Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

End Semester Exam

November 2015

Max. Marks: 100

Duration: 3 Hours

Class: B.Tech. (Electrical)

Semester: VII

Name of the Course: **Design, Management and Auditing of Electrical Systems**

Course Code : EE401

Instructions:

1. Question No. 1 is **compulsory**.
2. Attempt any four questions out of remaining six.
3. Answers to all sub-questions should be grouped together.
4. Draw neat diagrams.
5. Assume suitable data if necessary.

Question No.		Maximum Marks
Q 1. (a)	What is the need for energy audit?	2
(b)	Draw the symbols for the following as per Indian Standards: (i) Synchronous motor, 3-phase, star connected, neutral brought out (ii) Exhaust fan (iii) Single phase auto transformer (iv) Over head line	2
(c)	What is distributed generation? Why do we need it?	2
(d)	What is utilization factor or coefficient of utilization in lighting studies?	2
(e)	What are the typical billing components of the tariff structure of an industrial utility?	2
(f)	A process plant consumes of 12500 kWh per month at 0.9 power factor. What is the percentage reduction in distribution losses per month if power factor is improved up to 0.96 at load end?	2
(g)	What is a soft starter? What is its advantage?	2
(h)	Give the objectives of Energy Management Systems (EMS).	2
(i)	Define green building.	2
(j)	Define demand factor and diversity factor.	2
Q 2. (a)	What is the concept of payback period pertaining to the financial analysis technique? Cite an example with your explanation.	7
(b)	What are the various types of substations? Give classification.	6
(c)	A small electrical workshop 15 m long, 9 m wide and 3 m upto trusses is to be illuminated to a level of 200 lux. The coefficient of utilization is 0.75 and maintenance factor is 0.8. Calculate the number of lamps required to illuminate the whole area if the lumen output of the lamp selected in 3000 lumens.	7
Q 3. (a)	Discuss the tendering process.	8
(b)	List down the main components of the Energy Conservation Act 2001.	4

(c)	Write a note on automatic power factor controllers.		8
Q 4. (a)	Explain various energy efficient lighting controls.		10
(b)	Discuss the energy saving opportunities in **any one** of the following electrical installations: (i) Fans and blowers (ii) Electric motors		10
Q 5. (a)	A factory takes a load of 200 kW at 0.85 p.f. lagging for 2500 hours per annum. The tariff is Rs. 150 per kVA plus 5 paise per kWh consumed. If the p.f. is improved to 0.9 lagging by means of capacitors costing Rs. 420 per kVAR and having a power loss of 100 W per kVA, calculate the annual saving or loss effected for the first year after p.f. correction and for the second year after p.f. correction. Allow 10% per annum for interest and depreciation.		10
(b)	Draw the block diagram of a digital relay.		5
(c)	Define energy monitoring and targeting.		5
Q 6. (a)	Describe the features and functioning of SCADA.		8
(b)	Give the classification of cables on the basis of their applications.		4
(c)	Describe AC UPS with a neat block diagram.		8
Q 7. (a)	Write a note on **any one** of the following: (i) Numerical relays (ii) Types of electrical projects (iii) Types of distribution systems according to connections		10
(b)	Given the cash flows of the four projects, A, B, C, and D, and using the Payback Period decision model, which projects do you accept and which projects do you reject with a three year cut-off period for recapturing the initial cash outflow?		10

Project	A	B	C	D
Initial investment	Rs. 10,000	Rs. 25,000	Rs. 45,000	Rs. 1,00,000
Cash inflow 1st Year	Rs. 4,000	Rs. 2,000	Rs. 10,000	Rs. 40,000
Cash inflow 2nd Year	Rs. 4,000	Rs. 8,000	Rs. 15,000	Rs. 30,000
Cash inflow 3rd Year	Rs. 4,000	Rs. 14,000	Rs. 20,000	Rs. 20,000
Cash inflow 4th Year	Rs. 4,000	Rs. 20,000	Rs. 20,000	Rs. 10,000
Cash inflow 5th Year	Rs. 4,000	Rs. 26,000	Rs. 15,000	Rs. 0
Cash inflow 6th Year	Rs. 4,000	Rs. 32,000	Rs. 10,000	Rs. 0

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End Semester Exam

November 2015

Max. Marks: 100

Class: Electrical Eng.   Semester: VII

Name of the Course: Illumination

Duration: 3 Hrs

Program: B.Tech

Course Code : EE415

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

Master file.

Question No		Maximum Marks
Q1(a)	Write a short note on Electromagnetic theory of light?	5
(b)	Define Room Index, how it's calculated. What do you understand by the term color rendering index?	5
(c)	Distinguish between Lux and Lumen.	5
(d)	Give difference between maintenance factor and depreciation factor.	5
Q2(a)	Give the various reasons of fault occurring in fluorescent tubes, & their possible cause and remedies?	7
(b)	Differentiate between tungsten filament lamps & fluorescent tubes. Also write its working principle with neat sketch?	10
(c)	What all are the various sources of light available for the mankind?	3
Q3(a)	You being an electrical design engineer, is been called up by a govt. organization to illuminate their office of size 30mX 50m having south facing entrance in the place somewhere near Topic of Cancer. What all various lighting scheme will you use for designing the interior lighting design for the given govt. organization?	10
(b)	Estimate the number and wattage of the lamp which would be required to illuminate the workshop space 60 X 15 meter by mean of lamp mounted 5 meter above the working plane. The average illumination required is about 100 Lux, coefficient of utilization is 0.4, luminous efficiency 16 lumens per watt. Assume a space height ratio is unity and a candle power depreciation of 20%. Make a sketch showing the location of the lamps?	10

