(50 Marks)

2. Construct NFA with  $\epsilon$  which accepts a language consisting the strings of any number of 0's followed by any number of 1's followed by any number of 2's And also convert into NFA without  $\epsilon$  transitions. [10]

OR

3. Construct the Moore machine to determine residue mod 3 and convert into Mealy machine. [10]

- 4.a) Test whether the following two FSM's are equivalent.

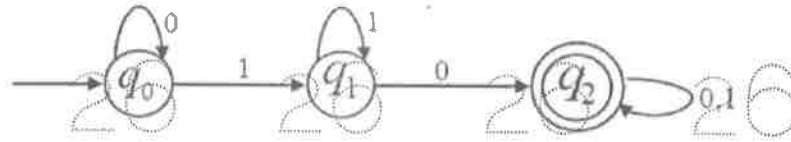
M1	0	1
$\rightarrow A$	B	D
$\textcircled{B}$	A	C
C	D	B
$\textcircled{D}$	C	A

M2	0	1
$\rightarrow P$	R	R
Q	R	P
$\textcircled{R}$	P	Q

- b) Apply pumping lemma for the language  $L = \{a^n/n \text{ is prime}\}$  and prove that it is not regular? [5+5]

OR

5. Construct the regular expression corresponding to the language accepted by following DFA. [10]



- 6.a) Elaborate on left most derivation and right most derivation.  
 b) Design Push down Automata for  $L = \{a^{2n}b^n \mid n \geq 1\}$ . [5+5]

OR

7. Construct the CFG for the PDA  $M = (\{q_0, q_1\}, \{0, 1\}, \{R, Z_0\}, \delta, q_0, Z_0, \Phi)$  and  $\delta$  is given by

$\delta(q_0, 1, Z_0) = (q_0, RZ_0)$

$\delta(q_0, 1, R) = (q_0, RR)$

$\delta(q_0, 0, R) = (q_1, R)$

$\delta(q_1, 0, Z_0) = (q_0, Z_0)$

$\delta(q_0, \epsilon, Z_0) = (q_0, \epsilon)$

$\delta(q_1, 1, R) = (q_1, \epsilon)$ . [10]

- 8.a) List out and discuss the closure properties of CFL.  
 b) Construct CFG without  $\epsilon$  – production from the one which is given below  
 $S \rightarrow a \mid Ab \mid aBa$   
 $A \rightarrow b \mid \epsilon$   
 $B \rightarrow b \mid A$

OR

9. Design a Turing Machine to accept  $L = \{WcW^R \mid W \text{ is in } (a+b)^*\}$ . [10]

- 10.a) Discuss in brief about NP Hard problems.  
 b) Discuss the examples of undecidable problems. [5+5]

OR

- 11.a) Explain about the undecidable problems about turing machines.  
 b) Distinguish between class P and class NP Problems. [5+5]

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Code No: 134BK

**R16**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year II Semester Examinations, May - 2019**

**MANUFACTURING PROCESS**

**(Mechanical Engineering)**

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

**PART – A**

**(25 Marks)**

- 1.a) List the advantages of metallic pattern materials. [2]
- b) What are the applications of sweep pattern? [3]
- c) Differentiate between Welding and soldering. [2]
- d) Explain the basic principle of resistance welding? [3]
- e) Discuss the parameters affecting Heat Affecting zone (HAZ) briefly. [2]
- f) Explain the principle of seam welding. [3]
- g) Differentiate blanking and piercing? [2]
- h) What is hot rolling? [3]
- i) What is swaging? [2]
- j) What are the forging defects? [3]

**PART – B**

**(50 Marks)**

2. Explain the principle of investment casting with necessary sketches. [10]
- OR
3. Describe the working of cupola with sketch. [10]
4. Sketch and explain atomic hydrogen welding. [10]
- OR
5. Categorize in detail welding defects and their causes and remedies. [10]
6. With sketch, explain the laser beam welding process. Mention advantages and limitation of laser welding also give application. [10]
- OR
7. Discuss magneto particle and radiographic inspection testing of weldings. [10]
8. Discuss recovery, recrystallisation and grain growth. [10]
- OR
9. Illustrate wire drawing and Tube drawing. [10]
- 10.a) Discuss impact extrusion.
- b) Enumerate the principles of forging. [5+5]
- OR
- 11.a) With a neat sketch, explain hydrostatic extrusion.
- b) Discuss smith forging and roll forging. [5+5]

