Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

S.Y.B.Tech (ET) Sem III

ENDSEM- EXAMINATION FEB2023

Program: ELECTRICAL | **Duration: 03 Hours**

Course Code: BS-BTE301 | **Maximum Points: 100**

Course Name: APPLIED MATHEMATICS-III | **Semester: III**

- **Attempt any five out of seven questions**
- **Use of scientific calculator is allowed.**

QNO.	QUESTION	POINTS	CO	BL	PI
QI a)	Obtain Laplace transforms of $f(t)=\sqrt{1+\sin t}$	06	1	2	2.1.3
QI b)	Find the bilinear transformation which maps $1, i, -1$ to $2, i, -2$ respectively. Find the fixed points of the transformation.	06	3	3,5	1.1.1
QI c)	Find for what values of k the set of equations $2x-3y+6z-5t=3,\ y-4z+t=1,\ 4x-5y+8z-9t=k$ has (i) no solution (ii) infinite number of solutions.	08	4	1	1.1.2
QII a)	Test for consistency and solve $x-2y+3t=2$ $2x+y+z+t=-4$ $4x-3y+z+7t=8$	06	4	2	2.1.4
QII b)	Prove that $\int_0^{\infty}\frac{\sin 2t+\sin 3t}{te^{t}}dt=\frac{3\pi}{4}$ using Laplace transforms	06	1	2	2.3.1
QII c)	Obtain the Fourier Series for $f(x)=\lvert\cos x\rvert \qquad -\pi\le x\le\pi$	08	2		2.1.4
QIII a)	Obtain the Fourier Series for $f(x)=x\sin x$ in $(0,2\pi)$	06	2	2	1.1.2
QIII b)	Show that the function $e^{x}(\cos y+i\sin y)$ is an analytic function, find its derivative.	06	3	2	1.1.1
QIII c)	Solve $y''+y=t$ Given $y(0)=1 \qquad y'(0)=-2$	08	1	4,5	2.1.4

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ENDSEM- EXAMINATION FEB2023

QIV a)	If f (z) = u + iv is an analytic function of $z = x + iy$ and $u - v = \frac{e^y - \cos x + \sin x}{\cosh y - \cos x}$, find f (z) subject to the condition that $f\left(\frac{\pi}{2}\right) = \frac{3-i}{2}$	06	3	3	2.3.1
QIV b)	Evaluate: $\mathcal{L}^{-1}\left\{\frac{s}{(s^2+4)(s^2+1)}\right\}$ using convolution theorem	06	1	2	1.1.3
QIV c)	If $f(x) = x \quad 0 \le x \le 2$ Find half range cosine series using Parseval's identity deduce $\frac{\pi^4}{96} = \frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \text{------}$	08	2	3	2.3.4
QV a)	Obtain the Fourier series for $f(x) = \begin{cases} 1 + \frac{2x}{\pi} & -\pi < x < 0 \\ 1 - \frac{2x}{\pi} & 0 < x < \pi \end{cases}$	06	2	2	2.3.1
QV b)	Evaluate $L^{-1}\left\{\frac{5S^2 + 8S - 1}{(S+3)(S^2+1)}\right\}$	06	1	2	1.1.1
QV c)	Find the characteristic equation of the symmetric matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and verify that it is satisfied by A and hence obtain A^{-1}. Express $A^6 - 6A^5 + 9A^4 - 2A^3 - 12A^2 + 23A - 9I$ in linear polynomial in A.	08	4	2	2.3.4
QVI a)	Find the Fourier series expansion of the periodic function of period $f(x) = \frac{1}{2} + x, \quad -\frac{1}{2} < x \le 0$ $= \frac{1}{2} - x, \quad 0 < x < \frac{1}{2}$	06	2	4	1.1.3
QVI	Find non – singular matrices P and Q such that P A Q is in	06	4	3	2.1.3