|		
Q4(a)	What are the various light control strategies involved for lighting control?	10
(b)	write about any two different sensors used achieving lighting control with its application for interior lighting	10
Q5(a)	Elaborate daylighting control system? Write about the two components which always taken in consideration for daylighting?	10
(b)	Write about any two lighting control strategy used to achieve daylighting control?	7
(c)	How does daylight control works?	3
Q6(a)	What are the various schemes used for street lighting designing. What factors should be considered while designing street light?	10
(b)	Write a notes on cutoff methods used in street light designing?	7
(c)	Draw the various schemes used in roadways lighting for vertical as well as lateral light distribution.	3
Q7(a)	What possible improvement/measure would you plan in a general lighting system?	10
(b)	Estimate the number of 1000 W flood light projector required to illuminate the upper 75 meters of one face of a 96 meter tower of width 13 meter and approximate initial average luminance is to be 6.85 cd/m^2. The projectors are mounted at ground level 51 meter from base to tower. Utilization factor is 0.2, refection factor of wall is 25% and efficiency of lamp is 18 lumen per watt.	10

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End Semester Exam

November 2015
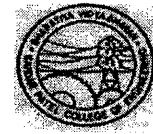
Max. Marks: **100**

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

Name of the Course: **High Voltage Engineering**

Duration: **3.00 Hrs**

Program: **Electrical Engineering**

Course Code : **EE411**

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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
Q1 (a)	Explain Townsend's Theory, of breakdown in gas.	**10**
(b)	Explain with neat sketches Cockcroft – Walton voltage multiplier circuit.	**10**
Q2 (a)	With reference to conduction and breakdown in commercial liquid explain, (i) Suspended particle mechanism (ii) Cavitation and Bubble Mechanism (iii) Stressed oil volume Mechanism	**10**
(b)	What is "Finite element method"? Find voltage at node 2 and 4 respectively?	**10**

Node (x,y)
1 (0.8, 1.8)
2 (1.4, 1.4)
3 (2.1, 2.1)
4 (1.2, 2.7)
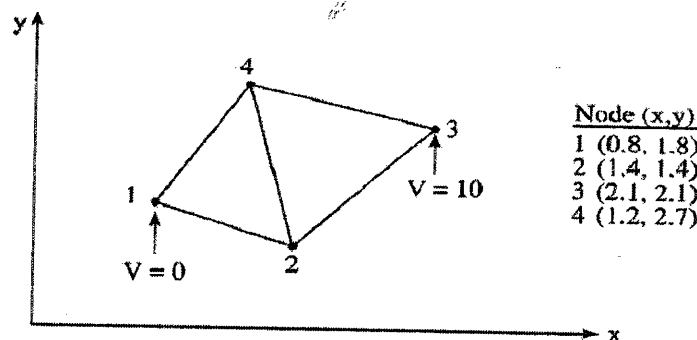
Q3(a)	State methods of High voltage DC measurement. Explain 'Generating Voltmeter' for H.V. measurement.	**10**
(b)	Draw and explain test cell and closed cycle purification system for reconditioning of transformer oil.	**05**
(c)	Explain the term "Treeing and Tracking"	**05**

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Q4(a)   Draw neat diagram of impulse voltage waveform.   **10**

A ten stage impulse generator has 0.250 μF condensers. The wave front and wave tail resistances are 75 ohms and 2600 ohms respectively. If the load capacitance is 2.5 nF, determine the wave front and wave tail times of the impulse wave.

(b)   Explain the different mechanism by which breakdown occurs in solid dielectrics in practices.   **10**

Q5(a)   Explain with diagrams, electrostatic generator for producing high DC voltage.   **08**

(b)   A solid dielectric specimen of dielectric constant of 4.0 shown in the Figure 1 has an internal void of thickness 1 mm. The specimen is 1 cm thick and is subjected to a voltage of 80 kV (rms). If the void is filled with air and if the breakdown strength of air can be taken as 30 kV (peak)/cm, find the voltage at which an internal discharge can occur.   **04**
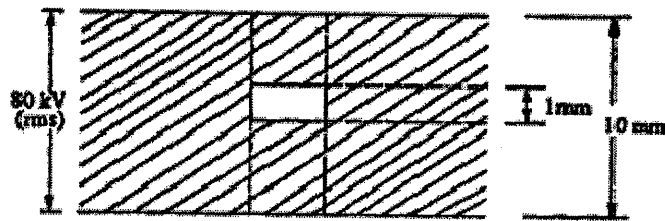
Figure 1

(c)   Explain the experimental set up for the measurement of pre-breakdown current in gases.   **08**

Q6(a)   Describe, with neat sketch, the working of 3-stage cascade transformer for producing very high a.c. voltage.   **10**

(b)   Determine the electromechanical breakdown voltage of PMMC sheet,4 mm thick, relative permittivity 4 and Young's modulus 1000 Kg/m^2 when subjected to an impulse voltage.   **06**

(c)   What is a composite dielectric and what are its properties ?   **04**

Q7(a)   List equipment used in High Voltage laboratory.   **05**

An air gap clearance is to be designed for withstand voltage of 1500 KV (rms). The withstand voltage is 80 % of 50 % flashover voltage. For a rod plane gap, Calculate the minimum clearance required.

(b)   Write short note on **any two** :   **10**

     a) Thermal breakdown
     b) Streamer Theory
     c) Suspended particle Theory.