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Code No: 124AG

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

FORMAL LANGUAGES AND AUTOMATA THEORY

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A**

(25 Marks)

- 1.a) Define DFA and NFA. [2]
- b) Design NFA to accept set of all strings over  $\{0,1\}$  does not contain 3 consecutive zeros. [3]
- c) Define Left Linear Grammar. [2]
- d) Define Pumping Lemma for Regular sets. [3]
- e) Define UNIT Production. [2]
- f) What is reachable variable? Give an example. [3]
- g) Give instantaneous description ID of Turing Machine. [2]
- h) What is a Turing Machine? [3]
- i) Give any two examples of Decidable Problems. [2]
- j) Define NP hard problems. [3]

**PART - B**

(50 Marks)

- 2.a) Minimizing the following DFA as shown in figure 1.

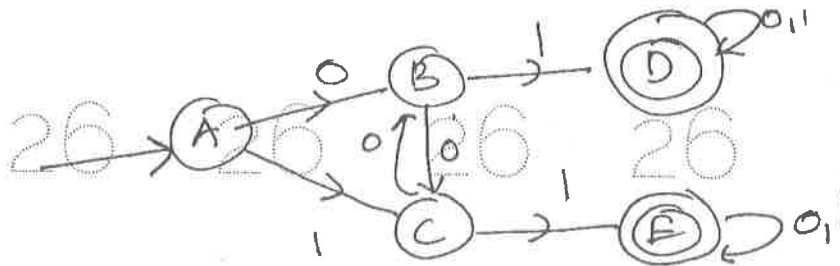


Figure: 1

- b) Define Mealy and Moore Machines. [6+4]

OR

- 3.a) Convert the following NFA with  $\epsilon$ -moves to DFA as shown in Figure 2.

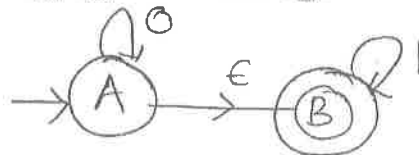


Figure: 2

- b) Design DFA for the language all strings over  $\{0,1\}$  which are ending with 00. [5+5]



- 4.a) Show that the language  $L = \{ a^n b^n / n \geq 1 \}$  is not a Regular language.  
 b) Find the Regular Grammar equivalent to the following Finite Automata shown in figure 3. [5+5]

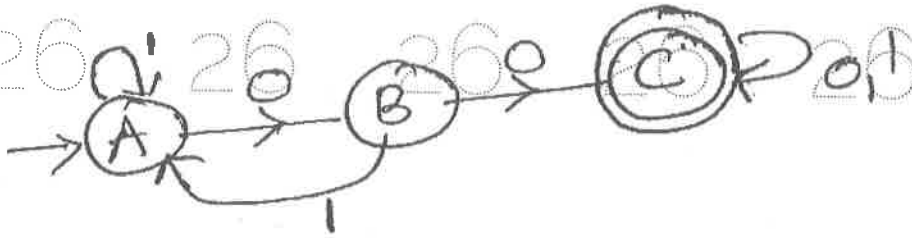


Figure 3

- 5.a) Construct Right Linear Grammar and Left Linear Grammar for the Regular Expression  $0(11)^+1001$   
 b) Give the RE for  
 (i) All strings over  $\{a,b\}$  which contains even number of a's  
 (ii) All strings over  $\{a,b\}$  which contains at least two a's  
 (iii) All strings over  $\{a,b\}$  which contains at most two a's  
 (iv) All strings over  $\{a,b\}$  which contains exactly two a's. [6+4]
- 6.a) Minimize the following Context Free Grammar  $G = (\{S,A,B,C\}, \{a,b,c,d\}, P, S)$ , where P is given as follows  
 $S \rightarrow AC \mid SB$   
 $A \rightarrow bASC \mid a$   
 $B \rightarrow aSB \mid bbB$   
 $C \rightarrow Bc \mid ad$   
 b) Design PDA for the language  $L = \{ a^{2n} b^n c^4 / n \geq 1 \}$ . [5+5]
- 7.a) Convert the following Context Free Grammar (CFG) to Chomsky Normal Form (CNF)  
 $S \rightarrow AaB \mid aaB$   
 $A \rightarrow \epsilon$   
 $B \rightarrow bbA \mid \epsilon$   
 b) Design PDA for the language  $L = \{ a^n b^{n+m} c^m / n, m \geq 1 \}$ . [5+5]
- 8.a) Explain different types of Turing Machine.  
 b) Design TM for performing proper subtraction of two numbers. [5+5]
- OR
9. Write about:  
 a) Church's hypothesis.  
 b) Counter machine. [5+5]
- 10.a) Discuss about turing reducibility.  
 b) What is post correspondence problem? Verify whether the following PCP has solution or not?  $A = \{ba, ab, a, baa, b\}$ ,  $B = \{bab, baa, ba, a, aba\}$  [5+5]
- OR
11. Define the NP-complete problems and give examples. [10]

