SARDAR PATEL COLLEGE OF ENGINEERING

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

END SEMESTER EXAMINATION JUNE 2024

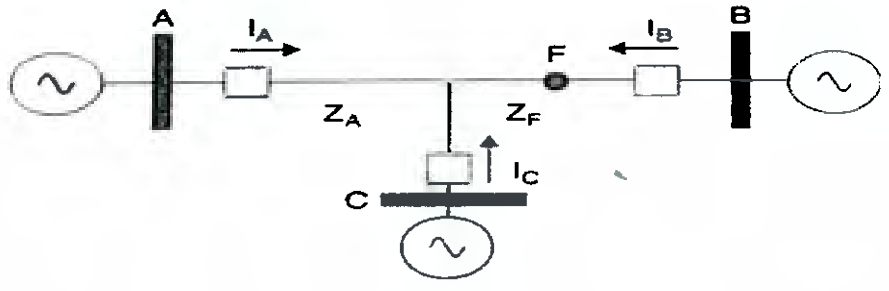
7/6/24

Program: M. Tech. (PEPS) Electrical **Duration: 3 hours**

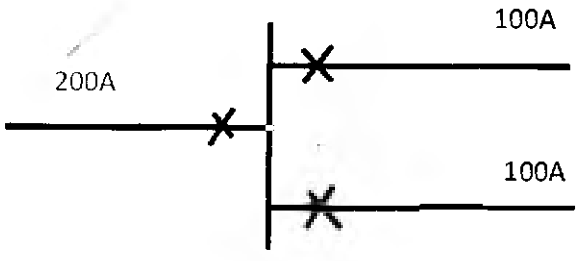
Course Code: PE-MTPX201 **Maximum Points:100**

Course Name: Advance Techniques of Power System Protection **Semester:** II

Notes: Question 1 is compulsory. Attempt any 4 questions from remaining 6.

Q. No.	Question	Points	CO	BL	Mo. No.
1a	What is meant by adaptive protection? Given below is three terminal line with a fault at point F. Suggest the adaptive settings for zone 1 of relay A in case circuit breaker at C is 1) ON & 2) OFF 	10	2	1,3	6
1b	Prove that for a single line to ground fault on a transmission line the impedance measured by a distance relay is given as $\frac{V_a}{Ia+mI_0} = xZ_1$ Va & Ia are phase voltage and fault current measured by relay and I_0 is zero sequence component of the fault. Where, m = $(Z_0 - Z_1)/Z_1$	10	1	2	4
2a	Draw and explain block diagram of Numerical relay. What is the role of Anti-aliasing filter? Is it analogue or digital filter?	10	1	2	3
2b	Second order polynomial is given as $y = Ax^2 + Bx + C$ Show that curve fitting or least square method can be used to estimate A, B, C constants from the data samples of x and y.	10	1	3	2
3a	What is CCVT? Draw and explain basic CCVT operation. What is the role of tuning reactor?	8	1	2,3	1
3b	We have studied how to apply DFT full cycle algorithm on discrete samples to get a phasor of the fundamental frequency. Can it be applicable for signal with 2nd harmonic? How will be the modified formula? Only write the first equation.	5	2	2,3, 4	3

3c	Show that the impedance measured by Distance Relay is inversely proportional the apparent power flowing on the line. Hence explain load encroachment problem of distance relay and remedy for the same.	7	1	2,3, 4	4
4a	Explain the travelling wave phenomena in case receiving end of the transmission line is short circuited.	10	2	2,3	5
4b	Prove that travelling wave can be used for fault location identification in case a fault occurs on transmission line. Further solve the following Given length of line L = 350 km, time difference measured by travelling wave protective device = 1 millisecond, Velocity of the wave = 3 X 10^8 meter/sec, Find the location of the fault on transmission line from sending end.	10	2	3,4	5
5a	Draw the typical Architecture (topology) of a Wide Area Measurement System. What are the functions of PMU and PDC? Compare WAMS with SCADA system.	10	2	2,5	7
5b	How can we distinguish a power swing from fault? Explain the principle of working of: 1) Out of step blocking relays 2) Out of step tripping relays How can OST differentiate between stable swing and unstable swing?	10	1	2, 3,4	4
6a	What is the impact of loss of excitation on the Synchronous Generator? With the capability curve of generator, suggest how to use Mho relay as a protection against loss of excitation?	10	1	2,3	5
6b	For 50 MVA, 11kV/ 220kV Delta/ Star transformer, select suitable CTs and draw the interconnection diagram for biased differential protection. Show that with selected CTs, there will be no current in the differential relay coil under normal condition.	10	1	6	5
7	Design suitable protection for the following bus-bar arrangement against the bus-bar fault. Redraw the circuit with proper CT connections. Rated currents are already mentioned on the lines. First select CTs based on line rated currents and show that relay trips under normal condition. What is the solution? Prove that with this solution relay does not trip under normal condition.	20	1	6	5



Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

End Semester Examinations June 2024

English for research paper writing

Program: **M.Tech CME**
Course Code: **AE-MTSE 201-202**
Course Name: **English for Research paper writing**

Duration: **03 hours**
Maximum Points: **100**
Semester: **II**

- **Note:**
- Total seven questions are given
- Attempt any **five** questions
- Question 01 is compulsory
- Out of remaining questions attempt any 04
- Subsections of questions are to be attempted together.