(c)   Explain the sphere gap measurement of high voltages.   **05**

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End Semester Exam
November 2015

Max. Marks: 100

Duration: 3 Hrs

Class: B. Tech. Electrical, Semester: VII

Name of the Course: **Embedded System and Real Time Programming**, Program: **Electrical Engineering**

Course Code: **EE412**

Instructions:
1. **Attempt any five questions out of seven.**
2. **Question No. 1 is compulsory.**
3. **Draw neat diagrams**
4. **Assume suitable data if necessary**

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Question No.		Max. Marks
Q1(a)	What is an embedded system? Give any two examples. List the major hardware and software components of embedded system.	5
(b)	What are the various types of memory in embedded systems?	5
(c)	Give the characteristics of embedded system? In what ways CISC and RISC processors differ?	10
Q2 (a)	List and Explain Barrel shifter operation of ARM 7 processor with any one example.	5
(b)	Explain each Arithmetic and Logical instructions of ARM 7 processor with examples.	10
(c)	Explain program status register in details. Also list the operating modes of ARM 7 Processor.	5
Q3 (a)	Describe the parallel communication using SCI and SPI bus standards.	10
(b)	Draw interfacing diagram of LCD display and explain the functions of: RS, EN, R/W.	5
(c)	What is an Interrupt? Explain Interrupt Service Routine, Interrupt Priorities, and Interrupt Latency and Interrupt Nesting.	5
Q4 (a)	Design interfacing of LED blinking with 8051 on port P0 and write an embedded C program to blink LED with 1 sec delay.	5
(b)	Draw interface diagram of LCD interfacing and write an embedded C program to send information "SPCE" to LCD.	10
(c)	Write a process to enable and disable IRQ and FIQ interrupts for ARM 7 processor.	5
Q5 (a)	What is real time system? Explain Hard and Soft real time system with examples.	5
(b)	Explain with necessary coding and examples, How flow of control is changed using branch instructions in ARM.	5

(c)	Draw and explain the interfacing diagram for seven segment display with 8051. Also write embedded c program.	10
Q6 (a)	Discuss any two embedded software development tools.	5
(b)	Explain Single and Multiple register Load-Store instructions in details. Also explain addressing modes for the same.	10
(c)	Write an embedded c program to monitor port P2.5 and assign P2.5 to P3.6 if it is set for 8051 microcontroller.	5
Q7 (a)	Draw and discuss the complete block diagram, Hardware and Software architecture of Smart card access control system.	10
(b)	Explain any one applications of embedded system for field of Robotics with neat block diagram and flow control.	5
(c)	Explain any one applications of embedded system for Medical with neat block diagram and flow control.	5

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End Semester Exam
November 2015

Max. Marks: **100** Duration: **03 hours**

Class: **BTech.** Semester: **VII** Program: **Electrical engineering**

Name of the Course: **RENEWABLE ENERGY SOURCES** Course Code : **EE404**

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
Q1 (a)	Name & define the performance indices of a solar Flat Plate Collector (FPC).	05
(b)	State the speed control strategies for wind turbines.	05
(c)	Obtain the I-V characteristic of an illuminated *pn* junction & hence define 'fill factor'.	05
(d)	How thermal energy is stored using solar ponds?	05
Q2 (a)	What is geothermal energy & why is it considered as a renewable energy source?	03
(b)	How does a conventional geothermal reservoir work?	05
(c)	State the basic methodology of deriving electricity from a geothermal reservoir & Name the four commercial types of geo thermal power plants.	04
(d)	Narrate a technology for economic production of electricity from geothermal resources lower than 150°C (302°F).	08
Q3 (a)	Name the three basic wave energy conversion systems & state the difference in the principle of operation of these systems.	06
(b)	What are the main components of an ocean thermal energy conversion system?	02
(c)	Suggest an energy conversion technology & give its operation to derive electricity from the following (one for each). (i) Ocean thermal energy (ii) Wave Energy (iii) Tidal energy	12

①

Q4 (a) Explain with a neat sketch the operation of a Wind turbine having variable speed with partial power electronic conversion WTG (Type-3).   **10**

(b) A propeller-type wind turbine has the following data: **10**
Speed of free wind speed at a height of 10m = 12 m/s; α=0.14; Air density = 1.226kg/m³; height of tower = 100m; Rotor diameter = 80m; Generator efficiency = 85%; wind velocity at the turbine reduces by 20%. Find (i) Total Power available in the wind; (ii) Power extracted by the turbine; (iii) Electrical power generated. (Mention the representation of notations used).

Q5 (a) State the approximate rules for sizing or performance estimation of a bio-gas plant.   **04**

(b) Calculate the size of the cow-dung based biogas plant supplying electricity to a school in a remote place having the following energy requirements.   **16**
10 lamps each of 100 CP that operate for 5 hours daily.
5 computers, each of 250 W, that operate for 6 hours daily by a dual fuel-engine driven generator.
One 2 hp water pump driven by dual fuel-engine for 2 hours daily.

Raw material availability & gas yield		
Raw material	Production rate	Gas yield (m³/kg of dry matter)
Cow dung	10-15 kg/day/head	0.34

Assume:
Conversion efficiency of generator = 80%
Thermal efficiency of engine = 25%
Heating value of bio gas = 23 MJ/ m³
Cow dung that can be collected from field = 70%
Solid matter content in cow dung = 18%
Biogas required for lighting a 100 CP lamp =0.126 m³/hour
Slurry density = 1090 kg/ m³

Q6 (a) What are the two main problems caused by cell mismatch & its effect in a PV module. & how are these effects minimized.   **10**

(b) A dc motor having efficiency of 82% is fed by a PV system. The motor produces 1.5 hp power at the shaft. Each module in the PV system has 36 multicrystalline silicon solar cells arranged in a 9 x 4 matrix. The cell size is 125mm x 125mm & the cell efficiency is 12%. Calculate the number of modules required in the PV array. Assume a global radiation incident normally to the panel as 1 kw/m².   **10**

Q7 **Explain the following (any two):**
(a) Earth-Sun angles & Observer-Sun angles   **10**