ENDSEM- EXAMINATION FEB2023

b)	normal form $A=\begin{bmatrix}1 & 2 & 3 & 4\\ 2 & 1 & 4 & 3\\ 3 & 0 & 5 & -10\end{bmatrix}$ Hence find rank of A.				
QVI c)	Evaluate: $L^{-1}\left\{\frac{s^2+2s+3}{(s^2+2s+2)(s^2+2s+5)}\right\}$	08	1	3	1.1.1
QVI I a)	Obtain Laplace transforms of $L\{\sin 2t \sin 4t \sinh t\}$	06	1	3	2.1.4
QVI I b)	Find the bilinear transformation that maps the point $z_1=-i, z_2=0, z_3=i$ into the points $w_1=-1, w_2=i, w_3=1$ respectively. Into what curve the y – axis is transformed to this transformation?	06	3	2	1.1.3
QVI Ic)	Find the eigen values and eigenvectors of the matrix $A=\begin{bmatrix}1 & 0 & -1\\ 1 & 2 & 1\\ 2 & 2 & 3\end{bmatrix}$	08	4	3,5	2.1.3

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Sardar Patel College of Engineering

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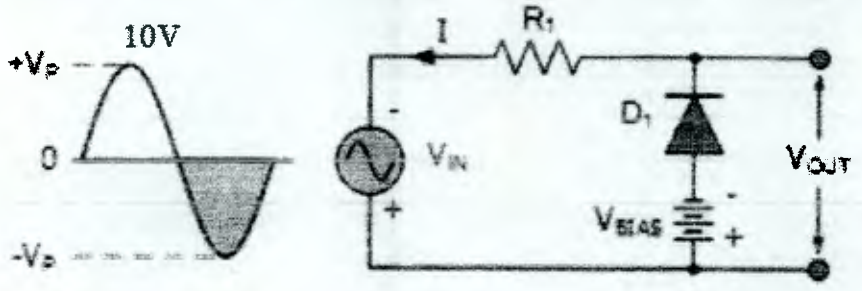
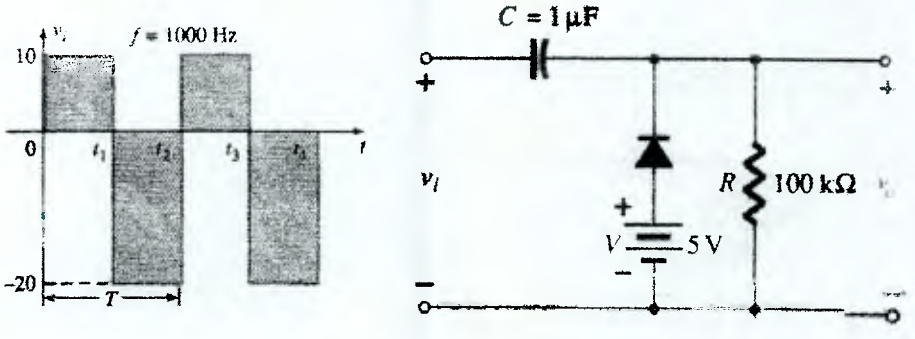
End Semester Exam February 2023

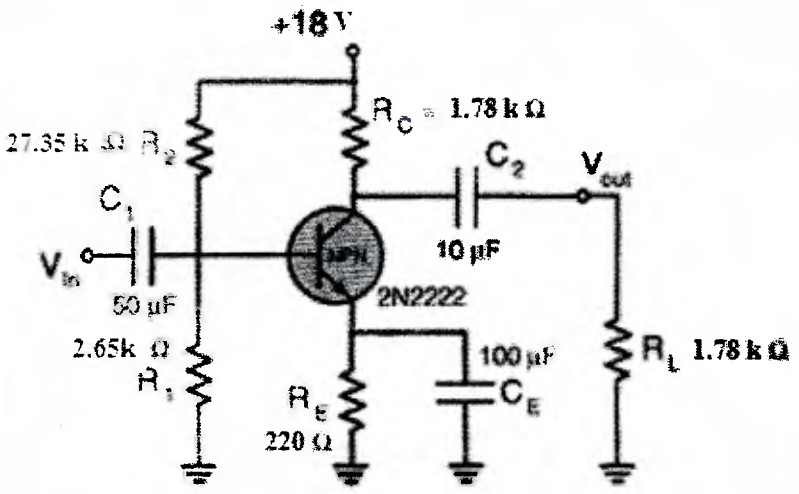
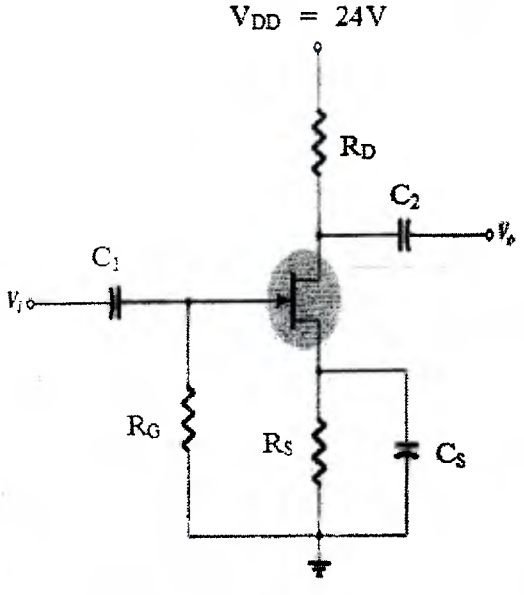
Program: Electrical Engineering
Course code: PC-BTE301
Name of the Course: Electronic Circuits

