

**PREVIOUS SEMESTER EXAMINATION DECEMBER-2022**Program: **ELECTRICAL**Course Code: **BS-BTE401**Course Name: **APPLIED MATHEMATICS-IV**Duration: **03 Hours**Maximum Points: **100**Semester: **IV**

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

QNO.	QUESTION	PO IN TS	CO	BL	Mod ule No.																				
QI a)	Let X & Y be two independent binomial variates with parameters $(n_1=6, p=1/2)$ and $(n_2=4, p=1/2)$ respectively. Evaluate $P(X+Y)=3$.	06	1	2	3																				
QI b)	The following data gives the heights in inches(X) and weights in lbs(Y) of a random sample of 9 students <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>X</td> <td>61</td> <td>68</td> <td>68</td> <td>64</td> <td>65</td> <td>70</td> <td>63</td> <td>62</td> <td>64</td> </tr> <tr> <td>Y</td> <td>112</td> <td>123</td> <td>130</td> <td>115</td> <td>110</td> <td>125</td> <td>100</td> <td>113</td> <td>116</td> </tr> </table> Estimate the weight of a student with height 59 inches.	X	61	68	68	64	65	70	63	62	64	Y	112	123	130	115	110	125	100	113	116	06	3	3	1
X	61	68	68	64	65	70	63	62	64																
Y	112	123	130	115	110	125	100	113	116																
QI c)	A crv X has PDF defined as $f(x) = \frac{k}{1+x^2}, -\infty < x < \infty$. Find k mean, variance & $P(X \geq 0)$	08	1	1	3																				
QII a)	In an examination, it is laid down that a student passes if he secures 30% or more marks. He is placed in Ist, IInd or IIIrd division according as he secures 60% or more marks, between 45% & 60% and between 30% & 45% respectively. He gets distinction in case he secures 80% or more marks. It is noticed from the result that 10% of the students failed in the examination where as 5% of them obtained distinction. Calculate the percentage of students placed in the second division.	10	1	2	3																				
QII b)	A & B throw alternately a pair of dice whoever throw '9' first wins the game. If 'A' starts the game. What are their chances of winning?	10	2	2	2																				
QIII a)	Solve using Taylor's series method $x \frac{dy}{dx} = x - y; y(2) = 2$, Find	06	1	2	7																				

**PREVIOUS SEMESTER EXAMINATION DECEMBER-2022**

	y at $x = 2.1$																									
QIII b)	The sales-data of an article in six shops before and after a special promotional campaign are as under <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Shops</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Before Campaign</td> <td>53</td> <td>28</td> <td>31</td> <td>48</td> <td>50</td> <td>42</td> </tr> <tr> <td>After Campaign</td> <td>58</td> <td>29</td> <td>30</td> <td>55</td> <td>56</td> <td>45</td> </tr> </tbody> </table> <p>Can the campaign be judged to be a success at 5% LOS.</p>	Shops	A	B	C	D	E	F	Before Campaign	53	28	31	48	50	42	After Campaign	58	29	30	55	56	45	06	1	2	4
Shops	A	B	C	D	E	F																				
Before Campaign	53	28	31	48	50	42																				
After Campaign	58	29	30	55	56	45																				
QIII c)	In an examination marks obtained by students in mathematics, physics and chemistry are normally distributed with means 51, 53 and 46 with standard deviations 15, 12, 16 respectively. Find the probability of securing total marks (i) 180 or more (ii) 90 or below	08	1	1	3																					
QIV a)	Suppose that a local appliances shop has found from experience that the demand for tube lights roughly distributed as Poisson with a mean of 4 tubes per week. If the shop keeps 6 tube lights during a particular week. What is the probability that the demand will exceed the supply during that week?	06	1	3	2																					
QIV b)	An urn contains 4 white and 3 red balls. Three balls are drawn with replacement, from this urn. Find μ , σ^2 and σ for the number of red balls drawn.	06	2	2	2																					
QIV c)	Solve the following system by Gauss - Jacobi method $30x - 2y + 3z = 75$, $2x + 2y + 18z = 30$, $x + 17y - 2z = 48$	08	3	1	6																					
QV a)	Fit a binomial distribution for the following data and compare the theoretical frequencies with the actual ones: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>X</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>f</td> <td>2</td> <td>14</td> <td>20</td> <td>34</td> <td>22</td> <td>8</td> </tr> </tbody> </table>	X	0	1	2	3	4	5	f	2	14	20	34	22	8	06	1	1	2							
X	0	1	2	3	4	5																				
f	2	14	20	34	22	8																				
QV b)	A certain drug is claimed to be effective in curing cold. In an experiment on 500 persons with cold, half of them were given the drug and half of them were given sugar pills. The patients' reactions to the treatment are recorded in the following table. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Helped</th> <th>Harmed</th> <th>No effect</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Helped	Harmed	No effect					06	1	2	5													
	Helped	Harmed	No effect																							