(b) Electricity generation using solar concentrators   **10**

(c) Measurement of solar beam radiations using Pyrheliometer.   **10**

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End Semester Exam

November 2015

Max. Marks: 100 Duration: 3 Hours

Class: B.Tech. Semester: VII Program: Electrical Engineering

Name of the Course: Project Management Course Code : EE 403

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

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Question No		Maximum Marks
Q1(a)	Taxonomy of a good Project.(Any five)	(05)
(b)	Detail Project Report. (Only Format)	(05)
(c)	Finance and Managerial appraisal. (In brief)	(05)
(d)	Different types of Tendering systems	(05)
Q2(a)	Draw a CPM Network for the following data. Arrive at the critical path using Forward and Backward pass computation and find out the estimated project duration along the critical path.	(10)

Activity	Preceding Activity	Duration in Weeks
A	-	5
B	-	11
C	-	8
D	C	7
E	A	9
F	A,B,C	4
G	C	12
H	C	5
I	E,F,G	10
J	F,G	5
K	H	5
L	H	9
M	J,K	3
N	L	6

(b)	Compare the **project 'A' and project 'B'** using Net Present Value method and Internal Rate of Return method assuming a discount rate of 11% p.a. ,Comment on the results achieved with both the methods.	(10)

Year	Project 'A' (Cash flow)	Project 'B' (Cash flow)
0	-10,00,000/-	-10,00,000/-
1	8,00,000/-	4,00,000/-
2	6,00,000/-	4,00,000/-
3		3,00,000/-
4		3,00,000/-
5		2,00,000/-

(Note- Negative figures indicate cash outflow)

Q3(a)	Carry out Risk Management Plan using 'Probability-Impact Matrix' and 'Other Heads' for the following project: Installation of Captive Generation Plant at ABC Steel Plant near Mumbai.	(10)
(b)	Explain in brief about the different types of Organization structures. Take suitable examples to explain them.	(10)

Q4	Following table defines various milestones in a project along with their interrelationships. It also gives details of the duration of each activity under normal and critical operating conditions and the corresponding costs incurred. The project involves Rs.350/- per week of operation as its indirect cost.
	       1. Draw the network diagram and find the critical path.
	       2. Calculate the cost/slope for each activity.
	       3. Carry out crashing till optimum time and cost is reached.
	       4. Find the critical path and additional project cost in each level of crashing.
		(20)

Activity	Preceding Activity	Duration in weeks		Direct cost in Rs.	
		Normal	Crash	Normal	Crash
A	-	7	4	1800	2100
B	-	9	7	3500	3800
C	B	5	4	2500	2625
D	A	8	5	4000	4225
E	C	9	8	3000	3325
F	B	11	11	3000	-

Q5(a)	What is the significance of Purchase Management? Define the different types of Purchase Systems.	(10)
(b)	What are the different heads of project cost estimation process? Explain in brief. (Take any example of your own choice)	(10)
Q6(a)	Discuss the importance of Material Management for "CAPITAL" Builder's exclusive housing scheme. Prepare an Inventory Format for the same with two or three entries.	(10)
(b)	**Mahatma Gandhi Institute** of Post Graduate Technical Education and Research Ahmedabad, intends to setup a turnkey contract. The scope of the work involves setting up of a multi-disciplinary advanced research Centre and a learning resource Centre. Design a tender document covering scope, specifications and important terms and conditions for the above project.	(10)
Q7(a)	Social Cost Benefit Analysis of Tata's Nano Car project in Gujarat.	(10)
(b)	Kirloskar India Private Limited increases the production of "D.G. Sets" to meet the increase in demand during the Diwali and New Year. Discuss the importance of the following to ensure the success of this business plan. (i) Quality assurance and (ii) Quality control	(10)

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End Semester Exam
November 2015

Max. Marks: 100

Class: BTech   Semester: VII
Name of the Course: Electronic Instrumentation

Duration: 3 Hrs
Program: Electrical engineering
Course Code : EE 402

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

Master file.

Question No		Maximum Marks
Q1 (a)	Write a short note on Dynamic characteristics of an instrument	[5]
(b)	Successive approximation A to D converter	[5]
(c)	Five point calibration	[5]
(d)	Voltage telemetering system	[5]
Q2(a)	A 5 bit converter is used for a voltage range of 0-10 V. Find the weight of MSB and LSB. Also the exact range of converter and error. Find the error if 10 bit converter is used	[5]
(b)	Write any three methods to program a PLC?	[5]
(c)	Explain SCADA?	[5]
Q3(a)	With a neat block diagram explain data loggers?	[10]
(b)	Obtain the unit step response of a 2nd order instrument?	[10]
(c)	Explain the importance of calibration	[5]
Q4(a)	Explain computer based data acquisition system?	[5]
(b)	With a neat block diagram explain PLC?	[5]
(c)	Write and explain program for filling oil into the tank until high level sensor turns on and turn off the motor until the level falls below the low level sensor(Refer Fig:1)	[8]

(1)