Code No: 124CV

**R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

**ELECTRONIC CIRCUIT ANALYSIS**

(Common to ECE, EIE, ETM)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

**(25 Marks)**

- 1.a) What is the concept of Miller's Theorem related to amplifiers.
- b) What is Cas-code Amplifier?
- c) Draw the Frequency response of BJT Amplifier.
- d) List out the General frequency considerations of BJT amplifier.
- e) What is the concept of Positive and Negative Feedback.
- f) List out the Different Classification of Oscillators.
- g) Write different Classification of Large signal amplifiers.
- h) What are the advantages if Heat sinks are used in amplifiers?
- i) What is the expression for harmonic distortion in tuned amplifiers?
- j) How to achieve stability in tuned amplifiers?

[2]  
[3]  
[2]  
[3]  
[2]  
[3]  
[2]  
[3]  
[2]  
[3]

**PART-B**

**(50 Marks)**

- 2.a) What are the different types of distortions present in Amplifiers? Why they occur in it.
- b) Explain the concept of Analysis of CE amplifier with Emitter follower along with circuit diagram.

[5+5]

**OR**

- 3.a) Derive the Analysis of Cascaded RC Coupled BJT amplifiers along with circuit diagram.
- b) Draw the circuit diagram of Direct Coupled Amplifier and explain its operation in detail.

[5+5]

- 4.a) Derive an expression for Voltage gain, input resistance, output resistance of a source follower at high frequencies.
- b) Draw the circuit diagram of Common Emitter Transistor II Model and explain its operation.

[5+5]

**OR**

- 5.a) Explain the following terms in detail:
  - i) CE Short Circuit Current Gain
  - ii) Current Gain with Resistive Load.
- b) Explain the significance of the gain bandwidth product.

[5+5]

6.a) Derive the expression for frequency of oscillation and condition for sustained oscillation of a Hartley oscillator.

b) Explain the limitations of RC phase shift oscillator in detail. [5+5]

OR  
7.a) Draw Wien bridge oscillator using BJT and show that the gain must be at least 3 for the oscillations to occur.

b) Draw the circuit diagram of Current Shunt Feedback amplifier and explain its operation. [5+5]

8.a) Explain the operation of a class-A power amplifier with necessary diagram.

b) A signal  $i_b = I_m \cos \omega t$  is applied to a power amplifier with second order nonlinearity between  $i_b$  and  $i_c$ . Derive the expression for  $i_c$  and also derive distortion factor. [5+5]

OR  
9.a) Explain the operation of a class B push-pull power amplifier and list out its Advantages and disadvantages.

b) Explain the operation of a complementary and symmetry class B push pull amplifier with necessary diagram. [5+5]

10.a) Explain the operation of a single tuned amplifier circuit and its frequency Response.

b) Show that for an "n" stage synchronously tuned amplifier, maximum bandwidth is achieved, if the single stage gain is 4.34 dB. [5+5]

OR  
11.a) What are the different effects of Cascading Double Tuned Amplifiers on Bandwidth in detail.

b) What are the different types of Tuned Amplifiers and explain various areas of applications? [5+5]

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Code No: 124DM

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

PRODUCTION TECHNOLOGY

(Common to ME, MCT, AME)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

(25 Marks)

- 1.a) List the advantages and limitation of casting process.
- b) What are the functions of patterns?
- c) What is carburizing flame?
- d) What are the basic types of weld joints? Explain.
- e) What is soldering and Brazing?
- f) Explain briefly the fluxes and filler rods used in gas welding.
- g) What is meant by strain hardening?
- h) How would you differentiate hot and cold rolling processes?
- i) How do we make collapsible tubes?
- j) Write notes on forging hammer.