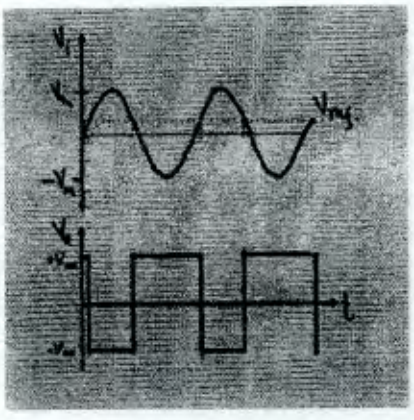
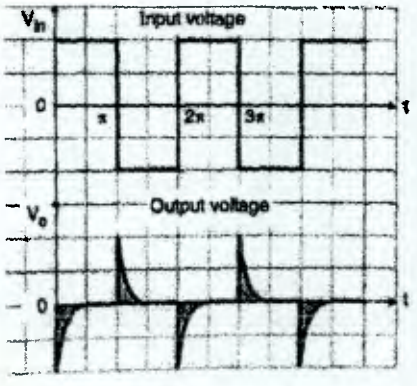
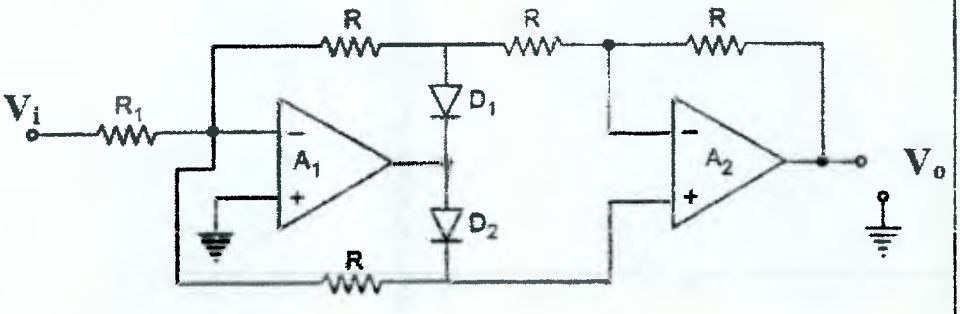
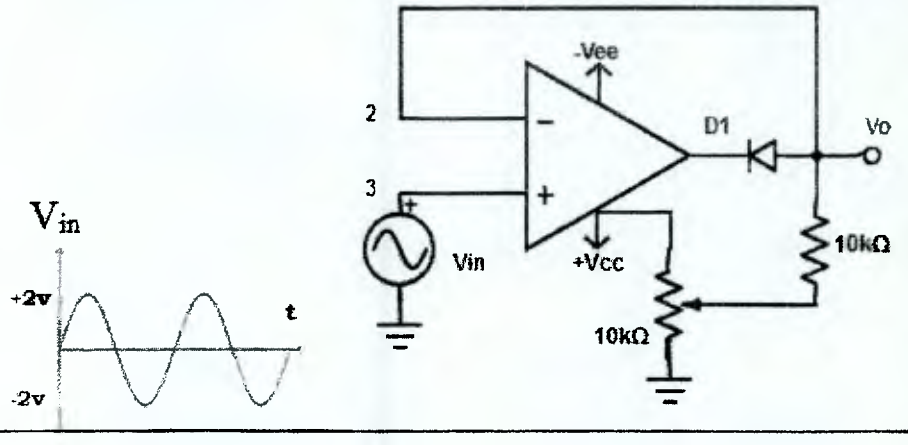
Duration: 3 Hour
Maximum Marks: 100
Semester: III

