Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

End Sem Re - Exam

June 2018

Max. Marks: 100 Duration: 3 **hr**

Class: **Third Year** Semester: **VI** Program: **Electrical Engineering**

Name of the Course: **Elective – VLSI** Course Code : BTE332

Instructions:

- Question One is Compulsory.
- Solve any four of remaining six questions.
- Illustrate your answers with neat sketches wherever necessary.
- Assume suitable data if required.
- Preferably, write the answers in sequential order.

Question No.		Module Number	Course Outcome	Max. Marks
Q1.				
A)	Compare the two technology scaling methods, namely, (i) the constant electric-field scaling and (ii) the constant power-supply voltage scaling. In particular, show analytically by using equations how the delay time, power dissipation, and power density are affected in terms of the scaling factor, S.	1	1	5
B)	Compare BJT, NMOS and CMOS technology.	1	1	5
C)	Explain simplified process sequence for the fabrication of the n-well CMOS integrated circuit with a single polysilicon layer, showing only major fabrication steps.	1	1	5
D)	Consider a simple abrupt pn-junction, which is	1	1	5

reverse-biased with a voltage V_{bias}. The doping density of the n-type region is $N_D = 10^{19}$ cm^{-3}, and the doping density of the p-type region is given as $N_A = 10^{16}$ cm^{-3} The junction area is A = 20 μm x 20 μm. Find equivalent capacitance.

Given:

$\varepsilon_0 = 8.85 \times 10^{-14}$ F/cm, $\varepsilon_{si} = 11.7 * \varepsilon_0$

$q = 1.6 \times 10^{-19}$C, $k = 1.3 \times 10^{-23}$ J/K

Intrinsic carrier concentration of silicon (Si) ni = 1.45×10^{10} (cm^{-3}) at 300K.

Thermal voltage kT/q = 0.026 V.

Q2.

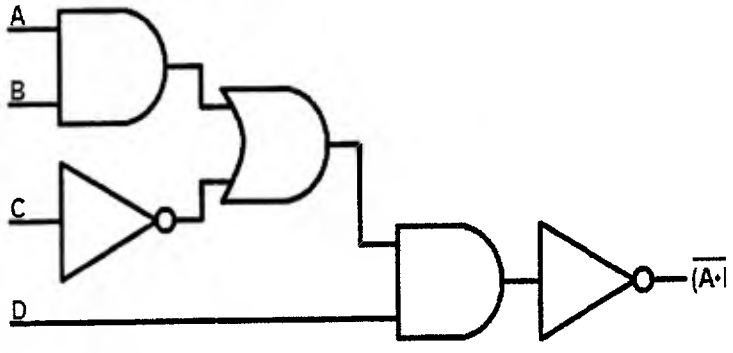
A)	Give the CMOS inverter voltage transfer characteristics and operating regions.	**2**	**2**	**5**
B)	Design a resistive-load inverter with R = 1 kΩ, such that V_{OL} = 0.6 V. The nMOS driver transistor has the following parameters: $V_{DD} = 5.0$ V $V_{T0} = 1$ V $\gamma = 0.2$ $V^{1/2}$ $\lambda = 0$ $\mu_n C_{ox} = 22.0$ μA/V^2 (a) Determine the required aspect ratio, W/L. (b) Determine V_{IL} and V_{IH}. (c) Determine noise margins N_{ML} and N_{MH}.	**2**	**2**	**5**
C)	Consider a CMOS inverter circuit with the following parameters: $V_{DD} = 5$V $V_{T0,n} = 0.6$ V $V_{TO,p} = -0.7$ V $k_n = 100$ μA/V^2 $k_p = 40$ μA/V^2 Calculate the noise margins of the circuit. Notice that the CMOS inverter being considered here has $k_R = 2.5$ and $V_{T0,n} \neq \lvert V_{T0,P} \rvert$ hence, it is not a symmetric inverter.	**2**	**2**	**10**

Q.3

A)	Draw the circuit and layout of CMOS NAND2 gate.	**2**	**2**	**5**
B)	Define: i) Pseudo-nMOS gate, ii) transmission gate.	**3**	**3**	**5**

	Implement two input multiplexer using CMOS transmission gate.			
C)	Write short note on SR latch circuit.	3	3	5
D)	Write short note pass transistor logic.	3	3	5
Q.4				
A)	Give the classification of semiconductor memories. Draw typical random access memory array organization.	4	3	5
B)	Design a 4-bit X 4-bit NOR based ROM array to store following data stream. Also write its column and rows combination. Data: 1001 1110 0110 1001 Draw layout for circuit designed.	4	3	10
C)	Discuss the operation of resistive-load SRAM Cell.	4	3	5
Q.5				
A)	Discuss the operation of three transistor DRAM Cell.	4	3	10
B)	Explain the operation of one transistor DRAM cell.	5	3	5
C)	Draw the circuit and layout of CMOS NAND2 gate.	2	2	5
Q.6				
A)	What is clock skew? What are the sources of clock skew? How it can be overcome?	6	4	5
B)	Explain clock system architecture.	6	4	5
C)	Explain in detail global clock generator of clock system.	6	4	5
D)	Draw circuit and layout of CMOS inverter.	2	2	5
Q.7				
A)	Draw the circuit and design layout for given Boolean expression. $Z = A (D+E) + BC$	7	4	5
B)	Define: A) VDD & GND pads. B) Input and Output Pads. C) Bidirectional pads. D) Analog pads. E) Clock input.	7	4	5
C)	Draw and explain the operation of CMOS D latch using pass gate.	3	4	5