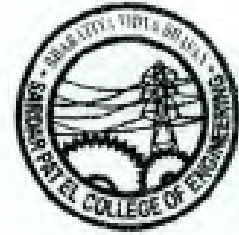
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(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai - 400058

PREVIOUS SEMESTER EXAMINATION DECEMBER-2022

	Drug	150	30	70																
	Sugar Pills	130	40	80																
	On the basis of this data, can it be concluded that the drug and sugar pills differ significantly in curing cold?																			
QV c)	Solve, by Gauss – Seidel method, the following system: $8x - 3y + 2z = 20$ $4x + 11y - z = 33$ $6x + 3y + 12z = 35$				08	3	2	6												
QVI a)	Compute spearman's rank correlation coefficient for the following data				06	2	1	1												
	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">X</td> <td style="padding: 5px;">18</td> <td style="padding: 5px;">20</td> <td style="padding: 5px;">34</td> <td style="padding: 5px;">52</td> <td style="padding: 5px;">12</td> </tr> <tr> <td style="padding: 5px;">Y</td> <td style="padding: 5px;">39</td> <td style="padding: 5px;">23</td> <td style="padding: 5px;">35</td> <td style="padding: 5px;">18</td> <td style="padding: 5px;">46</td> </tr> </table>								X	18	20	34	52	12	Y	39	23	35	18	46
X	18	20	34	52	12															
Y	39	23	35	18	46															
QVI b)	A drug is given to 10 patients and increments in their blood pressure were recorded to be 3, 6, -2, 4, -3, 4, 0, 0, 2, 6. Is it reasonable to believe that the drug has no effect on change of blood pressure?				06	1	3	5												
QVI c)	Using Runge-Kutta method {IV th order} find the numerical solution at $x = 0.6$ for $\frac{dy}{dx} = \sqrt{x+y}$, given $y(0.4) = 0.41$ using $h = 0.2$.				08	3	1	7												
QVI I a)	Using Newton-Raphson method find the root of $x \log_{10} x = 12.34$ with $x_0 = 10$ upto 3 places of decimal.				06	3	3	6												
QVI I b)	Using Euler's Method find the approximate value of y at $x = 1$ taking $h = 0.2$ given that $\frac{dy}{dx} = x + y$ and $y(0) = 1$. Also compare it with exact value				06	2	2	7												
QVI Ic)	Solve by Gauss – Elimination Method: $2x - y + 3z + w = 9$, $3x + y - 4z + 3w = 3$, $5x - 4y + 3z - 6w = 2$, $x - 2y - z + 2w = -2$				08	3	3	6												



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Previous Semester Exam Dec. 2022

Program: Electrical Engineering
Course code: PC-BTE401
Name of the Course: Analog Circuits