Fig:1
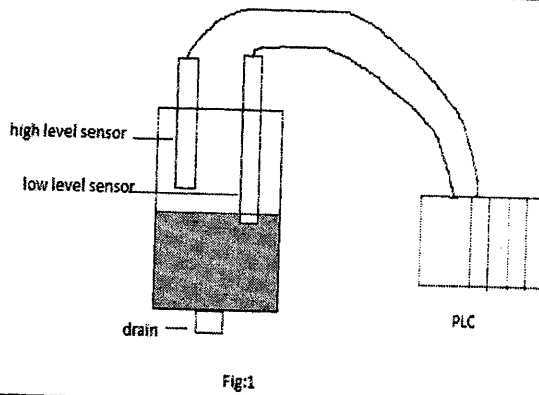
Q5(a)	With the help of a neat block diagram explain a function generator?	[8]
(b)	Name and explain the programming languages of PLC?	[7]
(c)	Explain optical encoders?	[5]
Q6(a)	Write the characteristics of a digital meter?	[5]
(b)	Suppose the error, fig 2, is applied to a proportional-integral controller with $K_P = 5$, $K_I = 0.7 \text{ s}^{-1}$, $p_I(0) = 20\%$. Draw a plot of the controller output	[15]
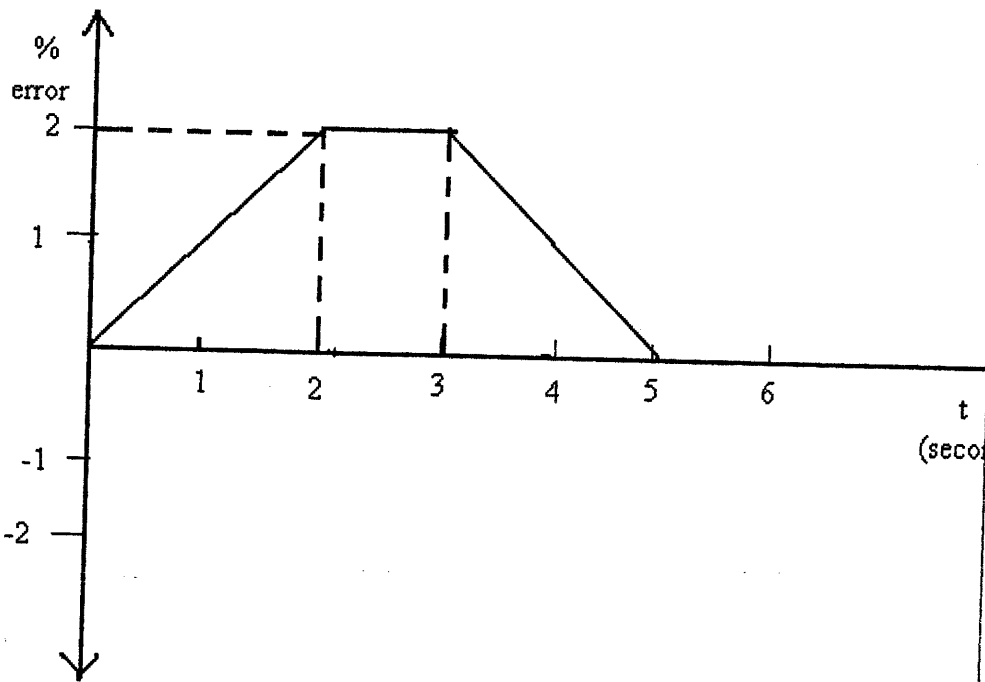
Fig:2

| Q7(a) | With the help of a block diagram explain frequency synthesizer? | [10] |
| (b) | Datas are shown in the table | [10] |

| Input level-start | 100 | Output level-start | 200 |
| Input level-end | 110 | Output level-end | 240 |

Output graph is shown in fig:3
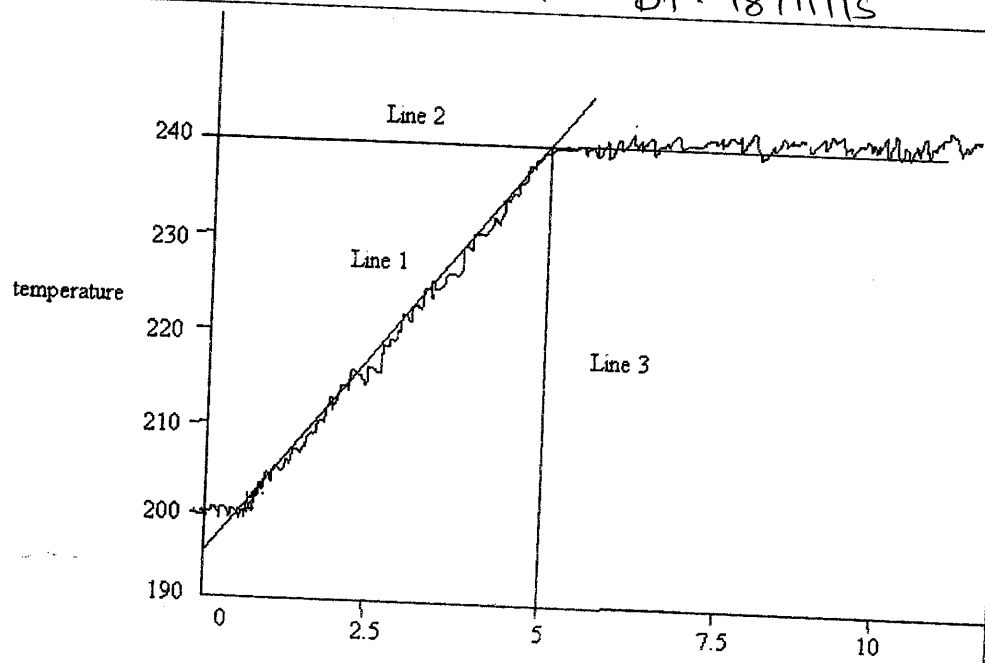
2

Fig.3

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 $\dfrac{Ke^{-sT_d}}{\tau_s + 1}$

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SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)

Final Yr. B.Tech. (Elect.) Sem VIII
Electrical Drives & Control.

Second Half-2015
K.T. Examination

Total Marks: **100**
Duration : **3 Hours**
CLASS/SEM : **B.E.(Electrical), Sem-VIII**
SUBJECT : **Electrical Drives & Control**

- Question no.1 is compulsory. Solve any four from remaining six questions
- Answers to all sub questions should be grouped together
- **Assume suitable data if required and justify the same.**
- Figures to the right indicate full marks

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Q.1 Solve the following: **20**
     a) What are the different types of load.
     b) Enlist the features of higher level control of electrical drives.
     c) What are the advantages of electrical braking over conventional braking methods.
   **d)** What is active and passive load torque. Give suitable example.