D) Realize the gate level circuit for given logic circuit using Pseudo nMOS gate. 7 4 5



Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(Govt. Aided Autonomous Institute under University of Mumbai)

Academic Year 2017 – 18 [Second Half]
Re-Examination – June 2018

Program: B. Tech. Electrical
Course: Elective 1 – Project Management
Total Marks: 100

Class: T. Y. Sem. VI
Course Code: BTE 331
Date: 2nd July 2018

Note: Solve any **FIVE** questions of the following. All questions carry equal marks.

		Question	CO No. / Mod. No.	Marks
1		**Answer the following questions.**		
	a	Explain meaning of OPAs and EEFs briefly.	3/1	(05)
	b	Explain various economic models of project selection with proper examples.	3/2	(05)
	c	Explain following terms, with reference to Quality Management on a project: (*i*) Gold Plating (*ii*) Kaizen (*iii*) JIT (*iv*) Marginal Analysis (*v*) TQM	2/3	(05)
	d	According to Tuckman ladder model, which are the different stages of team formation and development.	3/4	(05)
2		**Answer the following questions.**		
	a	Explain: Project, Program and Portfolio Management..	3/1	(05)
	b	What is role of PMO in any organization? Explain different types of PMOs.	3/1	(05)
	c	Describe the two major plans that are part of scope management plan.	2/3	(05)
	d	Explain the terms corrective action, preventive action and defect repair in relation to monitoring and controlling project work.	3/3	(05)
3		With the help of a neat chart, explain the mapping between project management process groups and knowledge areas.	1/1	(20)
4	*a*	M/s. Shilpa Pharmaceuticals Ltd. (SPL) is a multinational pharmaceutical company, operating in 7 countries across globe. M/s. SPL is looking for upgrading their existing payroll system, which is currently managing payroll and other HR functions for its 25,000 odd employees. This current payroll system is geographically focused, not flexible and integrated and needs substantial manual clerical time. Administering this system currently costs around US $ 2.4 million annually. For proposed payroll system company has allocated a budget of US $12,00,000 and wants to get the project functional by May 2029. For this project, Ms. Pranoti will be a Project Manager. Mr. Ganesh, Vice President, Human Resources (Global Operations) along-with Ms. Shilpa, MD M/s. SPL, will be the sponsors. Develop a Project Charter for this project. Make suitable assumptions, if required.	2/2	(20)
5	*a*	Explain in detail, the different estimation techniques that may be used on a project?	2/2	(10)
	b	What are the advantages and disadvantages of centralized contracting and decentralized contracting?	2/5	(10)

6 *a* How the PM should *manage stakeholder engagement* throughout the project? **4/3 (10)**

b Explain the different types of communications used on a project? **2/4 (05)**

Of these types, which is the most suitable type of communication in following situations? **(05)**

Sr. No.	Situation	Communication Type
1.	Sending an e-mail to ask for clarification of an issue	
2.	Holding a milestone party	
3.	Conducting a bidder conference	
4.	Making changes to a contract	
5.	Requesting additional resources	

7 *a* Write the advantages and disadvantages of : **3/5 (10)**
(*a*) Fixed Price Contract (*b*) Time and Material Contract (*c*) Cost Reimbursable Contract

b Two new software projects are proposed to M/s. Birla Infraprojects Pvt. Ltd. (BIPL), an infrastructure company. The Alpha project will cost $150,000 to develop and is expected to have annual net cash flow of $40,000. The Beta project will cost $200,000 to develop and is expected to have annual net cash flow of $50,000. The MD of BIPL, Mr. Yadnesh Birla is very concerned about the cash flow of both the projects. Using the payback period, suggest a better project from a cash flow standpoint? Justify your answer. **2/2 (10)**

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(Govt. Aided Autonomous Institute under University of Mumbai)

Academic Year 2017 – 18 [Second Half]

End – Semester Examination – May 2017

Program: B. Tech. Electrical
Course: Elective I – Project Management
Total Points: 100

Class: T. Y. Sem. VI
Course Code: BTE 331
Date: 25th May 2018

Note: Solve any **FIVE** questions of the following. All questions carry equal points.