S. V. B. P. U. M. (E.E.)
Sem IV

Duration: 3 Hour
Maximum Marks: 100
Semester: IV

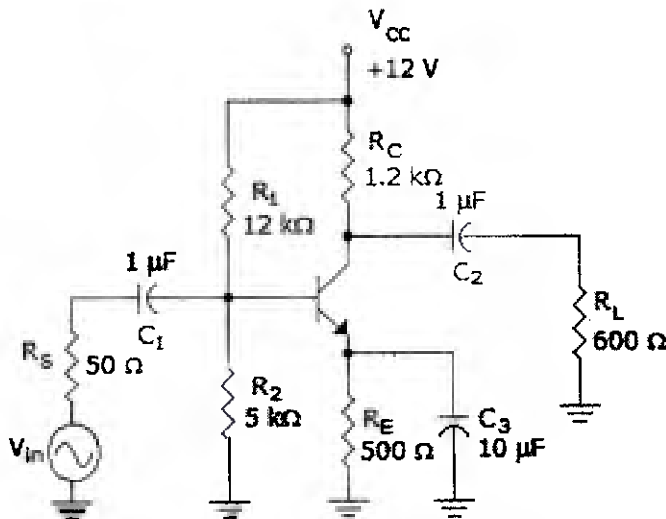
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Solve any five questions out of seven.

Q. No.		Points	CO	BL	PI
1	State whether following statements are True/False. Justify your answer.				
A	P_{dmax} rating is one of the important rating in power amplifier.	05	1	5	1.3.1
B	Active filters are preferred over passive filters.	05	5	5	1.3.1
C	Gain of BJT amplifier is more at higher frequencies compared to midband frequencies.	05	1	5	1.3.1
D	Oscillator circuit requires ac as well as dc input signal.	05	5	5	1.3.1
2 A	Explain classification of Power Amplifiers.	10	1	1	1.4.1
B	What is crossover distortion? How is it eliminated?	10	1	1	1.4.1
3 A	With the help of neat circuit diagram and waveforms, show how IC 555 can be used as monostable multivibrator. In the above circuit if $R = 100 K\Omega$, Calculate value of C for the time delay $T = 100$ mS.	10	2	3	1.4.1
B	Explain low voltage regulator using IC 723.	10	2	1	1.4.1
4 A	Explain how IC 7805 can be used to supply a current of 1A to a 10Ω , 10W load.	10	3	2	1.4.1
B	Explain the circuit to boost the current of IC 7805.	10	3	2	2.1.2
5 A	Discuss the reasons for difference in frequency response of BJT amplifier and opamp. Elaborate with suitable diagrams.	10	1	1	2.1.2

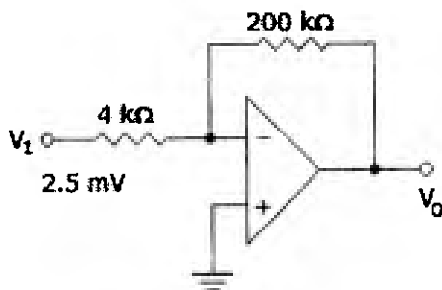
- B (i)** Calculate lower cutoff frequency due to C_1
 Given $h_{ie} = 4K$, $h_{fe} = 100$

3 1 3 2.1.2



- (ii) Determine the bandwidth of the amplifier shown below if UGB of opamp is 1 MHz

02 1 3 2.1.2



- (iii) State and explain Miller's Theorem

05 1 1 2.1.2

- 6 A** What are the advantages of negative feedback?

10 4 2 1.4.1

- B** With the help of suitable block diagram explain the different types of negative feedback. For each type give feedback factor, input resistance, output resistance.

10 4 2 1.4.1

- 7 A** Design first order Butterworth HPF at cutoff frequency 1kHz and passband gain of 2. Draw circuit diagram. Classify the filter designed as analog/digital, passive/active, audio/radio. Justify the answer.