Q.2a) Draw the torque-speed characteristics of traction load and suggest suitable motor. Check the steady state stability of their equilibrium point.   **10**

b) Explain the regenerative braking operation of three phase induction motor.   **10**

Q.3a) What is closed loop speed control. Draw the block diagram and explain important blocks.   **12**

b) A 220 V, 970 rpm, 100 A dc separately excited motor has an armature resistance of 0.05Ω. It is braked by plugging from an initial speed of 1000 rpm. Calculate
(a) resistance to be placed in armature circuit to limit braking current to twice the full load value.
(b) braking torque
(c) torque when the speed has fallen to zero   **08**

Q.4 a) Explain the four quadrant operation of hoist. Explain how these operation is achieved by DC motor drive.   **14**

b) Compare ac drives and dc drives.   **06**

Q.5a) Explain the V/F Control of induction motor. How constant torque and constant power operation is achieved.   **12**

(1)

B.E. (Elect) Sem VIII
Electrical Drives & Control. Dt. 06|01|16.

b) What is the necessity of soft starting. How it is achieved in three phase induction motor drives. **08**

Q.6a) A 440V, 50 Hz, 6 pole, star connected squirrel cage induction motor has following parameters:

$$R_s = 0.6\ \Omega, \quad R_r' = 0.6\ \Omega, \quad X_s = X_r' = 1\ \Omega$$

The normal full load slip is 0.05.
The motor is fed from a voltage source inverter, which maintains a constant V/F ratio. For an operating frequency of 10 Hz, calculate the breakdown torque as a ratio of its value at the rated frequency. **10**

b) Explain dynamic braking of three phase induction motor. Derive the expression of torque and draw torque speed characteristics. **10**

Q.7a) What are the types of motor duty. Explain any one duty with temperature-time characteristics and suitable example. **10**

b) Explain the effects of unbalanced source voltages on the operation of three phase induction motor **10**

B·Tech·(Mech) Sem VIII
CAD/CAM/CIM — D+· 05/01/16.

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

Re-exam

January 2016

Max. Marks:100

Class: B.tech   Semester: VIII

Name of the Course: CAD/CAM/CIM.

Duration: 3hrs

Program:B.Tech (Mech)

Course Code : ME452

Master file.

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

Q.1 (a) Explain the different types of Geometric Modeling techniques with neat sketches **(10)**

   (b) Explain the Characterictics of Bezier & B-Spline Curve with sketches **(10)**

Q.2 (a) Explain Computer Integrated Manufacturing **(10)**

   (b) Explain the concept of Knowledge Based Engineering **(10)**

Q.3 (a) Explain Painters Algorithm with neat sketches **(10)**

   (b) Write a C++ Program for Bresenham's Line Algorithm **(10)**

Q.4 (a) Explain any one Shading Algorithm **(08)**

   (b) Explain Cohen Sutherland Line Clipping Algorithm **(08)**

   (c) Write a note on Jupiter Technology (JT) **(04)**

Q.5 (a) Find a transformation of triangle A (1,0) , B (0,1) C (1,1) by **(10)**

   I.   Rotating 45 degree about origin and then translating one unit in x & y direction
   II.   Translating one unit in x & y direction & then rotating 45 degree about origin

   (b) Obtain transformation matrix for rotation about the line joining the points (0,0,0) and
       (1,1,1) with the angle of rotation 45 degree in counter clockwise sense **(10)**

(1)

Q.no.6 (a) Explain any 10 CNC codes with examples $\hspace{4cm}$ **(10)**

(b) Explain the following in APT Programming $\hspace{3cm}$ **(10)**

     a) Geometry Statements
     b) Motion Statements
     c) Post Processor & Auxiliary Statements
     d) MACROs

Q.7 Write Short notes on (Any Three) $\hspace{5cm}$ **[20]**

- Rapid Prototyping Techniques
- Virtual Reality & Virtual Manufacturing
- Constructional details of CNC machines
- Computer Aided Process Planning
- CAD-VR Integration
- CAD-PLM Integartion
- Structured Query Language (SQL)

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Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

KT Exam

5th Jan 2016

Max. Marks: 100   Duration: 3hrs

Class: B.Tech   Semester: VIII   Program: B.Tech Electrical

Name of the Course: **Power Electronics Application In Power System** Course Code : EE453

Instructions:

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

Question No		Maximum Marks
Q1	Explain any **two** of the following with neat diagrams & respective characteristics:	20
(a)	Thyristor Controlled Reactor & Thyristor Switched Capacitor	
(b)	Basic principle of operation of STATCOM	
(c)	Operation of 12 pulse converter	
Q2	Explain	
(a)	The control implementation of a two terminal HVDC link	10
(b)	The control characteristics considering power flow reversal with reference to a two terminal HVDC link	10
Q3	Explain	
(a)	Load balancing using passive elements	10
(b)	Switching converter based Voltage & Phase Angle Regulators	10
Q4	Explain the basic principle and control capabilities of Unified Power Flow Controller (UPFC) with neat schematic/single line/ phasor diagrams.	20
Q5	Explain	
(a)	The equivalent circuit of a 6-pulse controlled converter considering effect of source inductance	10
(b)	The performance of a symmetrical line on load with shunt compensation	10
Q6	Explain	
(a)	The effect of series capacitive compensation for a two machine power system on: i) P-δ & Q-δ curves ii) Stability margin	10
(b)	The concept of series capacitive compensation	10
Q7(a)	Compare the performance of TSSC and GTO controlled series capacitor	10
(b)	Explain the operation of Static Synchronous Series Compensator (SSSC)	10

B.Tech.(Elect) sem VII
Design, Mgmt & Auditing of Electrical System.

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

Re-exam (End Semester Exam)

January 2016

Max. Marks: 100　　　　　　　　　　　　　　Duration: 3 Hours

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

Name of the Course: **Design, Management and Auditing of Electrical Systems**

Course Code : EE401

Instructions:

Master file.