Q.No.	Questions	Points	CO	BL
1.A.	Explain in detail why proficiency in English language is mandatory for researchers. How good English language does help in writing effective research thesis?	10	01	03
1.B.	A student complained that she was having trouble with the following foreword, that it was more like an introduction than a foreword (and she was right). Turn it into a foreword by eliminating details unnecessary for a managerial reader. Feel free to write the sentences and move information around. ***Foreword:*** Flutter is a phenomenon in which structural instabilities are often characterized by divergent oscillations of the wings, resulting in structural failure and possible loss of the aircraft. Flight flutter testing involves the tracking of damping estimates of the excited vibration modes at different flight conditions. The violent nature of flutter makes safety an important concern during flight flutter testing. As with any flight test program, cost is also a major concern. Our objective at Smith is to provide safe testing at the lowest cost. Costs can be lowered by decreasing flight time. This requires utilizing the fastest analysis techniques that will meet the accuracy requirements that safety demands. Presently we have two software packages available for data analysis	10	01	01

	during flutter testing. They Are: 1. The Power Spectral Density Package (PSD) 2. The random Decrement (Randomdec) Package. The main objective of each package is to determine damping estimates of the structural modes. I was assigned to do a comparison study of two packages looking at two questions 1. How accurate are the dumping estimates? 2. How much time is required for analysis? These questions are concerned with safety and cost respectively. The purpose of this report is to present the findings of my study and to make some recommendations concerning future testing.			
2. A.	"Barriers lead to miscommunication or misinterpretation of information or ideas". Explain in detail the barriers faced by researchers while reading technical papers. Describe the four levels of reading.	10	02	02
2.B.	Explain the Strategies for effective reading techniques for journal papers. Draw a systematic diagram to reading technical papers.	10	02	05
3.A.	Answer any 2 questions from the following (100 Words Each) 1. Discuss Email as a channel of communication 2. Explain the basic characteristics of a good report. 3. Explain the SQ3R technique to improve research paper reading 4. What are the two types of application letter?	10	04	02
3. B.	Write a mail to Head of your department seeking permission to conduct a one week short term training program through the placement cell. Invent necessary details with schedule and details of speakers.	10	03	04
4. A.	Here is a first- hand account of a very good public speaker who trains professionals in public speaking. I train business professionals in public speaking and also in preparing their project proposals and presentations. One day, my friend Mohan called and asked if I could help his boss, Mr. Andrew's who had to speak at the convocation ceremony of an engineering institute in Mumbai. I asked if his boss knew what he wanted to say, and Mohan said yes, but the talk was not developed yet and his boss wouldn't have time to devote to it until the weekend. I learnt from Mohan that Mr. Andrews was really smart but not experienced in speaking to large groups. We set up two meetings with Mr. Andrews- the first to discuss what the message would be; the second to practice it. I asked for a general	15	04	03

summary of what would be said. Mohan replied, 'He is going to say something about today's job market for Engineering graduates due to the impact of pandemic and about its future as well. I was expecting to be briefed by Mohan on the content of his talk.

When I walked for the meeting, the receptionist escorted me into a meeting room off the lobby. Mohan too arrived, handed me his business card, and briefed me on the status of the scripts and slides (a work in progress). Shortly, Mr. Andrews arrived with a handful of wrinkled papers in his hand. They were his notes. He did not know how to connect his computer to the projector, or how to use power point well enough to re-sequencing the slides and add appropriate designs, insert tables and animate the slides where needed. However, his knowledge of contemporary job market was encyclopedic and the rate at which he spoke was supersonic. When I asked questions about his topic so that he could clarify what he wanted to say, and in what order, he was wonderfully patient with my modest understanding of his discipline, and used analogies and metaphors to explain his point-a sign, I think, of a good communicator.

In addition to speaking very fast he did not look me in the eye, and also did not relate what he said to the bar charts on the screen. But he spoke with visceral passion and emphatic verve about the way multinational companies are working these days – and that made up for his other flaws as a speaker. He could lift up his whole body and jump into a keyword with both feet-giving it real meaning and significance.