8 5 3 2.1.2

- B (i)** Derive the formula for resonant frequency for Wien-bridge oscillator,

8 5 3 2.1.2

- For the circuit of Wein Bridge Oscillator using opamp, the component values used are, $R = 5.1 K\Omega$, $C = 1nF$, for the feedback network. $R_1 = 5.1 K\Omega$ and $R_f = 12 K\Omega$ for opamp. Draw circuit diagram. Determine whether the circuit will oscillate or not. If yes, obtain the output frequency.

4 5 3 2.1.2



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Previous semester Examination - December 2022

Program: B.Tech. (Electrical)

Duration: 3 hrs.

Course Code: PC-BTE402

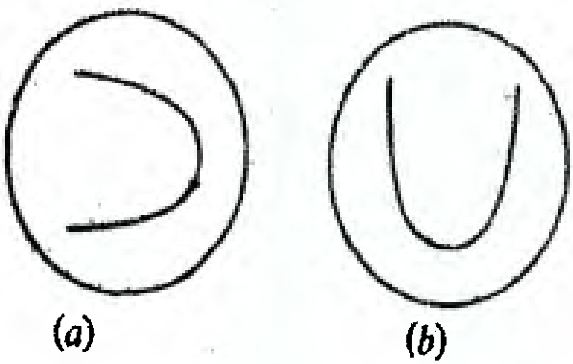
Maximum Points: 100

Course Name: Electrical and electronic measurement

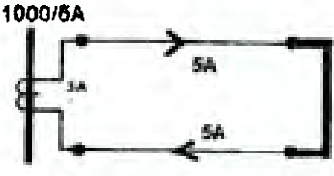
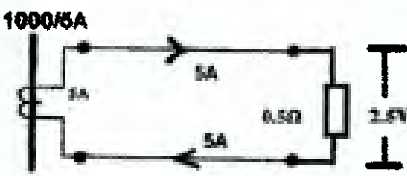
Semester: IV

Notes:

1. Question number 1 compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams.
4. Assume suitable data if necessary.

Q. No.	Questions	Pts.	CO	BL	Mod. No.
1. (a)	With the help of neat diagram explain in detail construction and working principle of photo multiplier.	10	2	L2	6
(b)	Explain in short eddy current damping system and derive the expression for damping torque of metal disc.	10	2	L3	1
2. (a)	Find the frequency of the horizontal plates if the frequency applied to vertical plate is 50 Hz for the pattern shown in figure (a) and (b).  (a) (b)	05	1	L2	4
(b)	Draw and explain the nature of equivalent circuit and corresponding phasor diagram of a current transformer. Derive expressions for the corresponding ratio error and phase angle error.	15	1	L1	3
3. (a)	Describe with clear schematic diagram how high voltage, current and power are measured with the help of instrument transformers.	05	2	L1	3

(b)	Explain in detail a five point calibration method with flow chart.	05	2	L1	7
(c)	Explain the term 1. Sampling and holding 2. Quantizing and encoding	05	2	L2	5
(d)	With the help of neat diagram derive expression of shunt resistance (R_{sh}) used in Ammeter.	05	1	L2	2
4.(a)	With the help of neat block diagram explain in detail working of digital multi-meter.	10	1	L1	5
(b)	With the help of neat diagram explain in detail how to measure time interval between two events digitally?	10	1	L1	4
5. (a)	Explain with the help of a neat diagram and expression how to measure power in the following condition.	10	3	L2	2
(b)	Draw and explain the operation of a meggar used for high resistance measurement.	10	1	L2	2
6. (a)	A moving-coil instrument whose resistance is 25Ω gives a full-scale deflection with a voltage of 25 mV. This instrument is to be used with a series multiplier to extend its range to 10 V. Calculate multiplier resistance value?	05	3	L3	1