		Question	CO No. / Mod. No.	Points
1		**Answer any FOUR questions of the following.**		
	a	Explain: Project, Program and Portfolio Management.	3/1	(05)
	b	What is role of PMO in any organization? Explain different types of PMOs.	3/1	(05)
	c	Describe the two major plans that are part of scope management plan.	2/3	(05)
	d	Explain the terms corrective action, preventive action and defect repair in relation to monitoring and controlling project work.	3/3	(05)
	e	Which are the different leadership and Management styles?	3/4	(05)
2		With reference to the case of 'Coal Fired Boilers Project', develop a detailed Project Charter for this Project. [The case text is given separately.]	2/2	(20)
3	*a*	Mr. Hrishikesh is a Project Manager at M/s. Thakur Enterprises Ltd. (TEL), an Electrical & Electronics Accessories Distributor Company. His organization is starting a new project to design and build end-to-end distribution network of Anchor Electrical domestic and industry products in the Thane district. He has figured out following dependencies in this project	4/3	(10)

- Activity 1 can start immediately and has an estimated duration of 3 weeks.
- Activity 2 can start after activity 1 is completed and has an estimated duration of 3 weeks.
- Activity 3 can start after activity 1 is completed and has an estimated duration of 6 weeks.
- Activity 4 can start after activity 2 is completed and has an estimated duration of 8 weeks.
- Activity 5 can start after activity 4 is completed and after activity 3 is completed. This activity takes 4 weeks.

a. Help Mr. Hrishikesh to draw a Network Diagram and determine duration of the critical path.
b. Calculate float for activity 2 and 3.
c. What is the float of the path with the longest float?
d. In the middle of the project an Engineer working on activity 3 leaves the organization and Mr. Hrishikesh has to recruit a new Engineer who is less experienced. This activity will now take 10 weeks. How will this affect the project?
e. After discussion with his team, Hrishikesh realizes that a new activity 6 needs to be added to the project. This activity will take 11 weeks to complete and must be completed before activity 5 and after activity 3. Ms. Anvita, MD of M/s. TEL is concerned that adding the activity will add 11 weeks to the project. An experienced member, Mr. Sadikmohammad from his team suggests that the time will be less than 11 weeks. Who is correct?
f. With this change to project, how much longer will the project take?

b Explain in detail, the different estimation techniques that may be used on a project? 3/3 (10)

4 a Paman is on a project to build a boundary wall for a square shaped MIDC plot. Each of the four sides of this wall is to take one day to build, and $1000 has been budgeted per side. The sides were planned to be completed one after the other, but circumstances changed on the project and the work on the sides was able to proceed in parallel. Now the sides have a Finish-to-Finish relationship instead of a Finish-to-Start relationship, so more than one side can be worked on at the same time. Today is end of day 3. Using the following project status chart, calculate PV, EV, AC, BAC, CV, CPI, SV, SPI, EAC, ETC, VAC. Also write what does these terms indicate on a project. 4/3 (10)

Activity	Day 1	Day 2	Day 3	Day 4	Status End of Day 3
Side 1	S---------F				Complete, spent $1,000
Side 2		S----F----PF			Complete, spent $900
Side 3		S---	PS---------PF		50% done, spent $600
Side 4			S----	PS--------PF	75% done, spent $600

Key S = Actual Start, F = Actual Finish, PS = Planned Start, and PF = Planned Finish

b (i) Enlist and define important types of costs that may incur on projects. 3/3 (05)

(ii) Explain following cost management concepts on detail: (05)
(a) Life Cycle Costing (b) Value Analysis (c) Cost Risk

5 a How the PM should manage stakeholder engagement throughout the project? 2/6 (10)

b Define following terms: 2/5 (10)
(a) Price (b) Profit (c) Cost
(d) Target price (e) Sharing ratio (f) Ceiling price
(g) Point of total assumption (h) Incentive (i) Force majeure
(j) Arbitration

6 a Describe various methods used to collect requirements of a project to prepare *Requirement Management Plan.* 2/2 (10)

b Two new software projects are proposed to M/s. Birla Infraprojects Pvt. Ltd. (BIPL), an infrastructure company. The Alpha project will cost $150,000 to develop and is expected to have annual net cash flow of $40,000. The Beta project will cost $200,000 to develop and is expected to have annual net cash flow of $50,000. The MD of BIPL, Mr. Yadnesh Birla is very concerned about the cash flow of both the projects. Using the payback period, suggest a better project from a cash flow standpoint? Justify your answer. 2/2 (10)

7 a What are the advantages and disadvantages of centralized contracting and decentralized contracting? 3/5 (10)

b Write the advantages and disadvantages of : 3/5 (10)
(a) Fixed Price Contract (b) Time and Material Contract (c) Cost Reimbursable Contract

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Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Exam
May 2018

Max. Marks:50 Duration: 2HR
Class: T.Y.B.Tech (Electrical) Semester: VI
Program: ELECTRICAL ENGINEERING
Name of the Course: ENVIRONMENTAL ENGINEERING AND MANAGEMENT SYSTEM
Course Code: BTE 330

Instructions:

1. **Question No 1 is compulsory.**
2. **Attempt any four questions out of remaining six.**
3. **Draw neat diagrams**
4. **Assume suitable data if necessary**

