



Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

Re-exam

June- 2018



Duration: 3.00 Hrs

Max. Marks:100

Class: B.Tech. (Electrical) Semester: VII

Program: Electrical Engineering

Name of the Course: High Voltage Engineering

Course Code : BTE408

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. Marks	C.O. No.	Mod. No.
Q.1(a)	Derive expression for current growth equation in terms Townsend's primary and secondary ionization coefficient.	15	01	02
(b)	Draw and explain test cell and closed cycle purification system for reconditioning of transformer oil.	05	01	03
Q2(a)	Explain the term: 1. Solid dielectric used in practice 2. Reactor series resonance circuit 3. Characteristics of liquid dielectric	10	02	04 05 03
(b)	Discuss the effect of following parameters on the breakdown strength of liquids : a) Suspended particle mechanism b) Cavitation and bubble mechanism c) Stressed oil volume mechanism	10	03	03
Q3(a)	A solid specimen of dielectric has a dielectric constant of 4.2 and $\tan\delta$ as 0.001 at a frequency of 50 Hz. If it is subjected to an alternating field of 50kV/cm, calculate the heat generated in the specimen due to the dielectric loss.	03	02	04
(b)	Explain the term: i) Voltage doubler circuit ii) Resistance potential divider for DC voltage measurement iii) Streamer Theory iv) Breakdown in composite dielectric	12	1,3	05 06 02 04
(c)	How is the Electric stress/electric field intensity controlled?	05	01	01
Q4(a)	What is "finite element method"? Find local coefficient matrix and global coefficient matrix of given geometry	10	03	01

	<p>Node (x,y) 1 (0.6, 0.6) 2 (1.2, 1.2) 3 (1.8, 1.8) 4 (1.0, 2.4)</p>			
(b)	Describe with a neat sketch, the working of Van de Graaff generator. What are the factors that limits the maximum voltage obtained	07	02	05
(c)	What is critical threshold distance for sustained discharge if $\alpha = 3.43/cm$ and $\gamma = 5.635 \times 10^{-4}$.	03	01	02
Q5(a)	A 100 kVA, 400V/250 kV testing transformer has 8% leakage reactance and 2% resistance on 100 kVA base. A cable has to be tested at 500 kV using the above transformer as a resonant transformer at 50 Hz. If the charging current of the cable at 500 kV is 0.4 A, find the series inductance required. Assume 2% resistance for the inductor to be used and the connecting leads. Neglect dielectric loss of the cable. What will be the input voltage to the transformer?	10	02	05
(b)	Explain 'Generating Voltmeter' for H.V. measurement and prove that $i_{rms} = \frac{VC_m\omega}{\sqrt{2}}$	10	01	06
Q6(a)	What is Paschen's law? Prove that breakdown condition in gases is depend on ' $p \times d$ ' only.	05	01	02
(b)	Explain in detail "Post breakdown phenomenon and its applications" in gases.	05	01	02
(c)	What are the criteria used in selecting ratings of the testing equipment for HV laboratories?	10	04	07
Q7(a)	A generating voltmeter has to be designed so that it can have a range from 10 to 100 kV d.c. If the indicating meter reads a minimum current of 1.5 μ A and maximum current of 18 μ A, what should the capacitance of the generating voltmeter be?	05	02	06
(b)	Draw layout and explain operation of UHV Laboratory of Central Power Research Institute, Bangalore	10	04	07
(c)	Explain in detail "Voltage doubler circuit"	05	02	05



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ReExamination

Program: Electrical Engineering

Duration: 3 hrs.

Maximum Marks: 100

Date: June 2018

Course code: BTE407

Semester: VII

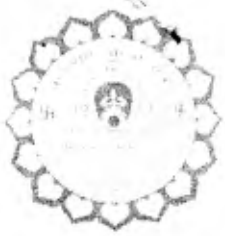
Course Name: Image Processing

Instructions: Q1. is compulsory. Solve any 4 questions from the remaining six.

Q. No.	Questions	Max Marks	C O No	Module No.																
1. a	Show that two dimensional DFT/IDFT of an image can be computed by row and column passes with one dimensional DFT/IDFT	05	4	6																
b	Show that the high pass (HP) filter can be obtained as $HP = ORIGINAL - LP$ (Assume a 3×3 mask)	05	3	3																
c	With an example explain 4-, 8- and m- adjacency in images.	05	1	1																
d	Quality of an image depends on number of pixels and gray levels of the picture. Justify or contradict.	05	1	1																
2 a	For the following image, find negative of an image, bit plane slicing and contrast modifications. <table border="1" data-bbox="193 1415 489 1703"><tr><td>10</td><td>4</td><td>3</td><td>7</td></tr><tr><td>14</td><td>13</td><td>7</td><td>12</td></tr><tr><td>5</td><td>6</td><td>8</td><td>4</td></tr><tr><td>3</td><td>6</td><td>9</td><td>8</td></tr></table>	10	4	3	7	14	13	7	12	5	6	8	4	3	6	9	8	10	2	2
10	4	3	7																	
14	13	7	12																	
5	6	8	4																	
3	6	9	8																	
b	Explain with example frequency domain image enhancement techniques.	10	3	3																
3 a	How edge detection is performed in digital images using (i) Laplacian Operator (ii) Sobel Operator (iii) Prewitt Operator	10	3	3																