(b)	<p>Calculate CT burden in following conditions</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Fig. (a)</p> </div> <div style="text-align: center;">  <p>Fig. (b)</p> </div> </div>	05	2	L3	3
(c)	<p>With the help of neat diagram explain in details how to measure water level by using Capacitive method</p>	10	2	L2	6
7. (a)	<p>Draw the block diagram of a CRO and explain the different components in detail.</p>	15	2	L2	4
(b)	<p>For a particular measurement, the wattmeter readings were 5000 W and 1000 W. Calculate the power and power factor if one of the meters has to be reversed.</p>	5	2	L2	2



Previous Semester Examination December 2022

Program: **DSY BTech**

Duration: 3 Hr

Course Code: **PC-BTE403**

Maximum Points: 100

Course Name: **Signals and Systems**

Semester: IV

Note:

- Attempt any FIVE question out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- In the absence of any data, make suitable assumptions and justify the same.

Q. No.	Questions	Points	CO	BL	Module No.
1a	Classify system $y(t) = \sin(x(t))$ as static/dynamic, linear/non-linear, time-variant/invariant, causal/non-causal and stable/unstable.	05			01
1b	Consider a signal $x(n) = (0.7)^n u(n)$. Test if the signal is i) energy or power signal. ii) Periodic or aperiodic	05			01
1c	If $x(t) = 5u(t)$ plot signals $x(t-5)$, $x(t+3)$, $x(3t)$, $x(t/4)$ and $x(-t)$	05			01
1d	Determine output of following system if $x[n] = \{4, 1, -2, 1\}$ and $h[n] = \{-5, 2, -3\}$	05			01
2a	A mechanical system dynamics are represented by $\frac{d^2y}{dt^2} + 5 \frac{dy}{dt} + 6y(t) = x(t)$ where $x(t)$ is input and $y(t)$ is the output. Using Fourier transform determine the output of the system if $x(t) = e^{-7t} u(t)$.	10			03
2b	Determine Fourier series of a half wave rectifier output if input applied to the rectifier is $10 \sin(5t)$.	10			03
3a	Convolve two signals $x_1(t) = e^{-2t} u(t)$ and $x_2(t) = u(t)$ using Graphical method.	10			02
3b	Consider a system described by a difference equation $3y[n] + 4y[n-1] = x[n]$.	10			02

**Previous Semester Examination December 2022**

	i) Determine Impulse response of the system ii) Determine output of the system when input $x(n) = (0.25)^n u(n)$ with initial output of the system $y(-1) = 0$. (Use time domain method)				
4a	Realize given DT system in series and parallel form $H(z) = \frac{z - 4}{(z - 1)(z - 3)(z - 6)}$	10			07
4b	Obtain Direct form I and Direct form II realization of a system with transfer function $H(s) = \frac{15s^2 - 2s + 17}{s^3 - 7s^2 + 8s - 9}$	10			07
5a	Determine LT and ROC for the following signals i) $6 \sin(20t) + 7 \cos(40t)$ ii) $f(t+10)$ if $f(t) = 4e^{-2t}u(t) + 5e^{3t}u(-t)$	10			03
5b	Consider a LTI system represented by $\frac{d^2y}{dt^2} + 3 \frac{dy}{dt} + 4y(t) = x(t)$ i) Determine its impulse response. ii) Determine output when input $x(t) = e^{-4t}u(t)$ Use Laplace Transform only.	10			03
6a	Determine Inverse ZT of $X(z) = \frac{z}{(z-5)(z-3)(z-1)}$ assuming all possible ROC combinations	10			05
6b	Determine ZT and ROC of following signals i) $x[n] = \sin(50n) - \cos(20n)$ ii) $x[n] = e^{-j5n}u[n] + e^{j5n}u[-n-1] + e^{-j15n}u[n]$	10			05
7a	The output of the system $y[n] = (2)^n u[n] + (5)^n u[n]$ when input applied is $x[n] = (3)^n u[n]$. i) Determine impulse response of the system. ii) Draw pole-zero plot of the system and comment on the stability	10			06
7b	State and prove initial and final value theorem of ZT	10			06



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Previous Semester Exam Dec. 2022