[2]  
[3]  
[2]  
[3]  
[2]  
[3]  
[2]  
[3]  
[2]  
[3]

**PART-B**

(50 Marks)

2. Explain the principle of investment casting process with neat sketch. Also discuss the advantages, limitations and applications of investment casting process.

[10]

OR

- 3.a) Illustrate and describe the process of Die casting.
- b) Explain different types allowances used in patterns making.

[5+5]

- 4.a) The voltage-length characteristics of a DC arc is given by  $V=20+30L$ , where V is the arc voltage and L is the arc length in cm. Determine open circuit voltage and short circuit current for arc length ranging from 3 to 5 mm and current ranging from 200 to 400 Amp during welding operation.

- b) Explain the process of forge welding.

[6+4]

OR

- 5.a) Compare and distinguish spot welding and projection welding.
- b) Explain the principle of thermit welding with applications, advantages and limitations.

[3+7]

- 6.a) Write the principle of operation along with application, advantage and limitations of explosive welding process.

- b) What is magnetic arc blow? Mention the causes and remedies of for magnetic arc blow.

[7+3]

OR

7. Write the principle of operation along with application, advantage and limitations of TIG welding process.

[10]

8.a) Write a note on control of hot rolling mills.

b) A number of cold rolling passes are required in a two high rolling mill to reduce the thickness of a plate from 50mm to 20mm. the roll diameter of 700mm and the coefficient of friction at the roll work interface is 0.1. it is required that the draft in each pass must be the same. Assuming no front and back tensions, determine, the minimum no of passes and the draft in each pass. [4+6]

OR

9.a) Derive an expression for the force acting on metal during rolling.

b) A metal strip is to be rolled from an initial wrought thickness of 3.5mm to a final rolled thickness of 2.5mm in a single pass rolling mill having rolls of 250mm diameter. The strip is 450 mm wide. The average coefficient of friction is 0.08. taking plane strain flow stress of 140 MPa, for the metal and assuming negligible spreading, estimate the roll separating force. [5+5]

10.a) What are the various equipment used in extrusion of metals? Briefly describe them.

b) Write the expression for determining the force required to produce an extrusion and discuss the effect of various parameters on the extruding force. [5+5]

OR

11.a) Explain different forging methods with neat sketches.

b) What are the defects may arise in forging process. Discuss the reasons and remedies for them. [6+4]

Code No: 124DT

**R15**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year II Semester Examinations, May - 2019**

**SWITCHING THEORY AND LOGIC DESIGN**

**(Electrical and Electronics Engineering)**

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

**(25 Marks)**

- 1.a) What is a Parity bit? What do you mean by even parity and odd parity? [2]
- b) State and Prove Demorgan's theorem. [3]
- c) Define Selective prime implicant and Redundant prime implicant. [2]
- d) Design  $2 \times 1$  Multiplexer with neat logic diagram. [3]
- e) Define Clock Skew. [2]
- f) Distinguish between combinational circuits and sequential circuits. [3]
- g) What is a Serial-in and Parallel-out shift register? [2]
- h) What is a Ring Counter? What are applications of Ring counters? [3]
- i) What is an ASM chart? [2]
- j) What are the capabilities and limitations of finite state machine? [3]

**PART-B**

**(50 Marks)**

- 2.a) i) Convert the given Octal number  $(756.603)_8$  to Hexadecimal Number?  
ii) Given that  $(16)_{10} = (100)_6$ , Find the value of b. [5+5]
  - b) Encode data bits 1101 into 7 bit even parity Hamming Code. [5+5]
- OR**
- 3.a) Prove that  $AB'C + B + BD' + ABD' + A'C = B + C$
  - b) Simplify the following expression  
 $F = AB' + ABD + ABD' + A'C'D' + A'BC'$  and implement with NAND gates. [5+5]
- 4.a) Obtain the simplified expression in SOP form and identify Prime implicants and Essential prime implicants  
 $F(A,B,C,D) = \sum m(0,1,2,3,4,8,12)$
  - b) Simplify the following Boolean expression using K-map and implement them with NOR logic gates  
 $F(A,B,C,D) = \sum m(1,3,7,11,15) + d(0,2,5)$  [5+5]
- OR**
- 5.a) Design a combinational circuit with three input variables that will produce a logic '1' output when more than one input variables are logic '1'?
  - b) Design and explain 3 to 8 decoder with necessary truth table and logic diagram. [4+6]