Question No		Maximum Marks	Course Outcome Number	Module No.
Q1	Explain roles and responsibilities of CPCB and SPCB.	5	3	7
	Explain the role of ISO14001:2015 for effective implementation of environmental studies in a different organization	5	1	5
Q2	Explain the following in details I. Acid rain II. Global warming III. Greenhouse effect	5	1	3
	Explain national rating system GRIHA.	5	2	6
Q3	What is an environmental engineering and discuss its benefits to the society?	5	1	1
	Explain core element functioning and benefits of environmental goals through reviews, evaluation and improvement with suitable example of industry for ISO14001.	5	4	5
Q4	Explain the ecological pyramid, pyramid of energy and pyramid of biomass.	5	3	2
	What are needs and objective of environmental legislation?	5	3,4	7

Q5.	Write short note on Vienna convention and Ramsar convention.	5	1,4	7
	Why do we need to use renewable energy sources?	5	3	4
Q6	Explain primary and secondary ecological succession.	5	2	2
	Write short note on the following I. Geothermal energy II. Tidal energy III. Wind energy	5	3,4	4
Q7	What is the point and non point contamination of water describe with suitable example?	5	1	3
	Suppose you appointed as GRIHA Engineer from Government of India, your work is to give a plan for constructing govt. Company according to GRIHA criteria. Describe your plan in details.	5	3,2	6

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End Semester Exam

May 2018

Max. Marks: **100** Duration: **3.00 Hrs**

Class: **T.Y.B.Tech. (Electrical)** Semester: **VI** Program: **Electrical Engineering**

Name of the Course: **Switchgear and Protection** Course Code : **BTE329**

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams
4. Assume suitable data if necessary

Que. No		Max. Mark	CO No.	Mod. No.
Q.1 (a)	Describe protection scheme which restraint operation of relay during magnetizinginrush current of transformer.	**08**	**2,3**	**04**
(b)	In a 220 KV system, the reactance and capacitance upto the location of circuit breaker is 6Ω and 30 nF respectively. A resistance of 750Ω is connected across the contacts of the circuit breaker. Determine the following a) Damped frequency of oscillation. b) Critical value of resistance which will give no transient oscillation. c) The value of resistance which will give damped frequency of oscillation, one fourth of the natural frequency of oscillation.	**07**	**1,2**	**05**
(C)	A 33 KV, 3 phase 50 Hz, overhead line 60 km long has a capacitance to ground of each line equal to 0.015μF per km. Determine the inductance and KVA rating of Peterson coil.	**05**	**2**	**02**
Q.2	Enumerate the relaying schemes which are employed for protection of a modern generator. Describe with neat sketch 1. Percentage differential protection 2. Protection against stator inter turn fault 3. Loss of excitation	**20**	**2,3,4**	**04**
Q.3(a)	Discuss the operating principle of a) Phase splitting type phase comparator b) Integrating type phase comparator	**10**	**1,2**	**01**
(b)	What are different types of air blast circuit breaker? Discuss their operating principle and area of applications. Which type is less affected by current chopping?	**10**	**1,2**	**06**

Q4(a)	Explain in detail construction and working principle of polarized moving iron type of relay.	**05**	**1**	**01**
(b)	What is Buchholz relay? Which equipment is to be protected by it? For what type of fault it is employed? Discuss its working principle.	**07**	**2**	**04**
(c)	Describe construction and working principle of operation of 1. Expulsion type lightning arrester 2. Valve type lightning arrester	**08**	**2**	**07**
Q5(a)	Discuss the operating principle of Vacuum circuit breaker. What are its advantages over other types of circuit breakers? For what voltage range it is recommended?	**10**	**2,3**	**06**
(b)	Explain the basic working principle and characteristic of mho relay.	**05**	**1,2**	**03**
(c)	Discuss the problem associated with interruption of 1. Low inductive current 2. Capacitive current 3. Fault current If the fault is very near the substation.	**05**	**2**	**05**
Q6 (a)	Explain the term insulation coordination. Describe the construction and of volt time curve and terminology associated with impulse testing.	**05**	**1,2,3**	**07**
(b)	Which are the types of over current relay according to the time-current characteristics? Explain.	**10**	**2**	**03**
(c)	Explain the term a) Neutral grounding b) Non effective earthing c) Effective earthing d) Coefficient of earthing e) Resonance earthing	**05**	**1**	**02**
Q7 (a)	Explain the term restriking voltage and recovery voltage. Derive expression for restriking voltage and RRRV.	**10**	**1**	**05**
(b)	Explain impedance relay characteristics on the R-X diagram. Discuss the operating principle and range of setting of three impedance relays placed at particular location.	**10**	**2,3**	**03**

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End Sem Exam

May 2018

Max. Marks: **100** Duration: **3hr**

Class: **Third Year** Semester: **VI** Program: **Electrical Engineering**

Name of the Course: **Elective – VLSI** Course Code : BTE332

Instructions:

- Question One is Compulsory.
- Solve any four of remaining six questions.
- Illustrate your answers with neat sketches wherever necessary.
- Assume suitable data if required.
- Preferably, write the answers in sequential order.