1. Question No. 1 is **compulsory**.
2. Attempt any four questions out of remaining six.
3. Answers to all sub-questions should be grouped together.
4. Draw neat diagrams.
5. Assume suitable data if necessary.

Question No.		Maximum Marks
Q. 1. (a)	What do you understand by temporary and permanent power supply? What is the general procedure for arranging temporary power supply?	5
(b)	What are the challenges in integrating renewables in an existing electric power system?	5
(c)	What are the essential components of a sub-station? Describe in brief.	10
Q. 2. (a)	What do you mean by energy monitoring and targeting? What are the benefits of doing energy monitoring and targeting in a utility?	4
(b)	Draw the symbols for the following as per Indian Standards: (i)　Synchronous motor, 3-phase, star connected, neutral brought out (ii)　Exhaust fan (iii)　Single line representation of three conductors (iv)　Over head line (v)　Plug and socket (vi)　Ceiling fan	6
(c)	The cash inflows (Rs. in lakhs) of two project proposals are given in the following table. Initial investment is Rs. 1000 lakhs for each project. Calculate the simple payback period for each project.	10

Year	Project A	Project B
1	500	100
2	400	300
3	100	400
4	50	600
5	10	800

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B. Tech. (Elect) Sem VII. Dt. 04/01/16.

Design, Management & Auditing of Electrical Systems.

Q. 3. (a)	Describe the main features of Energy Conservation Act 2001.	10
(b)	Define load factor, demand factor and diversity factor.	3
(c)	Write a short note on **any one** of the following: (i) Single Line Diagram (ii) Electrical Plans (iii) Tendering procedure (iv) Automatic power factor controllers	7
Q. 4. (a)	What is a soft starter? What is its advantage?	2
(b)	Define green building.	2
(c)	What is the concept of 'payback period' and 'time value of money' method pertaining to the financial analysis techniques? Cite suitable examples with your explanation.	10
(d)	What are the various types of substations? Give classification.	6
Q 5. (a)	Explain various energy efficient lighting controls.	10
(b)	Discuss the energy saving opportunities in **any one** of the following electrical installations: (i) Fans and blowers (ii) Electric motors	10
Q 6. (a)	A factory takes a load of 200 kW at 0.85 p.f. lagging for 2500 hours per annum. The tariff is Rs. 150 per kVA plus 5 paise per kWh consumed. If the p.f. is improved to 0.9 lagging by means of capacitors costing Rs. 420 per kVAR and having a power loss of 100 W per kVA, calculate the annual saving or loss effected for the first year after p.f. correction and for the second year after p.f. correction. Allow 10% per annum for interest and depreciation.	10
(b)	Describe the features and functioning of SCADA with suitable block diagram.	10
Q. 7. (a)	Give the classification of cables on the basis of their applications.	4
(b)	Describe AC UPS with a neat block diagram.	6
(c)	Write a note on **any one** of the following: (i) Numerical relays (ii) Digital relays (iii) Types of electrical projects (iv) Types of distribution systems	10

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B.Tech. (Elect) sem VII
Electronic Instrumentation.

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
Re Exam Even Semester Examinations
January 2016

Max. Marks: 100

Class: **BTech**   Semester: VII

Name of the Course: Electronic Instrumentation

Duration: 3 Hrs
Program: Electrical engineering
Course Code : EE 402

Instructions:
1. Attempt any five questions.
2. Draw neat diagrams
3. Assume suitable data if necessary

Master file.

Question No		Maximum Marks
Q1(a)	Obtain the step response for a 1st and 2nd order instrument?	[10]
(b)	Name and explain the static characteristics of an instrument?	[10]
Q2(a)	With the help of a neat block diagram explain a function generator?	[10]
(b)	With neat block diagram explain frequency synthesizer?	[10]
Q3(a)	An analog transducer with a 0-10 V input is able to distinguish a change of 1mV in its input signal.(1) Calculate resolution (2) Calculate no. of bits of an A/D converter so that digital output has almost same resolution as the transducer. The A/D converter uses a binary code. Calculate (3) quantization error (4) no. of decision level	[5]
(b)	Explain digital data acquisition system with block diagram?	[7]
(c)	Explain SCADA?	[8]
Q4	Explain any four 1. Digital storage oscilloscope 2. LCD 3. Computer based data acquisition system 4. Telemetry 5. Final control operation 6. Types of control	[4*5]
Q5(a)	With a neat block diagram explain process control system?	[10]
(b)	With one example explain A/D and D/A converters?	[10]

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Q6(a)   Name and explain the programming languages of PLC?   [10]

(b)   With a neat block diagram explain PLC?   [10]

Q7(a)   Write a short note on   [2*5]
1. Data loggers
2. Virtual instrumentation

(b)   Datas are shown in the table   [10]

Input level-start	100	Output level-start	300
Input level-end	110	Output level-end	330