- 6.a) Explain about Triggering methods in sequential circuits.  
 b) Design SR flip flop using NAND gates and explain its operation. [5+5]

OR

- 7.a) Convert D flip-flop to SR flip-flop.  
 b) Derive the characteristic equation for JK flip-flop and T flip-flop. [5+5]

- 8.a) Draw the State diagram and State table for a 4 –bit Odd- Parity generator.  
 b) A clocked sequential circuit is provided with a single input x and single output Z. Whenever the input produces a string of pulses 1 1 1 or 0 0 0 and at the end of the sequence it produce an output Z = 1 and overlapping is also allowed. Obtain State diagram and State table? [5+5]

OR

- 9.a) Design a 3-bit counter which counts the following sequence  
 $0 \rightarrow 2 \rightarrow 5 \rightarrow 3 \rightarrow 4 \rightarrow 0 \rightarrow 2$   
 b) Explain about Bi-directional Shift Register with neat logic diagram. [5+5]

- 10.a) Find the equivalence Partition and corresponding reduced state table for the given completely specified sequential machine.

Present State	Next State, Z	
	X =0	X=1
A	E,0	D,1
B	F,0	D,1
C	E, 0	B,0
D	F, 0	B,1
E	C,0	F,0
F	B, 0	C,0
G	D,1	C,1
H	B,1	A,1

- b) Draw the Merger Graph and obtain the set of maximum compatibilities for the given incompletely specified sequential machine. [5+5]

Present State	Next State, Z	
	I <sub>1</sub>	I <sub>2</sub>
A	E, 0	B, 0
B	F,0	A, 0
C	E, -	C, 0
D	F, 1	D, 0
E	C,1	C,0
F	D,-	B,0

OR

- 11.a) Draw the State diagram and ASM chart for sequence detector to detect 1010.  
 b) Draw the State diagram, State table and ASM chart for a D flip-flop. [5+5]

---ooOoo---

Code No: 114DM

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year II Semester Examinations, May - 2019**

**PRODUCTION TECHNOLOGY**

**(Common to ME, MCT, AME)**

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.  
Part A is compulsory which carries 25 marks. Answer all questions in Part A.  
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

**(25 Marks)**

- 1.a) List the advantages and limitation of casting process.
- b) What are the functions of patterns?
- c) What is carburizing flame?
- d) What are the basic types of weld joints? Explain.
- e) What is soldering and Brazing?
- f) Explain briefly the fluxes and filler rods used in gas welding.
- g) What is meant by strain hardening?
- h) How would you differentiate hot and cold rolling processes?
- i) How do we make collapsible tubes?
- j) Write notes on forging hammer.

[2]  
[3]  
[2]  
[3]  
[2]  
[3]  
[2]  
[3]  
[2]  
[3]

**PART-B**

**(50 Marks)**

2. Explain the principle of investment casting process with neat sketch. Also discuss the advantages, limitations and applications of investment casting process.

[10]

**OR**

- 3.a) Illustrate and describe the process of Die casting.
- b) Explain different types allowances used in patterns making.

[5+5]

- 4.a) The voltage-length characteristics of a DC arc is given by  $V=20+30L$ , where V is the arc voltage and L is the arc length in cm. Determine open circuit voltage and short circuit current for arc length ranging from 3 to 5 mm and current ranging from 200 to 400 Amp during welding operation.

- b) Explain the process of forge welding.

[6+4]

**OR**

- 5.a) Compare and distinguish spot welding and projection welding.
- b) Explain the principle of thermit welding with applications, advantages and limitations.

[3+7]

- 6.a) Write the principle of operation along with application, advantage and limitations of explosive welding process.

- b) What is magnetic arc blow? Mention the causes and remedies of for magnetic arc blow.

[7+3]

**OR**

7. Write the principle of operation along with application, advantage and limitations of TIG welding process.

[10]



8.a)  
b)

Write a note on control of hot rolling mills.