	Compare their outcomes																												
b	Describe Histogram Equalization. Obtain Histogram Equalization on the following 8 bit image segment of size 5x5. Write inference on image segment before and after equalization. <table border="1" style="margin: 10px auto;"> <tr><td>180</td><td>180</td><td>180</td><td>160</td><td>220</td></tr> <tr><td>160</td><td>160</td><td>160</td><td>160</td><td>170</td></tr> <tr><td>170</td><td>170</td><td>170</td><td>170</td><td>160</td></tr> <tr><td>170</td><td>180</td><td>200</td><td>200</td><td>220</td></tr> <tr><td>210</td><td>160</td><td>170</td><td>190</td><td>210</td></tr> </table>	180	180	180	160	220	160	160	160	160	170	170	170	170	170	160	170	180	200	200	220	210	160	170	190	210	10	3	3
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160	160	160	160	170																									
170	170	170	170	160																									
170	180	200	200	220																									
210	160	170	190	210																									
4 a	Consider an image matrix given by <table border="1" style="margin: 10px auto;"> <tr><td>2</td><td>1</td></tr> <tr><td>1</td><td>2</td></tr> </table> Find 2D cosine transform and 2D discrete Fourier Transform	2	1	1	2	10	4	6																					
2	1																												
1	2																												
b	What is Hadamard transform? Discuss its application. Compute Hadamard transform of the image <table border="1" style="margin: 10px auto;"> <tr><td>3</td><td>2</td><td>3</td><td>2</td></tr> <tr><td>2</td><td>3</td><td>4</td><td>3</td></tr> <tr><td>3</td><td>4</td><td>5</td><td>4</td></tr> <tr><td>2</td><td>3</td><td>4</td><td>3</td></tr> </table>	3	2	3	2	2	3	4	3	3	4	5	4	2	3	4	3	10	4	06									
3	2	3	2																										
2	3	4	3																										
3	4	5	4																										
2	3	4	3																										
5 a	Explain following morphological operations (i) Boundary Extraction (ii) Hit or Miss Transformation (iii) Thinning and Thickening	10	3	5																									
b	Which morphological techniques are used for (i) Removal of structures of certain shape and size. (ii) Filling of holes of certain shape and size. Explain with example.	10	3	5																									
6 a	Explain with example image compression using vector quantization.	10	5	7																									
c	Explain with example run length coding. What are the	10	5	7																									

	advantages and disadvantages of the same.			
7 a	Explain steps in JPEG image formation	10	5	7
b	With a neat block diagram explain various components of image processing. Explain any one application which uses various image processing methods	10	1	1



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ODD SEM REEXAMINATION JUNE 2018

Program: Electrical Engg

Date: November 2017

Duration: 3 hrs.

Course code: BTE404

Maximum Marks: 100

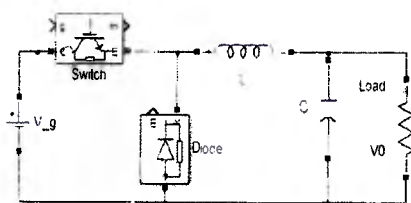
Semester: VII

Name of the Course: ADSMC

Instructions: Solve any 5 questions.

Question Number	Questions	Max. points
Q1) a)	Explain working of practical Forward converter using circuit diagram and waveforms of primary voltage, primary current, output voltage, output current, and voltage across switch.	12
b)	Which type of snubber circuit is required to be used with transistors? Explain one of it using waveforms of switching voltage and current	8
Q2)a)	What is ZCS Resonant Switch Converter? Explain the operation with relevant waveforms.	10
b)	The ZCS resonant converter shown below, delivers maximum power of $P_L = 1\text{W}$ at $V_0 = 5\text{V}$. The supply voltage is $V_s = 15\text{V}$. The maximum operating frequency is $f_{\max} = 40\text{KHz}$. Determine L & C . Assume that t_1, t_2 are small and $x = I_m/I_0 = 1.5$	10
Q3)a)	Explain necessity of heat sink in power electronics components. Explain heat transfer mechanisms.	12