S.Y. B.Tech (E) Sem III

Solve any five questions out of seven

Q. No.		Points	CO	BL	PI
1	State whether the following statements are true/false. Justify the same.				
A	Stability of the fixed bias BJT circuit is very poor	5	2	5	1.3.1
B	The open loop gain of an op-amp depends on the values of the resistors used in the electrical circuit.	5	4	5	1.3.1
C	The input impedance of a MOSFET is of the order of several MΩ	5	2	5	1.3.1
D	Use of current mirror circuit enhances performance of differential amplifier	5	3	5	1.3.1
2A (i)	Draw the output waveform assuming practical diode. Bias voltage is 4V. 	5	1	3	1.4.1
(ii)	Draw the output waveform assuming ideal diode. 	5	1	3	1.4.1
B	Define CMRR. The following specifications are given for the dual input, balanced-output differential amplifier: R_C = 5 kΩ, R_S = 100Ω, R_E = 50 KΩ, $+V_{CC}$ = 10V, $-V_{EE}$ = -10 V, h_{ie} = 2 kΩ, h_{fe} = 50. Draw the circuit diagram showing components values. Determine A_d, A_c. Determine CMRR in dB.	10	3	3	1.3.1

3A	Determine I_{BQ}, I_{CQ}, V_{CEQ}, Given $h_{fe} = 100$, $h_{ie} = 2\,k\Omega$. $V_{BE} = 0.7V$	10	2	3	1.3.1
					
B	Explain how h_{fe} and h_{ie} parameters can be determined from BJT characteristics.	10	2	3	1.3.1
4A	Draw and explain block diagram of opamp.	10	4	2	1.3.1
B (i)	Explain following terms with respect to opamp 741 1) Input Bias current 2) Slew rate 3) Input offset current	6	4	2	1.4.1
(ii)	Opamp has open loop gain of 20000 and open loop upper cut off frequency is 40Hz. Determine unity gain frequency of the opamp.	2	4	3	1.3.1
(iii)	Explain virtual ground with respect to opamp.	2	4	1	1.4.1
5A	Explain following terms with respect to JFET (i) Pinch off voltage (ii) Transconductance (iii) Drain resistance	10	2	2	1.3.1
B	JFET shown below has $V_P = -2V$, $I_{DSS} = 1.65mA$. It is desired to bias the transistor at $I_D = 0.8$ mA. Calculate (i) V_{GS} (ii) g_m (iii) R_S	10	2	3	2.1.3
					
6A	4 bit SAR type ADC is to be used to convert analog voltage of 5.3 V. Explain the process with clear steps and relevant diagrams	10	3	2	1.3.1
B	Draw the circuit diagram of 3 bit R - 2R type DAC. Explain the conversion steps for digital input as 100.	10	3	2	1.3.1

7A	Fig. shows input output waveforms. Identify the application of opamp and draw the circuit diagram accordingly.	10	4	3	1.3.1
(i)	 (ii) 				
B (i)	Identify the circuit shown below. Explain its woking during positive half cycle of the input signal.	5	4	3	1.3.1
					
(ii)	For the circuit shown below, draw the output waveform and explain the same. V_{in} is as shown. V_{ref} is derived from $+V_{CC}$ such that its value is +1V	5	4	3	1.3.1
					

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END SEMESTER EXAMINATION FEB-MARCH 2023

Program: S.Y. B.Tech., Electrical Engineering | **Duration: Three Hour**

Course Code: PC-BTE302 | **Maximum Points: 100**

Course Name: Electrical Networks | **Semester: III**

Note: Question No. 1 is compulsory.

Solve any four questions from remaining SIX.