Program: Electrical Engineering *S. Y. B. Tech Sem IV*
 Course code: PC-BTE404
 Name of the Course: Microprocessor and Microcontroller *But*

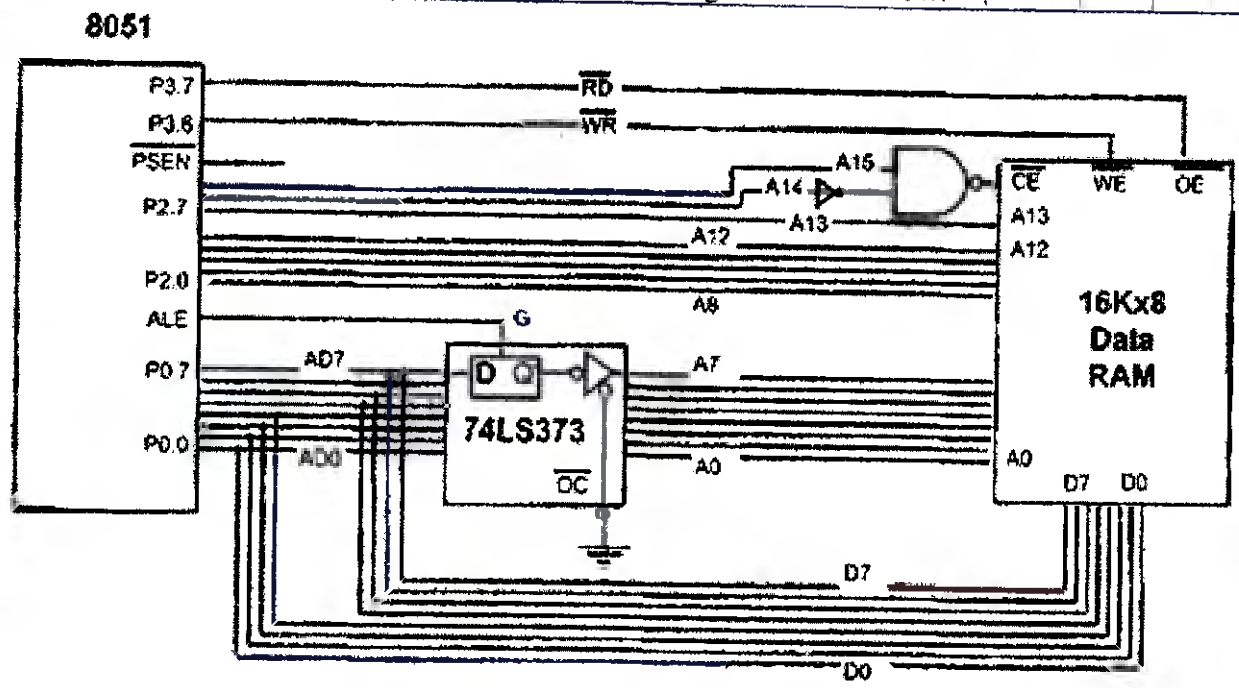
Duration: 3 Hours
 Max. Marks: 100
 Sem. IV

- Solve any five questions out of seven.
- Answers to all sub questions should be grouped together.
- Make suitable assumptions whenever necessary. State them clearly.
- Diagrams drawn to support your answer should be clearly visible.