b)	Explain Fly back converter using circuit diagram.	8
Q4) a)	In a step down converter consider all components to be ideal. Let V_0 be held constant at 5 V by controlling the switch duty ratio D . Calculate the minimum inductance L required to keep converter operation in continuous conduction mode under all conditions if V_d is 10 V – 40 V, $P_0 \geq 5$ W and $f_s = 50$ KHz.	12
b)	What are the issues in inductive current switching in case of switched mode converters? How these issues are addressed.	10
Q5)	Elaborate Fly-back converter working in continuous conduction mode using waveforms like source current, inductor voltage and capacitor current.	20
Q6)	With the help of circuit diagram and waveforms explain full bridge transformer isolated buck converter.	20
Q7)	Design an inductor for a Buck Converter configuration as shown in figure below, for the following specifications: Output voltage, $V_0 = 5$ V, output current, $I_0 = 5$ A, Switching frequency, $f_s = 40$ KHz, input voltage, $V_g = 12$ V $\pm 10\%$ (assume: $B_m = 0.2$ T for ferrite, $J = 3$ A/mm ² (3×10^6 A/m ²), $K_c = 1$ (for square wave) and $K_w = 0.6$ use appendix 1 and 2 for standard values)	20



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KT Exam

November 2017 / May 2018



Max. Marks: 100

Class: **BTech (Electrical)**

Semester: **VII**

Name of the Course: **RENEWABLE ENERGY**

Q. P. Code:

Duration: **3 Hrs**

Program: **UG**

Course Code : **BTE403**

Instructions:

Answer **any five** questions from **Q1 to Q7**.

Assume suitable data & necessary neat diagrams wherever required.

Question No		Maximum Marks	Course Outcome Number	Module Number
Q1	Explain the following:			
	a. Solar radiation measurement.	10	1	1
	b. Electricity generation using Solar concentrators	10	1	2
Q2	a. Explain the Performance indices of solar collectors.	10	2	1
	b. Compare the performance of Flat Plate & concentrating-type collectors used for electricity generation.	10	2	2
Q3	a. What are the major components & its functions of a wind turbine	10	1	5
	b. With a neat sketch explain solar pond electric power plant.	10	3	3
Q4	a. Methods to convert Ocean thermal energy in to electricity	10	3	6
	b. Scope & economics and availability of Wave & tidal energy	10	4	7
Q5	Significance of the following with reference to Solar photo voltaic cell:	10	4	2
	a. I-V & P-V characteristics	10	4	
	b. Effect of variation of insolation & temperature on I-V & P-V characteristics.			

Q6	<p>With reference to Solar photo voltaic cell explain:</p> <ul style="list-style-type: none"> a. Solar PV module b. Cell mismatch in a module c. Effect of shadowing d. Solar PV Panel & Array 	<p>05 05 05 05</p>	<p>3 3 3 3</p>	<p>2</p>
Q7	<p>Explain any two from the following:</p> <ul style="list-style-type: none"> a. Power-speed characteristic of wind turbine b. Wind energy conversion systems (WECS) c. Electricity generation from Wave & tidal energy d. Biogas plant for electricity generation 	<p>10 10 10 10</p>	<p>2 2 2 2</p>	<p>5 5 7 4</p>



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End Sem Exam (KT)

June 2018

Max. Marks: 100

Duration: 3 hr

Class: **Final Year**

Semester: **VII**

Program: **Electrical Engineering**

Name of the Course: **Electronic Instrumentation**

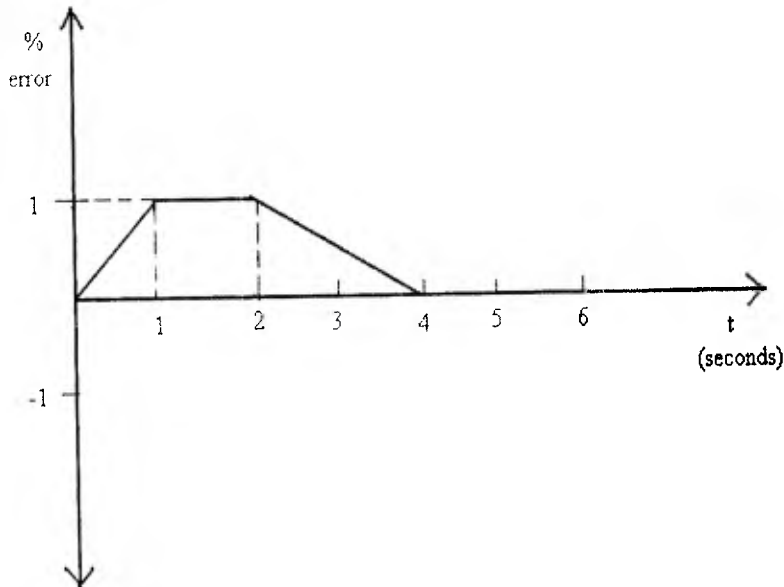
Course Code : **BTE402**

Instructions:

- **Question No. 1 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.	M	C	Max. Marks
Q1.A) Explain Basic Characteristics of Instruments.	1	1	5
B) An electrically deflected CRT has a final anode voltage of 1000V and parallel deflecting plates 1.7 cm long and 7 mm apart. If the screen is 50 cm from the centre of deflecting plates, find (a) beam speed, (b) the deflection sensitivity of the tube, and (c) the deflection factor of the tube.	3	2	4
C) What are the different ways to program a PLC? Explain.	6	3	5
D) Find the output of a 4 bit R2R DAC where the input is 1101.	4	4	6
Q2.A) Name and explain any 5 static characteristics of an instrument.	1	1	10
B) Draw and explain the block diagram of pulse generator.	2	1	10
Q3.A) Draw and explain internal structure of CRT.	3	2	10
B) Draw and explain CRT of storage type oscilloscope.	3	2	10
Q4.A) A Wein's Bridge oscillator is required to generate a sinusoidal waveform of 5200 Hz. Draw the circuit and calculate the values of the frequency determining resistors R_1 , R_2 and R_3 , R_4 and two capacitances C_1 , C_2 to produce the required frequency.	2	1	5

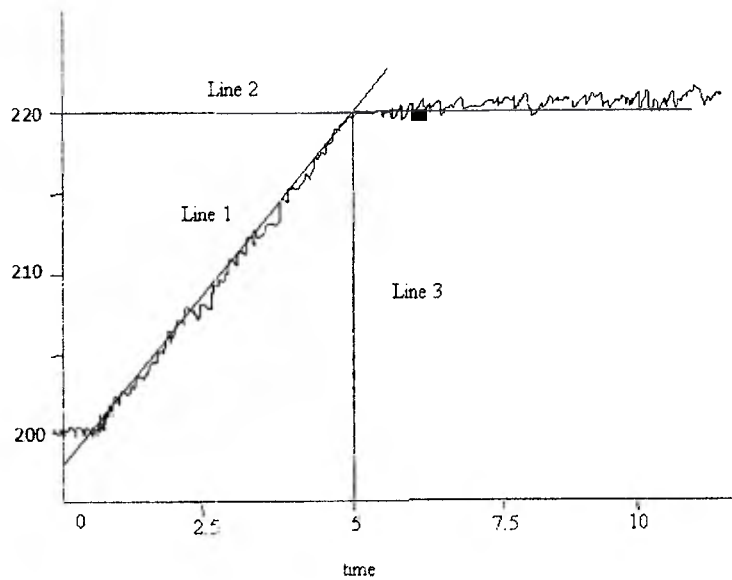
- B) Which are the components of an analog data acquisition system? Explain. 4 4 8
- C) What are the types of multiplexing system? Explain. 4 4 7
- Q5.A) With a neat block diagram explain process control system 5 3 5
- B) Explain proportional control mode of operation? How proportional band varies with gain? What is an offset? 5 3 7
- C) Suppose the error, in fig, is applied to a PID controller with $K_P = 5$, $K_I = 0.6 \text{ s}^{-1}$, $K_D = 0.5 \text{ s}$, $P_I(0) = 10\%$. Draw a plot of the controller output.



- Q6. A) With neat block diagram explain PLC. 6 3 7
- B) Draw the block diagram of a sweep generator using a heterodyne frequency generator. What is the function of frequency sweeper block? 2 1 5
- C) Explain the following instructions in PLC: 6 3 8
- a) OSR
 - b) Latch and unlatch instruction
 - c) Timer instruction
 - d) Negated output instruction
- Q7.A) What is the need of calibration? What are the risks involved in not calibrating an instrument. 7 4 5
- B) Data are shown in the table 7 4 8

Input level-start	100	Output level-start	200
Input level-end	110	Output level-end	220

Output graph is shown in fig.(Assume suitable data if necessary)



1. Use reaction curve method to process the data and produce the tuning parameters for a PI controller
2. Fit an appropriate first order plus delay time model

transfer function, given by $\frac{K e^{-sT_d}}{\tau_s + 1}$

C) The data given correspond to a sustained oscillation test. 7 4 7
 Process the data and produce the tuning parameters for a PID controller using the rules to give $\frac{1}{4}$ decay output.

Input reference	6.5 cm
Output level start	6.5 cm
Oscillating gain value	2