S.Y. B.Tech (E) Sem III

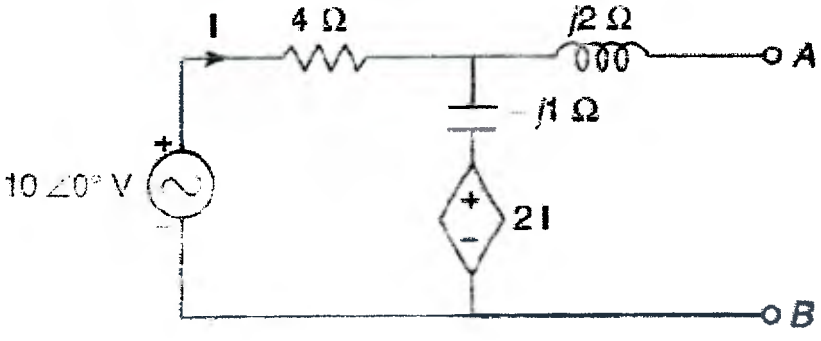
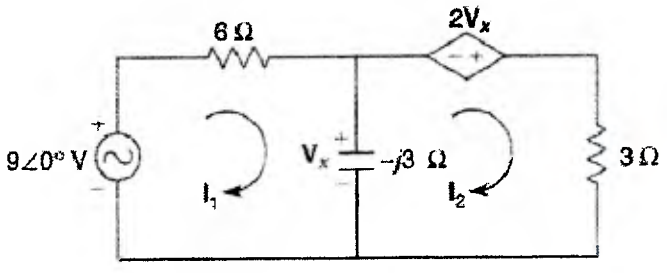
Q.No.	Questions	Points	CO	BL	Module No.
1.	a. Describe overdamped, underdamped, undamped and critically damped systems in brief.	05			
	b. Define poles, zeros and driving point function.	05			
	c. Write down all initial conditions required to solve the below given differential equation. $\frac{d^5i}{dt^5} + 6\frac{d^4i}{dt^4} + 17\frac{d^3i}{dt^3} + 28\frac{d^2i}{dt^2} + 24\frac{di}{dt} + 8i = 0$	05			
	d. The cut-set matrix of a graph is shown below.				

$Q_a =$

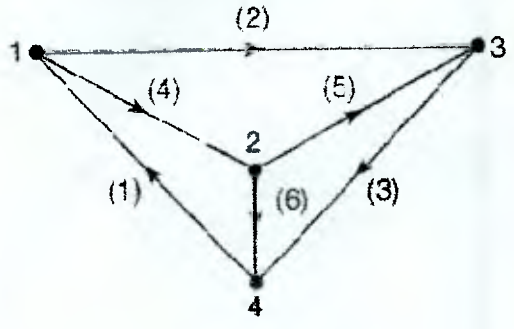
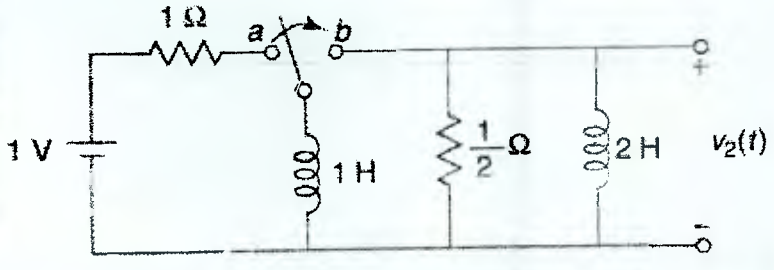
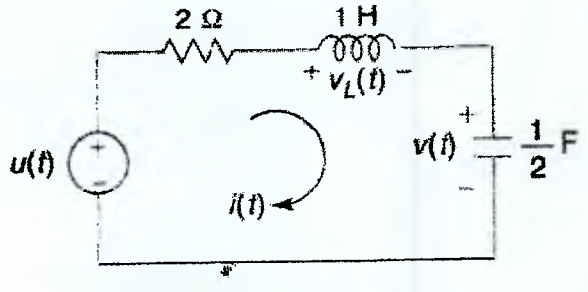
Cut-sets ↓ \ Branches →	1	2	3	4	5	6	7
1	1	−1	0	1	0	0	0
2	−1	1	−1	0	0	−1	−1
3	0	0	0	0	−1	1	0
4	0	0	1	−1	1	0	1
5	0	0	1	−1	0	1	1

Draw the oriented graph from the given cut-set matrix and Find cut-set matrix Q.