The challenge, however, was to develop his topic so that the audience would think they were hearing a standard talk about globalization and job markets for fresher's in particular and further developing to talk to strategies to get placed in good companies.

After two meetings, we cut the slides down to 40 and the timing down to One hour. He had no time to rehearse. He promised he would work on it in his hotel room when he arrived in Mumbai. I continued to email him suggestions over the weekend.

I learned from Andrews that he did not rehearse until he was on the plane, and then he stayed up most of the night in a panic working on it. Two days after the event, he called to say it went well, and that me emails helped. I called Mohan to get his assessment, who said it was a little short- much shorter than the presentations made by other speakers.

	I pointed out that short presentations are not a bad thing-'For a speech to be immortal, it not be interminable'. The points Andrews needed to remember were as follows: 1. Get attention of his audience 2. Sustain the attention 3. Make a clear point in a memorable way 4. Be unique in his own way 5. Persuade people to come to talk to him His job was to generate trust and curiosity among his audience and sustain their interest in his convocation address. **Questions:** 1. 'Mr. Andrews had not adequately planned and prepared his presentation'. Do you agree or disagree with this statement? Explain in detail the steps that Mr. Andrews needs to work on for planning the presentation. 2. What are the factors that Mr. Andrews need to keep in mind regarding the designing of his power point slides his body language, time and word budgeting during presentation.			
4.B.	Prepare an Introduction to Mr. Andrews's presentation keeping the Delivering effective presentations syllabus topic in mind.	05	04	03
5.A.	Apply for the position offered by "Shine International groups' ltd'. **Write a cover letter and detailed Curriculum Vitae for the job position given below. (Invent necessary details)** Selected Engineer's Day-to-day Responsibilities Include • Execution Planning of all the site civil related works - Earthwork / Civil work/ Footing Foundations, /JCB/ Dozers, etc., • Ensuring the quality of construction Materials • Project work scheduling and maintaining the project Deadlines • Project execution co-ordination with Consultants, Surveyors, Vendors, Management, etc., • Responsible for inventory storage of materials on the site.	20	04	06

• Preparing daily reports on closing stocks, labor attendance tasks done, etc.

• Administrative area: Budgets / indents / review, etc.

• Weekly submission of bill book, petty cash accounts with respect to the site works.

• To receive materials submit necessary documents for the same.

• Fix Agenda for review meetings, etc.

Desired Candidate Profile • M.Tech in Civil/ Electrical engineering •

0- 2 years of

Experience as a Civil/Site Engineer

• Intermediate knowledge required on AutoCAD, GIS and MS office

Role Structural/ Construction Management Industry

Type Engineering Construction Functional Area Site Engineering, Project Management Employment Type Full Time, Permanent Role Category Site Engineering Education PG : M.Tech /B.Tech. in Civil

For Electrical Students:

We seek a passionate, dynamic, and creative Electronics Engineer to join our team.
Responsibilities • Full product design • PCB design and layout • Electrical design including component selection, thermal system design, and interconnection hardware selection/design.
• Create assist with the documentation and implementation of Engineering Changes to the product design
• Work fluidly in a high cross-functional environment involving manufacturing, product development, as well as supply chain specialists, product design engineers, and logistics personnel. Behavioral Traits • Self-managed and willing to work in a fast-paced and time-variant environment
• Ambitious, self-starting and motivated attitude; willingness to learn Requirements
• Bachelor/ Masters of Engineering/Technology in Electrical/Electronics/Mechatronics • Diploma in Engineering in Electrical/Electronics/Mechatronics
• Previous internship project experience is a plus. (Self-projects most

	appreciated) • Experience with software and hardware used in electronics product testing • Highly proficient in hands-on skills, especially soldering and component-level assembly, and troubleshooting equipment • Fundamental knowledge of circuit design, battery-powered systems, refrigeration and air conditioning, electrical engineering materials, computer-aided electrical drawing, and manufacturing process • Computer Basis (MS Office, Online Collaboration Tools) careers@seebecutilities.com			
6.A	The Government of India is concerned about the steady increase in the outbreak of diseases among working class especially youth. In order to work on the possible solutions, the Health Minister has asked you as the Chief Medical Officer of IMSI Delhi to find out the possible causes of these diseases, the problems faced and other related factors. On the basis of the data provided draft a **letter report** as Chief Medical Officer Delhi and submit your report with recommendations to the Health Minister of India. 1. Table showing diseases and the percentage of people suffering from it. Please provide at least five recommendations to improve the situation	20	02	04
7. A.	Read the given report carefully. The report given here is not written in proper format and language. **Rewrite the complete report in (Memo Format) with complete details. Invent necessary details.** (Make changes in style, sentence-construction, and sequencing and make it objective and remove vagueness wherever necessary). Topic: The personnel officer of a factory reports on apprentice unrest. Date: 13th June, 2024 To: The General Manager From: the Personnel Officer Subject: Apprentice unrest at K K Engineering Pvt. Ltd.	20	03	04

Sr.No.	Name of Diseases	Percentage of people suffering from it.
1.	Diabetes	25%
2.	Blood Pressure	20%
3.	Stress	25%
4.	Asthma	10%
5.	Heart attacks	10%
6.	Slip Disc	10%

Terms of Reference: According to the instructions given by you, a report has been compiled on apprentice unrest and recommendations made.