A number of cold rolling passes are required in a two high rolling mill to reduce the thickness of a plate from 50mm to 20mm. the roll diameter of 700mm and the coefficient of friction at the roll work interface is 0.1. it is required that the draft in each pass must be the same. Assuming no front and back tensions, determine, the minimum no of passes and the draft in each pass.

[4+6]

OR

9.a)  
b)

Derive an expression for the force acting on metal during rolling.

A metal strip is to be rolled from an initial wrought thickness of 3.5mm to a final rolled thickness of 2.5mm in a single pass rolling mill having rolls of 250mm diameter. The strip is 450 mm wide. The average coefficient of friction is 0.08. taking plane strain flow stress of 140 MPa, for the metal and assuming negligible spreading, estimate the roll separating force.

[5+5]

10.a)  
b)

What are the various equipment used in extrusion of metals? Briefly describe them.

Write the expression for determining the force required to produce an extrusion and discuss the effect of various parameters on the extruding force.

[5+5]

OR

11.a)

Explain different forging methods with neat sketches.

b)

What are the defects may arise in forging process. Discuss the reasons and remedies for them.

[6+4]

Code No: 114CV

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year II Semester Examinations, May - 2019**

**ELECTRONIC CIRCUIT ANALYSIS**

**(Common to ECE, EIE)**

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

**(25 Marks)**

- 1.a) What is the concept of Miller's Theorem related to amplifiers. [2]
- b) What is Cas-code Amplifier? [3]
- c) Draw the Frequency response of BJT Amplifier. [2]
- d) List out the General frequency considerations of BJT amplifier. [3]
- e) What is the concept of Positive and Negative Feedback. [2]
- f) List out the Different Classification of Oscillators. [3]
- g) Write different Classification of Large signal amplifiers. [2]
- h) What are the advantages if Heat sinks are used in amplifiers? [3]
- i) What is the expression for harmonic distortion in tuned amplifiers? [2]
- j) How to achieve stability in tuned amplifiers? [3]

**PART-B**

**(50 Marks)**

- 2.a) What are the different types of distortions present in Amplifiers? Why they occur in it.
- b) Explain the concept of Analysis of CE amplifier with Emitter follower along with circuit diagram. [5+5]

**OR**

- 3.a) Derive the Analysis of Cascaded RC Coupled BJT amplifiers along with circuit diagram.
- b) Draw the circuit diagram of Direct Coupled Amplifier and explain its operation in detail. [5+5]

- 4.a) Derive an expression for Voltage gain, input resistance, output resistance of a source follower at high frequencies.
- b) Draw the circuit diagram of Common Emitter Transistor II Model and explain its operation. [5+5]

**OR**

- 5.a) Explain the following terms in detail:
  - i) CE Short Circuit Current Gain
  - ii) Current Gain with Resistive Load.
- b) Explain the significance of the gain bandwidth product. [5+5]

6.a) Derive the expression for frequency of oscillation and condition for sustained oscillation of a Hartley oscillator.

b) Explain the limitations of RC phase shift oscillator in detail. [5+5]

OR  
7.a) Draw Wien bridge oscillator using BJT and show that the gain must be at least 3 for the oscillations to occur.

b) Draw the circuit diagram of Current Shunt Feedback amplifier and explain its operation. [5+5]

8.a) Explain the operation of a class-A power amplifier with necessary diagram.

b) A signal  $i_b = I_m \cos \omega t$  is applied to a power amplifier with second order nonlinearity between  $i_b$  and  $i_c$ . Derive the expression for  $i_c$  and also derive distortion factor. [5+5]

OR  
9.a) Explain the operation of a class B push-pull power amplifier and list out its Advantages and disadvantages.

b) Explain the operation of a complementary and symmetry class B push pull amplifier with necessary diagram. [5+5]

10.a) Explain the operation of a single tuned amplifier circuit and its frequency Response.

b) Show that for an "n" stage synchronously tuned amplifier, maximum, bandwidth is achieved, if the single stage gain is 4.34 dB. [5+5]

OR  
11.a) What are the different effects of Cascading Double Tuned Amplifiers on Bandwidth in detail.

b) What are the different types of Tuned Amplifiers and explain various areas of applications? [5+5]

---ooOoo---

Code No: 114AG

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

FORMAL LANGUAGES AND AUTOMATA THEORY

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A**

(25 Marks)

- 1.a) Define DFA and NFA. [2]
- b) Design NFA to accept set of all strings over  $\{0,1\}$  does not contain 3 consecutive zeros. [3]
- c) Define Left Linear Grammar. [2]
- d) Define Pumping Lemma for Regular sets. [3]
- e) Define UNIT Production. [2]
- f) What is reachable variable? Give an example. [3]
- g) Give instantaneous description ID of Turing Machine. [2]
- h) What is a Turing Machine? [3]
- i) Give any two examples of Decidable Problems. [2]
- j) Define NP hard problems. [3]

**PART - B**

(50 Marks)

- 2.a) Minimizing the following DFA as shown in figure 1.