Question No.		MN	CO	Max. Marks
Q1.				
A)	Compare the two technology scaling methods, namely, (i) the constant electric-field scaling and (ii) the constant power-supply voltage scaling. In particular, show analytically by using equations how the delay time, power dissipation, and power density are affected in terms of the scaling factor, S.	1	1	5
B)	Explain the steps involved in flow of circuit design procedure.	1	1	5
C)	What are the steps involved in patterning of silicon dioxide.	1	1	5
D)	Consider a simple abrupt pn-junction, which is reverse-biased with a voltage V_{bias}. The doping density of the n-type region is $N_D = 10^{19}$ cm^{-3}, and the doping density of the p-type region is given as $N_A = 10^{16}$ cm^{-3} The junction area is A = 20 μm x 20 μm. Find the average junction capacitances.	1	1	5
Q2.				
A)	Give the CMOS inverter voltage transfer characteristics and operating regions.	2	2	5

B)	Design a resistive-load inverter with R = 2 kΩ, such that V_{OL} = 0.05 V. The nMOS driver transistor has the following parameters: $V_{DD} = 1.1V$ $V_{T0} = 0.52$ V $\gamma = 0$ $V^{1/2}$ $\lambda = 0$ $\mu_n C_{ox} = 22.0$ μA/V^2 (a) Determine the required aspect ratio, W/L. (b) Determine V_{IL} and V_{IH}. (c) Determine noise margins N_{ML} and N_{MH}.	**2**	**2**	**.5**
C)	Consider a CMOS inverter circuit with the following parameters: $V_{DD} = 1.2V$ $V_{T0,n} = 0.48$ V $V_{TO,p} = -0.46$ V $\mu_n C_{ox} = 102$ μA/V^2 $(W/L)_n = 10$ $\mu_p C_{ox} = 51.6$ μA/V^2 $(W/L)_p = 19$ Calculate the noise margins of the circuit.	**2**	**2**	**10**

Q.3

A)	Draw the circuit and layout of CMOS NOR2 gate.	**2**	**2**	**5**
B)	Define: i) Pseudo-nMOS gate, ii) transmission gate. Implement two input multiplexer using CMOS transmission gate.	**3**	**3**	**5**
C)	Write short note on JK latch circuit.	**3**	**3**	**5**
D)	Write short note on 1-bit shift register.	**3**	**3**	**5**

Q.4

A)	Give the classification of semiconductor memories. Draw typical random access memory array organization.	**4**	**3**	**5**
B)	Design a 4-bit X 4-bit NOR based ROM array to store following data stream. Also write its column and rows combination. Data: 1100 1010 0110 1001 Draw layout for circuit designed.	**4**	**3**	**10**
C)	Discuss the operation of resistive-load SRAM Cell.	**4**	**3**	**5**

Q.5

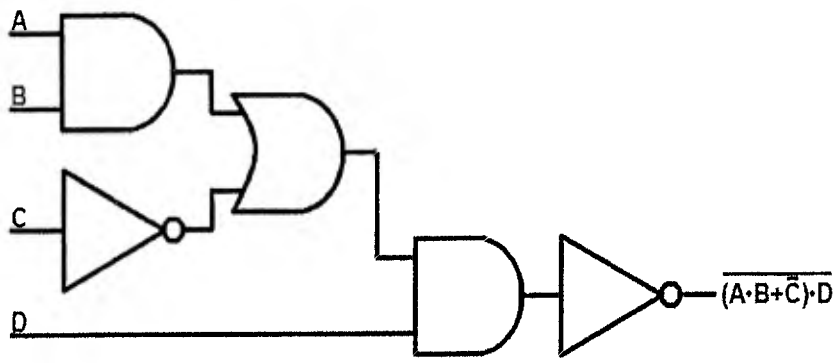
A)	Discuss the operation of three transistor DRAM Cell.	**4**	**3**	**10**
B)	Draw and explain ripple carry adder circuit.	**5**	**3**	**5**
C)	Write short note on barrel shifter.	**5**	**3**	**5**

Q.6

A)	What is clock skew? What are the sources of clock skew? How it can be overcome?	**6**	**4**	**5**
B)	Explain clock system architecture.	**6**	**4**	**5**
C)	Explain in detail global clock generator of clock system.	**6**	**4**	**5**
D)	Comment on the advantages and disadvantages of H-trees and clock grids. How does the hybrid tree/grid improve on a standard grid?	**6**	**4**	**5**

Q.7

A)	Draw the circuit and design layout for given Boolean expression. $Z = A(D+E) + BC$	**7**	**4**	**5**
B)	Define: A) VDD & GND pads. B) Input and Output Pads. C) Bidirectional pads. D) Analog pads. Draw bidirectional pad circuitry.	**7**	**4**	**5**
C)	Draw and explain the operation of CMOS D latch using pass gate.	**3**	**4**	**5**
D)	Realize the gate level circuit for given logic circuit using Pseudo nMOS gate.	**7**	**4**	**5**



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Munshi Nagar, Andheri (West), Mumbai – 400058

End Semester

Program: Electrical Engineering | **Date: May 2018**

Duration: 3 hrs. | **Course code: BTE328**

Maximum Marks: 100 | **Semester: VI**

Course Name: Communication Engineering

Note: Q1 is compulsory. Solve any four questions from remaining six questions.