30/12/22

Q.		Points	CO	BL	PI
1	State whether following statements are True/False. Justify the same.	20	1,2	5	1.4
i	MOV A, #54H XRL A, #78H After executing above A will contain 2CH.				
ii	8031 is called ROMless 8051.				
iii	WR is used to get the converted data out of the ADC0804 chip				
iv	The instruction "SETB P2.1" makes all pins of P2 high.				
v	In IBM PC keyboards, a single microcontroller takes care of hardware and software interfacing of the keyboard.				
2	What is the result after executing following? Explain	20	1	1	1.3.1
i	MOV A, #25H ANL A, #0EH				
ii	MOV A, # 04H ORL A, # 68H				
iii	MOV A, #39H CPL A				
iv	MOV A, #66H RR A				
3A	Describe the internal architecture of 8051 microcontroller with neat diagram.	10	1	3	1.4.
B	With the help of neat diagram explain RAM allocation in 8051. Hence explain	10	2	2	1.3.
4	Explain with suitable diagram, interfacing of 4x4 matrix keyboard with 8051.	10	2	2	1.3.
A	Explain the method to detect key press.				
B	Explain the connection between 8051 and DAC0808 with the help of a neat interfacing diagram. Write a program to generate saw tooth waveform.	10	2	2	1.3.
5A	A program to generate a square waves, of 50 Hz frequency on P1.2 using interrupts is to be written. Assume XTAL = 11.0592 MHZ. The timer 0 is to be used in mode 1. Explain the initialization required. i.e. determine the values to be loaded in (i) timer registers (ii) Interrupt register	8	1	3	1.4.

ii	Explain what is represented by the following instructions. Specify its significance. MOV IE, #10000010B	2	1	2	1.6.1
B i	Write a program to take data from P1 and send it to P2 continuously. Explain	4	1	3	1.3.1
ii	Draw the interfacing diagram with LCD and 8051, in which Port 1 is used to connect data bus of 8051. P 2.0, P 2.1 and P2.2 are to be connected to RS, R/ \bar{W} , E respectively. With respect to the diagram explain the following code. MOV P1, A SETB P2.0 CLR P2.1 SETB P2.2 ACALL DELAY CLR P2.2 RET	6	2	3	1.4.1
6A i	Show the status of the carry, auxiliary carry and parity flag after executing following instructions MOV A, #9DH ADD A, #54H	6	1	2	1.6.1
ii	Draw the diagram showing the PSW register. Hence select bank 2.	4	1	2	1.6.1
B	Explain registers TMOD, SCON, SBUF. A program to receive data at a baud rate of 4800 is to be written using timer 1 in mode 2. Explain initialization required i.e. values to be stored in TMOD, SCON, TH1	10	1	3	1.4.1
7A i	Draw control word format of 8255. Hence find the control word of the 8255 for all the ports A, B, and C as output ports (mode 0).	4	2	3	1.4.1
ii	Stepper motor is connected to 8051 using port A of 8255. Determine the control word required. Explain the same. How is it moved to the control register?	6	2	3	1.4.1
B	Determine the address space allocated to data RAM in figure shown below.	10	3	3	1.3.1



**PREVIOUS SEMESTER EXAMINATION JANUARY 2023**Program: Electrical Engineering

Duration: 3 hours

Course Code: PC-BTE 405

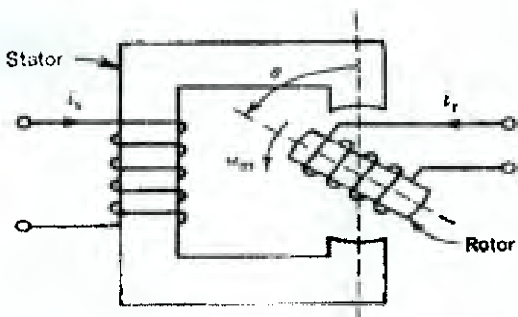
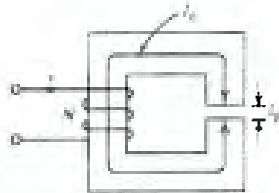
Maximum Points:

Course Name: Electrical Machines -1

Semester: IV

Notes:

- Solve any five questions out of seven
- Make suitable assumptions wherever necessary
- Combine all the sub-questions in a given question together
- All Diagrams should be neat and clear