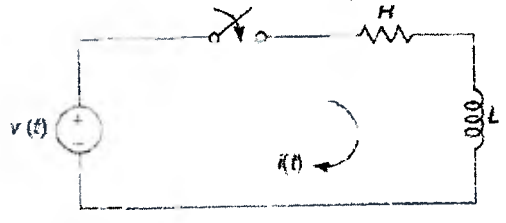
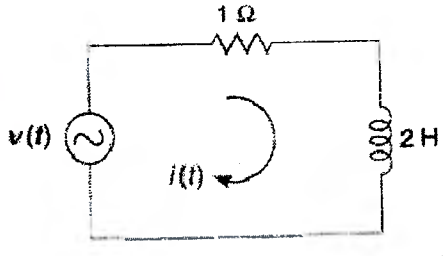
END SEMESTER EXAMINATION FEB-MARCH 2023

2.	a. Find Thevenins Equivalent representation across A and B for the network shown below. 	10				
	b. Define/Describe following 1. Loop Matrix 2. Path 3. Rank of a graph. 4. Time Constant for series RL Circuit with initially charged L and then L is discharging through resister only without any other element in the circuit. 5. Fundamental Cut-Set.	10				
3.	a. Find the loop currents by using mesh analysis. 	10				
	b. Derive the condition for maximum power transfer through the complex load when load has variable reactive as well as resistive.	06 04				
	c. Explain Superposition and Nortan Theorem.					

END SEMESTER EXAMINATION FEB-MARCH 2023

4.	a. For the graph of network shown below find 1) Incidence Matrix 2) Tieset Matrix 3) Cutset Matrix  	10			
	b. In a network of the figure given below, the switch is in position **"a"** for a long period of time. At t=0, the switch is moved from **"a"** to **"b"**. Find v_2 using the numerical values given in the network. Assume that the initial current in the 2-H inductor is zero.  	10			
5.	a. Determine whether RLC circuit given below is underdamped, overdamped or critically damped? Also find $v_L(0^+), \frac{di}{dt}(0^+), \frac{d^2v}{dt^2}(0^+)$ if $v(t) = u(t)$.  	14			

END SEMESTER EXAMINATION FEB-MARCH 2023

	b. Draw the locus of following in s-plane for a standard second order system 1. Constant Damping Ratio 2. Constant Natural Frequency of Oscillations 3. Constant damped frequency of oscillations	06				
6.	a. At t=0, a switch is closed, connecting a voltage source **v = Vsin(ωt)** to a series RL circuit.By method of the Laplace Transformations show that the current is given by the equation. $i=\frac{V}{Z}\sin(\omega t-\phi)+\frac{\omega LV}{Z^2}e^{-Rt/L}$ *where* $Z=\sqrt{R^2+(\omega L)^2}$ *and* $\phi=\tan^{-1}\left(\frac{\omega L}{R}\right)$ 	12				
	b. The network shown in the figure below is at rest for t<0. If the voltage, as given below, is applied to the network, determine the value of A so that there is no transient term in the curret response. $v(t)=u(t)\cos(t)+A\delta(t)$ where, u(t) – unit step and $\delta(t)$ – *impulse* 	08				

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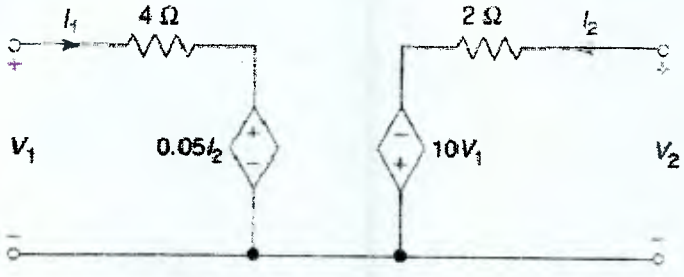
END SEMESTER EXAMINATION FEB-MARCH 2023

7.	a. Derive Y paramaters in terms of Z and ABCD parameters for a two port network.and ABCD parame	10			
	b. Determine Y and Z parameters of the network shown below. 	10			

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SARDAR PATEL COLLEGE OF ENGINEERING

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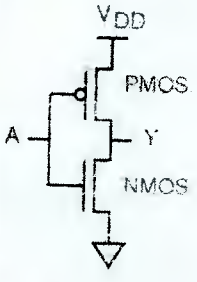
End Sem Exam – Feb 2023 Examinations

Program: Electrical
Course Code: PC-BTE303
Course Name: Digital Electronics

Duration: 3 hours
Maximum Points: 100
Semester: III

S.Y. B.Tech (Sem III)

- Question 1 is compulsary
- Attempt **any 4** out of remaining 6 questions
- Make suitable assumptions wherever necessary