Q. No.	Questions	Max Marks	CO No.	Module No.
1 a.	Show that SSB transmission is power efficient, bandwidth efficient and less susceptible to noise as compared to that of AM as well as DSBSC.	05	01	01
b.	A zero memory source emits messages m1 and m2 with probabilities of 0.65 and 0.35 respectively. Find the optimum binary code for its second order extension (N=2). Determine the code efficiency?	05	02	02
c.	Explain frequency reuse principle in cellular telephony. Draw a cell pattern if with a frequency reuse factor of 7.	05	03	05
d.	Encrypt the plain text "BOOK" using additive cipher with k=10. Decrypt the cipher text to get the original plaintext.	05	04	06
2 a.	An RC capacitive reactance modulator is used to vary the frequency of 10MHz oscillator by ±100KHz. The FET whose trans conductance varies linearly with gate voltage from 0 to 0.628 mS is used in conjunction with a resistance whose value is one tenth of the capacitive reactance used. Calculate an inductance and capacitance of the oscillator tank circuit.	05	01	01
b.	With neat block diagrams explain BPSK modulator and demodulator	05	01	01
c.	How can the performance of pulse code modulation be improved?	05	01	01
d.	Compare Delta modulation with pulse code modulation. Explain the working of Delta modulator demodulator	05	01	01
3 a.	What is entropy? Derive an expression for message probability that yields the maximum entropy	05	02	02

b.	What is a systematic single error correcting (7,4) cyclic code for message m=1010. Determine the data vector transmitted if the received data r= 1011011,	05	02	02
c.	What is the significance of Hamming distance in channel coding. Explain with an example	05	02	02
d.	Derive an expression for channel capacity of noisy channel	05	02	02
4 a.	Explain two major categories of transmission media. What is the function of twisting in twisted pair cable?	05	03	03
b.	What is the purpose of cladding in an optical fiber. Compare multimode fiber with single mode fiber.	05	03	03
c.	How can the disparity in the input data rates be handled in Time Division Multiplexing system?	05	03	03
d.	Differentiate frequency Hopping spread spectrum and Data Sequence spread spectrum.	05	03	03
5 a.	What are the different types of communication networks? Compare them. Name the different types of protocols used for each of them	05	04	04
b.	What are the reasons that CSMACD cannot be used in wireless LAN?	05	04	04
c.	What are the different data transfers in zigbee network?	05	04	04
d.	Compare circuit switching and packet switching.		04	05
6 a.	How data transfer is achieved using Cable TV channels?	05	04	05
b.	With neat diagrams explain different SONET networks	05	04	05
c.	Explain any algorithm to set communication between Alice and Bob using asymmetry key cryptography. Using e=13, d=37 and n=77, in the RSA algorithm, encrypt the letter "T" using the values of 00 to 25 for letters A to Z.	05	04	06
d.	Explain Man in the Middle Attack. How is it overcome?	05	04	06
7 a.	Explain different types of simple ciphers.	05	04	06
b.	Explain various sensing devices used in Smart Grid	05	04	07
c.	State Kepler's laws. Compare GEO, MEO and LEO satellite.	05	04	05
d.	What is the purpose of Smart Grid? List features and challenges involved in Smart Grid system design.	05	04	07

Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058

Re-Examination

Program: Electrical Engineering
Duration: 3 hrs.
Maximum Marks: 100

Date: June 2018
Course code: BTE328
Semester: VI

Course Name: Communication Engineering

Q. No.	Questions	Max Marks	CO No.	Module No.
1 a>	With neat block diagram explain digital communication system	10	1	1
b>	Explain in detail Tuned radio frequency and Super heterodyne radio receivers. Also, explain any two characteristics of good radio receivers	10	1	2
2 a>	A source emits seven messages with probabilities 1/3, 1/3, 1/9, 1/9, 1/27, 1/27, 1/27 respectively. Find the entropy of the source. Determine Huffman binary code and code efficiency. What will be Huffman 3 ary code?	10	2	3
b>	Explain Shannon's theorem. An analog signal with bandwidth 4KHz is sampled at twice the Nyquist rate, and each sample is quantized into one of 256 equally likely levels. Can the output of this source be transmitted without an error over AWGN channel with bandwidth10KHz and SNR 20 dB?	10	2	3
3 a>	With neat block diagram explain pulse code modulation demodulation. How one can improve the performance of pulse code modulation?	10	1	2
b>	How is the adaptive delta modulation better than delta modulation?	10	1	2
4 a>	(i) Distinguish between synchronous and statistical TDM. (ii) Define FHSS and explain how it achieves bandwidth spreading	10	2	3
b>	What is the man in the middle attack? How it can be prevented	10	4	7