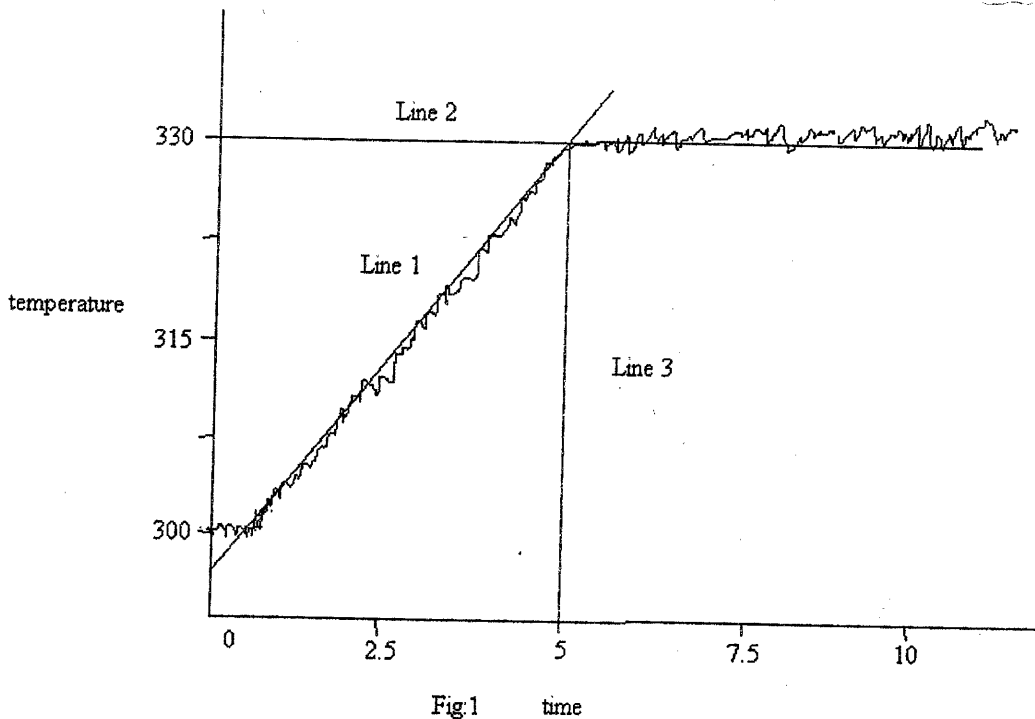Output graph is shown in fig:1 (Assume suitable data if necessary)

Fig:1   time

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

$$\frac{Ke^{-sT_d}}{\tau_s + 1}$$

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BHARATIYA VIDYA BHAVAN'S
SARDAR PATEL COLLEGE OF ENGINEERING
GOVERNMENT AIDED AUTONOMOUS INSTITUTE
ANDHERI (WEST), MUMBAI - 400 058.
Re Exam
Dec – Jan 2015

Max. Marks: 100	Duration: 03 hrs
Class: B.Tech Mechanical	Semester: VII
Name of Course: Elective -- I Computational Fluid Dynamics	Program: B.Tech Mechanical Engineering
Course Code: ME - 408	
Instructions: 1. Question no. 1 is Compulsory 2. Attempt any four questions out of remaining six. 3. Figures to right indicate full marks 4. Assume suitable data if necessary	Master file. B.Tech.(Mech) sem VII Computational fluid Dynamics.

Q. 1 (a)   Write Short Notes on: 10

     (i)   Analytical Approach

     (ii)   Complexities in solving flow problems

  (b)   Explain the concept of substantial derivative?   04

      Derive the equation for substantial derivative   06

Q. 2 (a)   Derive the Continuity Equation for an infinitesimally small fluid element. State all the   10

      assumptions made clearly.

  (b)   Explain different types of Boundary Conditions with example.   06

  (c)   State whether the following equations are non linear or linear. Justify your answer   04

     i) $\dfrac{\partial T}{\partial t} + \dfrac{\partial^2 T}{\partial x^2} + \dfrac{\partial^2 T}{\partial y^2} + \dfrac{\partial^2 T}{\partial z^2} = 0$

     ii) $\dfrac{\partial u}{\partial t} + u\dfrac{\partial u}{\partial x} + v\dfrac{\partial u}{\partial y} = -\dfrac{\partial p}{\partial x}$

Q. 3 (a)   Solve the following equations by Gauss Elimination & Gauss Seidel method and   10
      Compare the Results.

$$2x_1 + x_2 + x_3 = 5$$
$$3x_1 + 5x_2 + 2x_3 = 15$$
$$2x_1 + x_2 + 4x_3 = 8$$

  (b)   Derive the equations for Thomas Algorithm Method for Solving.   10

Q. 4 (a)   Explain Explicit Approach with the help of one dimension unsteady state heat   10

      conduction problem. Derive the stability criteria for the explicit approach.

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(b) Shown in figure 1 is a cylindrical fin with uniform cross section area A. The base is at $\quad$ 10
temperature of 100 °C (T_B) and the tip is insulated. The fin is exposed to an ambient
of temperature 20 °C. Give one dimensional steady state governing equation for this
problem.

If $m^2 = hP/kA = 25$ m^{-2}, L= 1 m. $\Delta x = 0.2$ m, then calculate the steady state
temperature at every 0.2m interval from base.

Insulated
(zero heat flux
across this boundary)

T_B

$T_{ambient}$
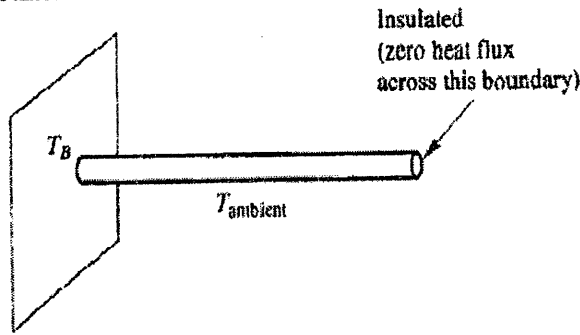
Q. 5 (a) Write Short Notes on:

    (i) FOU scheme $\qquad$ 05

    (ii) Hybrid scheme $\qquad$ 05

  (b) Derive steady one dimensional convection diffusion equation by Finite difference $\qquad$ 10

    Method? State its stability criteria?

Q. 6 (a) Derive the equation for pressure correction for Stream Function Vorticity method. $\qquad$ 06

    Give the Algorithm for Solution by Stream function-Vorticity Method. $\qquad$ 04

  (b) Explain Staggered Grid? $\qquad$ 06

    State the steps for Simple Algorithm. $\qquad$ 04

Q. 7 (a) Write short notes on:

    (a) LES model $\qquad$ 05

    (b) $k - w$ model $\qquad$ 05

  (b) Give the characteristics of a turbulent flow. $\qquad$ 06

    Give the Classification of Turbulence models $\qquad$ 04

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