Q.No.	Questions	Points	CO	BL	PI
1a.	Reduce the following using K-maps and implement the circuit. $F(P,Q,R,S) = \Pi M(0,2,3,7,8,9,11,15)$	06	2	3	2.4.1
1b.	 a. Identify the given circuit b. Why this circuit is better compared to TTL circuit.	04	4	3	2.1.2
1c.	Do the following conversion i. $(A2C4)_{16}$ to $(?)_{BCD}$ ii. $(10110)_2$ to $(?)_{gray}$	04	1	4	2.4.1
1d.	Discuss the drawbacks of ripple counter.	06	3	2	1.4.1
2a.	Explain the following terms related to Logic Families i. Fan out and Fan in ii. Voltage parameters iii. Temperature iv. Noise immunity and noise margin	10	4	2	1.4.1
2b.	Design a ripple mod 7 down counter using JK flip flop having +ve edge triggered clock.	10	3	6	3.2.2

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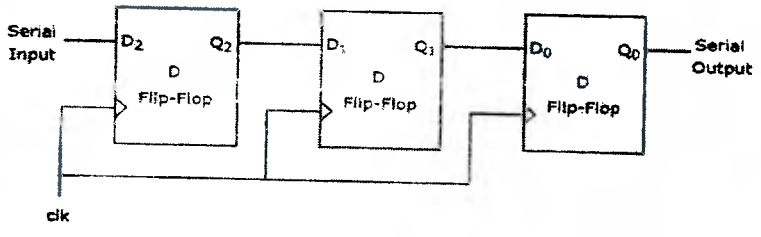
End Sem Exam – Feb 2023 Examinations

3a.	Design synchronous decade counter using T flip flop.	10	3	6	3.2.2
3b.	Implement the following using 8:1 Mux. $f = AB + BC$	10	2	3	2.1.3
4a.	Explain working of SR flip flop with Preset and Clear inputs.	10	3	2	1.4.1
4b.	Do the following conversion: i. S-R flip flop to T flip flop ii. T flip flop to D flip flop	10	3	3	2.1.3
5a.	Design a comparator circuit to compare following two nos. using single IC 7485 and additional gates. 10110 and 10111	10	2	6	2.1.3
5b.	Write short note on weighted and non-weighted codes.	10	1	2	2.4.1
6a.	 i. If D_2 represents MSB bit, identify the type of Register. ii. Also suggest the changes required in the above circuit if Ring counter needs to be implemented. iii. If the initial state of the ring counter is 110 determine the state diagram of the counter.	10	3	5	1.4.1
6b.	Write Short note on memories	10	4	2	1.4.1
7a.	Design 9 bit odd parity checker using IC 74180	10	2	6	2.1.3
7b.	Implement Full adder using 1:8 DeMux which is having inverted logic outputs.	10	2	3	2.1.3

6/3/23

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End Semester Examination

March 2023

Organizational Communication and Interpersonal Skills

Max. Marks: 100 Duration: 3 Hours
Class: S.Y. Mech /Electrical **Semester: III** Program: B.Tech

Course Code : HSM BTM 307/ BTE 301

Note:

- **Q.1. is Compulsory**
- **Out of remaining 6 questions attempt any 4**
- **Each question carries 20 marks**
- **Start every question from a fresh page.**

Questions	Answer the following questions:	Grade points	CO	BL	PI
Q.1.	Attempt any four questions out of six. Each question carries five marks: **A.** Explain the parts of an Email sequentially **B.** Write down ten most important etiquettes to maintain a professional work environment at the office. **C.** Define a team. Explain the different types of teams in detail. **D.** Discuss the pros and cons of Autocratic and Democratic types of leadership with one example each. **E.** Distinguish between an Abstract and Summary **F.** Explain the interview screening process steps in detail.	**20**	**01,04**	**04**	**10.1.3**
Q.2	Wishcart.com is an online company that sells laptop and Mobile accessories like External Hard discs, pen drive, Bluetooth earphones/ Earbuds/ Headphones, stylus, IPad, Mouse, Detachable Keyboards, Laptop stands, Phone covers, etc. to Youth. The Chief Executive officer of the company has noticed a decrease in sales in the last three months and has appointed a market research agency called MARKETSTATS PVT. LTD. to	**05+ 15** **20**	**02**	**03**	**4.1.2**