5 a>	With an example how is the syndrome test used for error detection and error correction in linear block code:	10	2	2
b>	Describe the SS7 service and its relation to the telephone network	10	3	5
6 a>	Compare (i) A piconet and a scatternet. (ii) CSMAlCD with CSMAICA (iii) Standard Ethernet and Fast Ethernet	10	3	4
b>	()i) List the advantages of optical fiber over twisted-pair and coaxial cable. (ii}How does sky propagation differ from line-of-sight propagation?	10	2	3
7 a>	Compare (i) Message Authentication and Digital Signature (ii) PSK, ASK, FSK	05	2,4	2,6
b>	Explain various sensing devices used in Smart Grid	05	4	7
c>	How zigbee can be used in home automation system?	05	4	7
d>	With a neat block diagram explain Data Encryption System	05	4	6

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058

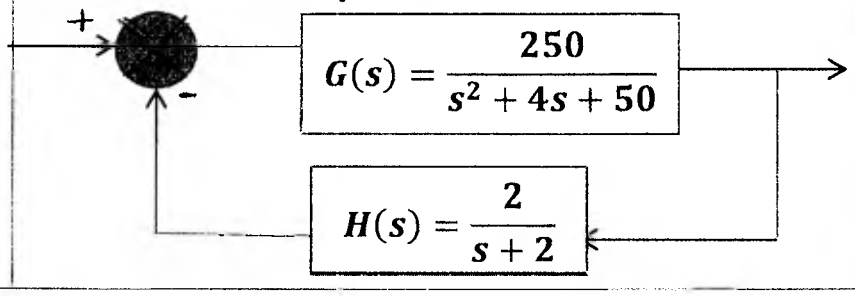
End Semester

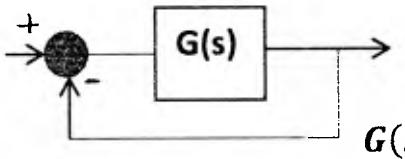
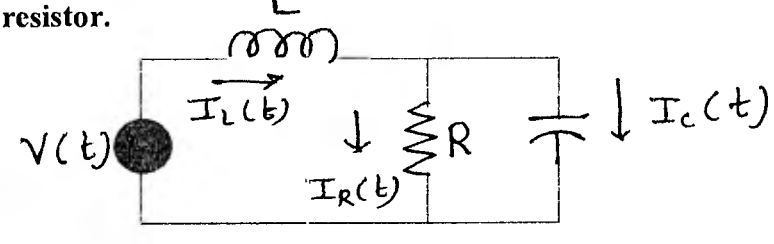
Program: Electrical Engineering
Duration: 3 hrs.
Maximum Marks: 100

Date: May 2018
Course code: BTE327
Semester: VI

Course Name: Control System II

Note: Q1 is compulsory. Solve any Four questions from remaining Six questions.

Q. No.	Questions	Max Marks	CO No.	Module No.
1	**Solve any four**			
a.	Describe Eigen values and Eigen vectors in brief.	05	02	03
b.	Briefly state the Nyquist criterion and define gain margin and phase margin.	05	01	01
c.	Briefly explain how the lag network allows the low frequency gain to be increased to improve steady state error without having the system becomes unstable.	05	01	02
d.	Define state variables, state, state vector and state space.	05	02	03
e.	Define Controllability and Observability.	05	03	06
2 a.	Draw a typical Bode plot, define gain and phase margin and indicate gain and phase margin on Bode plot. Draw the Bode Plot for transfer function $$G(s) = \frac{100}{s(s+2)(s+10)}$$	10	01	01
b.	Explain how Position, Velocity and Acceleration error constants are derived from Bode plot.	10	01	02
3 a.	Sketch the Nyquist plot for the system shown below and comment on its stability. 	10	01	01

b.	For unity feedback system shown below use frequeney response method to determine the value of gain K, to yield the step response with 20% overshoot if  $G(s) = \frac{k}{s(s+6)(s+12)}$	10	01	02
4 a.	Derive the transfer function from state space model for single input single output system and explain in brief how stability of the system can be confirmed from the Eigen Values of the System Matrix A. Explain with mathematical justification that there exists infinite state models for same dynamical physical system	10	02	03
b.	Given the system by the following equations. Find the transfer function $T(s) = Y(s)/U(s)$ where, $U(s)$ is the input and $Y(s)$ is the output $\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -2 & -3 \end{bmatrix} x + \begin{bmatrix} 10 \\ 0 \\ 0 \end{bmatrix} u$ $y = [1 \quad 0 \quad 0]x$	10	02	03
5 a.	With proper mathematical analysis justify that "s" can be replaced by "jw" when the system is analyzed using frequency domain approach	10	01	02
b.	For the state equation and initial state vector find the state transition matrix and solve for x_1, x_2. $u(t)$ is the step input. $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ $x(0) = [1 \quad 0]^T$	10	02	05
6. a	For the electrical network shown below find the state space representation if the output is the current through the resistor.  	10	02	03

b.	Consider the unity feedback system with  $G(s) = \frac{k}{s(s+5)(s+20)}$. The uncompensated system has about 55% overshoot and a peak time of 0.5 sec. and $K_v = 10$. Use frequency response methods to design a lead compensator to reduce the % overshoot to 10% while keeping the peak time and steady state error about the same or less. Make any required second order approximation.	10	01	02
7	Solve Any Two			
a.	Briefly describe the design procedure for a controller	10	04	07
b.	Briefly describe the design technique for an observer	10	04	07
c.	Describe the diagonal canonical form state space model. Given the transfer function of a system as $\frac{s+3}{s^2+3s+2}$, find the diagonal canonical state space model	10	03	04
d.	The second order system has transfer function $\frac{Y(s)}{u(s)} = \frac{4}{s^2+2s+4}$ Find peak time, settling time and maximum percentage overshoot. Draw the step response of the same.	10	01	02