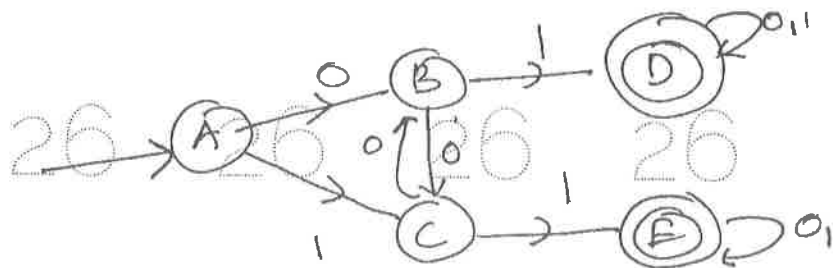


Figure: 1

- b) Define Mealy and Moore Machines.

[6+4]

- 3.a) Convert the following NFA with  $\epsilon$ -moves to DFA as shown in Figure 2.

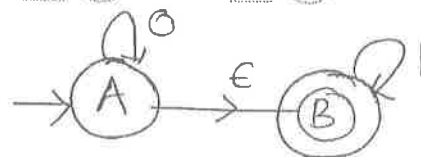


Figure: 2

- b) Design DFA for the language all strings over  $\{0,1\}$  which are ending with 00. [5+5]

- 4.a) Show that the language  $L = \{ a^n b^n / n \geq 1 \}$  is not a Regular language.  
 b) Find the Regular Grammar equivalent to the following Finite Automata shown in figure 3. [5+5]

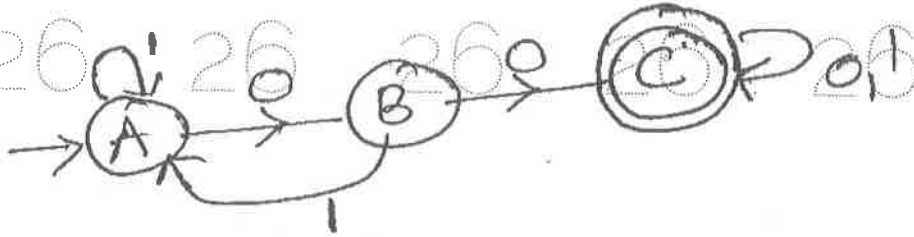


Figure 3

- 5.a) Construct Right Linear Grammar and Left Linear Grammar for the Regular Expression  $0(11)^+1001$   
 b) Give the RE for  
 (i) All strings over  $\{a,b\}$  which contains even number of a's  
 (ii) All strings over  $\{a,b\}$  which contains at least two a's  
 (iii) All strings over  $\{a,b\}$  which contains at most two a's  
 (iv) All strings over  $\{a,b\}$  which contains exactly two a's. [6+4]

- 6.a) Minimize the following Context Free Grammar  $G = (\{S,A,B,C\}, \{a,b,c,d\}, P, S)$ , where P is given as follows  
 $S \rightarrow AC \mid SB$   
 $A \rightarrow bASC \mid a$   
 $B \rightarrow aSB \mid bbB$   
 $C \rightarrow Bc \mid ad$   
 b) Design PDA for the language  $L = \{ a^{2n} b^n c^4 / n \geq 1 \}$ . [5+5]

- 7.a) Convert the following Context Free Grammar (CFG) to Chomsky Normal Form (CNF)  
 $S \rightarrow AaB \mid aaB$   
 $A \rightarrow \epsilon$   
 $B \rightarrow bbA \mid \epsilon$   
 b) Design PDA for the language  $L = \{ a^n b^{n+m} c^m / n, m \geq 1 \}$ . [5+5]  
 8.a) Explain different types of Turing Machine.  
 b) Design TM for performing proper subtraction of two numbers. [5+5]