Q.No.	Questions	Po ints	CO	BL	Mo dule No.
1. a)	<p>Derive expression for torque developed in rotational electromagnetic system for doubly excited system shown below.</p> 	10	1	3	2
1. b)	<p>For the magnetic circuit of Fig. $N = 400$ turns. Mean core length $l_c = 50$ cm. Air gap length $l_g = 1.0$ mm. Cross-sectional area $A_c = A_g = 15$ cm². Relative permeability of core $\mu_r = 3000$. $i = 1.0$ A. find</p> <ol style="list-style-type: none"> 1. Flux and flux density in the air gap. 2. Inductance of the coil 	10	1	3	1,2

2. a)	In 8 pole DC machine 90 mechanical degrees corresponds to how many electrical degrees?	4	2	3	4												
2. b)	Tests are performed on a 1 phase, 10 kVA, 2200/220V; 60 Hz transformer and the following results are obtained.	16	3	3	6												
	<table border="1"> <thead> <tr> <th></th> <th>Open-circuit test (HV side open)</th> <th>Short Circuit test (Low voltage side shorted)</th> </tr> </thead> <tbody> <tr> <td>Voltmeter</td> <td>220 V</td> <td>150 V</td> </tr> <tr> <td>Ammeter</td> <td>2.5 A</td> <td>4.55 A</td> </tr> <tr> <td>Wattmeter</td> <td>100 W</td> <td>215 W</td> </tr> </tbody> </table>		Open-circuit test (HV side open)	Short Circuit test (Low voltage side shorted)	Voltmeter	220 V	150 V	Ammeter	2.5 A	4.55 A	Wattmeter	100 W	215 W				
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Voltmeter	220 V	150 V															
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	<p>1. Calculate approximate equivalent parameters referred to HV side</p> <p>2. Determine power factor for no load and short circuit tests</p>																
3. a)	The $\lambda - i$ relationship for an electromagnetic system is given by $i = \left(\frac{\lambda g}{0.09}\right)^2$ which is valid for the limits $0 < i < 4$ A and $3 < g < 10$ cm. For current $i = 3$ A and air gap length $g = 5$ cm, find the mechanical force on the moving part, using coenergy of the field.	10	1	3	3												
3. b)	Derive induced torque in the DC motor.	10	1	3	4												
4.	Write short note on following topics A. High frequency transformer B. Vector groups	20	3	2	6												

**PREVIOUS SEMESTER EXAMINATION JANUARY 2023**

5.	<p>A 12 kW, 100V, 1000rpm DC shunt generator has armature resistance of $R_a=0.1$ ohm, shunt field winding resistance $R_{fw}=80$ ohm, and $N_r=1200$ turns per pole. The rated field current is 1 ampere. The magnetizing characteristic at 1000 rpm is given in table. The machine is operated as a separately excited dc generator at 1000 rpm with rated field current.</p> <p>1. Neglect the armature reaction effect. Determine the terminal voltage at full load</p> <p>2. Consider that armature reaction at full load is equivalent to 0.06 field amperes</p> <p>a. determine the full load terminal voltage</p> <p>b. Determine the field current required to make terminal voltage 100 V at full load condition</p> <table border="1" data-bbox="256 1075 1110 1301"><tbody><tr><td>E_a (V)</td><td>22</td><td>44</td><td>67</td><td>84</td><td>98</td><td>105</td><td>108</td><td>112</td></tr><tr><td>I_f (A)</td><td>0.21</td><td>0.42</td><td>0.61</td><td>0.83</td><td>0.94</td><td>1.1</td><td>1.2</td><td>1.4</td></tr></tbody></table>	E_a (V)	22	44	67	84	98	105	108	112	I_f (A)	0.21	0.42	0.61	0.83	0.94	1.1	1.2	1.4	20	2	3	5
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6.	<p>Write short note on following topics</p> <p>1. compare high frequency transformer with conventional power frequency transformer</p> <p>2. Autotransformers</p>	20	3	2	7																		
7. a)	<p>What is commutator? Where it is placed? What is the function of commutator?</p>	10	2	2	4																		
b)	<p>Draw and explain the torque speed characteristics of DC series motor.</p>	10	2	2	5																		