Bharatiya Vidya Bhavan's

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End Semester

May 2018

Program: B. Tech Electrical Engineering **Date : 14/05/2018**

Course code : BTE 326 **Duration : 3hr.** **Maximum Marks : 100**

Name of the Course: Power System Operation & Control **Semester: VI**

Instructions: Question 1 and 2 are compulsory. Attempt any 3 from remaining 5.

Q. No.	Description	Marks
Q.1 a)	Explain the transmission line loadability curve. How can the loadability be increased in case of a long transmission line?	7
Q.1 b)	If for a generating plant i, the cost of generation is given as $C_i = \alpha_i + \beta_i P_i + \gamma_i P_i^2$ and P_D is the total demand of the real power. Find condition of optimal generation such as to minimize total cost of generation $C_t = \sum_{i=1}^{n} C_i$ subject to the constraint $\sum_{i=1}^{n} P_i = P_D$ Hence comment on the optimality condition.	8
Q.1 c)	A 200 MW 50 Hz generator set has a speed regulation of 5% based on its own rating. The generator frequency decreases from 50 Hz to 49.5 Hz. Determine the increase in the turbine power output.	5
Q.2 a)	Explain basic principle of operation of Thyristor controlled reactor (TCR) with current waveform with firing angle $\alpha = 100^0$. Also show the 3-phase, 6 pulse TCR arrangement for a transmission line.	10
Q.2 b)	Compare vertically integrated utility and deregulated power utility based on a) structure (show configurations) b) electricity bill c) customer focus.	10
Q.3 a)	For a power system with generator connected at one end, derive relation between per unit receiving end real power i.e., P_R/P_O (where, P_O is SIL loading) and per unit receiving end voltage i.e., V_R/E_S (where, E_S is sending end voltage) at unity power factor using long line equation. Hence explain the P-V curve.	10
Q.3 b)	Draw and explain generator capability curve by considering all constraints of a generator.	10
Q.4 a)	What is meant by relative motion and common motion of the generators? How does a system frequency is decided under transient as well in steady state condition?	10

Q.4 b)	Draw the block diagram of a complete two area system with LFC loop. Show the flows and system components on the same. Prove that frequency deviation in such case is a function of deviation in Tie line power flow.	10
Q.5 a)	Discuss in brief various methods of voltage control in a power system by considering 1) mode of connection (draw single figure for each method) 2) application	10
Q.5 b)	A single area consist of two generators in parallel rated at 400 MVA and 600 MVA with speed regulation of 4% and 5% on their respective ratings. Both are sharing a load of 500 MW. Generator 1 supplies 200 MW and generator 2 supplies 300 MW at 50 Hz (1pu) frequency. The load is increased by 100 MW. 1. Assume there is no frequency dependent load, i.e., D=0. Find steady state frequency deviation and the new generation on each unit. 2. Repeat the same with D = 0.8	10
Q.6 a)	Draw and explain the voltage and current profiles for a 400 m lossless transmission line under no load condition with sources connected at both ends. Assume both sources voltages are held at 1 per unit. Use long line equations to prove. Consider $\beta = 0.0013$ rad/kkm	10
Q.6 b)	Derive each control block and hence LFC block diagram of an isolated power system. Also show and explain AGC on the same.	10
Q.7 a)	The fuel cost function in Rs./hr for three thermal plants is $C_1 = 500 + 5.3P_1 + 0.004P_1^2$ $C_2 = 400 + 5.5P_2 + 0.005P_2^2$ $C_3 = 200 + 5.8P_3 + 0.008P_3^2$ Where, P_1, P_2, and P_3 are in MW. Neglecting line losses and generator limits, determine the optimal scheduling of generation, when the total load is 950 MW. Use analytical technique. Verify your answer by iterative technique with initial estimate of $\lambda = 7.5$ Rs/MWh. Calculate the total cost of generation.	10
Q.7 b)	Solve the problem given in Q. 7 a) by considering following generator limits (in MW) $200 \leq P_1 \leq 400$, $150 \leq P_2 \leq 400$, $100 \leq P_3 \leq 250$ Calculate the total cost of generation. Compare with the result of Q.7 a) and comment.	10

Disclaimer: This question paper has been set in absence of approved scheme and syllabus for the course BTE 326 (Power System Operation and Control) for the academic year 2017-18. Hence the paper setter should not be held responsible for any consequences.