OR

9. Write about:  
 a) Church's hypothesis.  
 b) Counter machine. [5+5]  
 10.a) Discuss about turing reducibility.  
 b) What is post correspondence problem? Verify whether the following PCP has solution or not?  $A = \{ba, ab, a, baa, b\}$ ,  $B = \{bab, baa, ba, a, aba\}$  [5+5]

OR

11. Define the NP-complete problems and give examples. [10]

Code No: 54004

**R09**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year II Semester Examinations, May - 2019**

**ENVIRONMENTAL STUDIES**

**(Common to CE, CSE, EIE, IT, AME)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any five questions  
All questions carry equal marks**

- 1.a) What is the need for studying environmental issues?  
b) What is the scope of environmental education? [7+8]
- 2.a) What is the relationship between fair land distribution and appropriate land use?  
b) Discuss about living and nonliving resources. [8+7]
- 3.a) What are the objectives of identifying biodiversity hotspots?  
b) Differentiate habitat, microhabitat and Niche. [7+8]
- 4.a) What are the sources of marine pollution? Explain its control measures.  
b) What is thermal pollution? Explain its impact on stream water quality. [7+8]
5. What is carbon warming? Explain in detail its causes and effects on human health and natural sources. [8+7]
- 6.a) Discuss about Environmental Impact Assessment.  
b) Discuss about Environmental Management plan. [7+8]
- 7.a) State the typical features of environmental protection act.  
b) Discuss about National Environmental policy. [8+7]
- 8.a) Discuss about sustainable cities and communities.  
b) Explain the variation of population growth among nations. [7+8]

---ooOoo---

Code No: 54019

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, May - 2019

PRINCIPLES OF ELECTRICAL ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

- 1.a) Explain transient response in series R-L-C circuit with D.C excitation.  
b) Determine the Laplace Transforms Impedance of the circuit shown in Figure:1. [8+7]

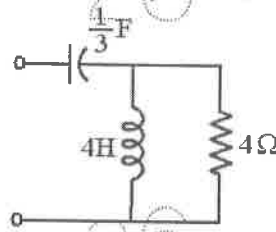


Figure: 1

- 2.a) Obtain the y parameters for the network shown in the Figure 2.

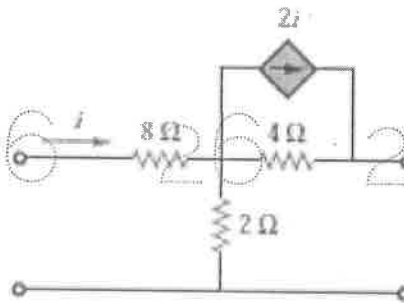


Figure: 2

- b) Obtain the condition of transmission parameters for two network connected in cascade. [8+7]  
3.a) Derive the important relations in constant-k low pass filter and constant-k high pass filter.  
b) Explain the design considerations of band stop filter and draw its characteristics. [8+7]  
4.a) Explain symmetrical lattice Attenuator.  
b) Design a symmetrical lattice attenuator to have characteristic impedance of 600 Ω and attenuation of 20 dB. [7+8]

5.a) Explain different types of dc generators with neat sketches and give the application of each.

b) A 110 V d.c shunt generator delivers a load current of 50 A. The armature resistance is  $0.2 \Omega$ , and the field resistance is  $55 \Omega$ . The generator, rotating at a speed of 1800 rpm, has 6 poles, lap-wound, and a total of 360 conductors. Calculate no-load voltage at the armature and the flux per pole. [7+8]

6.a) What is speed control? Explain the Speed Control of DC Shunt Motor by using Armature Voltage Control method.

b) What are all the various losses in a D.C. Machine? Derive an expression for efficiency of a D.C. Machine. [7+8]

7.a) Describe the principle of operation and constructional features of a single phase transformer.

b) A 6600/400V, 50 Hz, single phase Transformer has a net cross-sectional area of the core of  $428 \text{ cm}^2$ . The maximum flux density in the core is 1.5 Tesla. Calculate the number of turns in the primary and secondary windings. [8+7]

8.a) Write short notes on application of:

i) AC Servomotor

ii) Stepper motor.

b) Briefly discuss the functioning and applications of Synchros.

[8+7]