	investigate current market trends, Availability of customers, and choices of youths. He has also instructed the agency to suggest innovative marketing strategies to help increase sales. Assume that you are the Chief Research officer in MARKETSTATS PVT. LTD. Conducted surveys through different procedures on behalf of the company. Draft a **letter report** addressed to the CEO of Wishcart.com with your findings and recommendations to increase the sales of the products.				
Q.3.	The maintenance of the classrooms, labs and corridors of your college campus is unsatisfactory. As the General Secretary 2023 of the Students' Council you have been asked by the Principal to study the matter by calling a meeting of the Council Members, class representatives, maintenance officer, Housekeeping personals and students volunteers to discuss the reasons and solutions for improving the hygiene and aesthetics of the campus.	**(20)**	**04**	**02, 03**	**3.1.1**
A.	Assuming you to be the Magazine Secretary of the council, Draft the Notice and Agenda for the above meeting.	**10**			
B.	Prepare minute of narration based on the above notice and agenda.	**10**			
Q.4	**Post- Product Engineer:** **Company: Wipro Pvt. Ltd., M.G. Road, Mumbai** **Experience- Two years with good communication skills and leadership qualities.** **Software proficiency: Mat lab, Python, Data structures and algorithms.**	**(20)**	**02**	**01**	**10.1.2**
A.	Write a Job Application letter in response to the above advertisement	**10**			
B.	Prepare an appropriate Resume with a summary statement	**10**			
Q.5.	Your best friend's concepts are clear and her reasoning is sound, but in the feedback to her presentations, the audience often says that she is very feeble. You just cannot hear her beyond the first two rows. She fumbles with words during presentations. She has also not made her PowerPoint slides properly as she has not read any rules for preparing PowerPoint presentations You want to see her improve the quality of delivery of her presentations, as you feel this is a critical skill needed for going forward and achieving success as an engineer.	**(20)**	**05**	**04**	**10.1.3**
A.	What suggestions would you give her for presentations regarding improvement in the Content, Delivery and Attire?	**10**			
B.	What tips would you like to give for the Visual Aids and Body Language during presentation?	**10**			

Q.6. A.	As a student of Sardar Patel College of Engineering, Write a detailed Email to the Training and Placement officer of the institute to provide you a Technical internship in the vacation slot of semester III. Provide information about you and the field in which you would like to take the internship. Keep your subject faculty and Principal in courtesy copy.	**(20)** **10**	**03**	**01**	**10.1.2**
Q.6.B.	Emails are one of the most commonly misused tools in the new technology space and one need to ensure that the code of conduct (Netiquette) is not violated in your organization. As a student of second year, list and describes the email etiquettes that are to be followed so as to not create a bad image or reputation. (Write ten email etiquettes)	**10**			
Q.7. A	**Identify the leadership styles and explain the style that emerge from the given case studies:** Stephen is the vice president of a medium- sized organization. He has been with the company for over 10 years. He directly manages a team of around 20 departmental managers, who between them are responsible for almost 300 people. He allows his managers to make most operational decisions. For example, when planning a major stock reduction programme, he encourages his managers to put forward ideas and develop plans.	**(20)** **05**	**02**	**01**	**10.3.2**
Q.7. B.	**Imagine for a moment that you are an online entrepreneur and you have a very successful website. This website is your primary source of income and your goal is to make it successful.** So let's say your to do list looks like this (in random order) • Write sales copy for new product • Watch the comedy skit on You-tube • Re-organize my desktop • Cancel dentist appointment • Download the new podcasts from The Ranveer Show • Attend Birthday party of Batch mate • Prepare a presentation for sales pitch of new product Based on your knowledge of Stephen Covey's Time Management Quadrant, in which quadrant does each task belong to? Draw the quadrant and place the task in the respective quadrants.	**05**	**01,03**	**05**	**12.3.2**
Q.7.C	**State whether the following statements are true or false.** a. Scheduling meetings is one of the most common tasks in	**05**	**01**	**06**	**9.2.1**

	modern workplace b. In a group, more the number, more knowledge and information can flow in. c. Leaders are born and not made. d. Statutory reports are written for the smooth functioning of an organization. e.. When dealing with corporate politics, it is usually best to respect all people's opinions and treat everyone fairly to help make the best decisions for the success of the company.				
Q.7. D	**Fill in the Blanks:** a. _____ showcases the contents of the report graphically b. A good report is always _____ in nature. c. _____ are one of the best methods of collecting primary information in writing reports. d. _____ interview is somewhat informal in nature. e. The first constituent of Etiquette is _____	**05**	**03**	**06**	**12.1.1**