Procedure

1. Interviewed twenty apprentices on the shop floor at random
2. Interviewed all supervisors and foremen concerned with apprentices.
3. Checked the data and records

Facts Findings:

1. Extent of Unrest: The results of the interviews with the supervisors and foremen were real eye–openers to say the least. I was shocked to hear that there is widespread resentment among the apprentices. They hinted that although everything seems calm on the surface, there is seething discontent and the situation may deteriorate unless we sit up and take note.

2. Cause of Unrest: The apprentices are disgruntled because of the following matters:

- 2.1. Training: They complained to me that:
  - 2.1.1. Supervisors are never there when they are needed
  - 2.1.2. We are used only on production lines
  - 2.1.3. We are never given a chance to learn something new.
- 2.2. Conditions: They cribbed about the fact that:
  - 2.2.1. Working conditions in the factory are not conducive
  - 2.2.2. The supervisors ignored the safety precautions.

3. Results of data and records

- 3.1. salary unpaid
- 3.2. Promotions and perks not given

Conclusion:

You must take immediate action to prevent disturbance and resolve grievances immediately. The records of all complaints were checked and found that there was no action on the complaints.

Recommendations:

1. Complaints regarding training should be resolved.
2. Working conditions should be improved
3. Rates of pay should be revised.

13th June, 2024

XYZ Personnel Office

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

END SEM EXAMINATION JUNE 2024

13/6/24

Program: M. Tech (PEPS)
Duration: 03 Hour

Course Code: PE-MTPX202
Maximum Points: 100

Course Name: Smart Grid Technologies
Semester: II

Instructions:

1. Attempt **any FIVE** questions.
2. Draw neat diagrams wherever possible.

Q.No.	Questions	Points	CO	BL	Module No.
Q. 1(a)	Explain the concept of smart grid and hence discuss the evolution of electric grid. Also, state the difference between conventional grid and smart grid.	02+03 +05	01	L-1	01
Q. 1(b)	Explain the different tasks to be performed by home area network (HAN) in smart grid environment. Hence, list the different types of smart appliances used in smart home. Explain the key features of smart appliances in smart grid.	04+ 02+ 04	01	L-1	02
Q. 2 (a)	Explain the role of Plug in Hybrid Electric Vehicle (PHEV) in making greener future. Hence state advantages and disadvantages of PHEV.	04+ 03+ 03	01	L-1	02
Q. 2 (b)	Discuss accurate customer to electrical system model of modern outage management system with block diagram to provide accurate predictions of outage locations.	02+ 08	02	L-1	02
Q. 3 (a)	Explain the significance of smart storage. Hence describe superconducting magnetic energy storage (SMES) and pumped hydro compressed air energy storage with diagram.	02+ 05+ 05	02	L-1	03
Q. 3 (b)	Explain the working of Phasor Measurement Unit with block diagram in detail. State the advantages of PMU over the conventional methods.	06+ 02	02	L-1	03

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

END SEM EXAMINATION JUNE 2024

Q. 4 (a)	What are the different challenges related to protection of microgrid? Hence explain the various control strategies used in.	04+ 04	03	L-1	04
Q. 4 (b)	Write detail notes on the following by explaining working principle, diagram, advantages, disadvantages and application. (1) Variable speed wind generator. (2) Fuel cells. (3) Microturbines.	04+ 04+ 04	03	L-1	04
Q. 5 (a)	Why do you need to study/understand power quality and electromagnetic compatibility (EMC) in Smart Grid? Hence, what is power quality conditioner? Explain different power quality conditioners used in Smart Grid (**Any Two**).	03+ 01+ 04+ 04	03	L-1	05
Q. 5 (b)	Why power quality audit is necessary in smart grid? Hence explain the various steps followed to conduct power quality audit.	03+ 05	03	L-1	05
Q. 6 (a)	What is the importance of information and communication technology system (ICT) in smart grid environment? Hence, explain Home area network (HAN), neighbourhood area network (NAN), wide area network (WAN) and do their comparative analysis.	02+ 04+ 04+ 04	04	L-1	06
Q. 6 (b)	Explain the following communication protocols/networks used in smart grid. (1) Zigbee (2) Bluetooth (3) Wi-Fi	02+02 +02	04	L-1	06
Q. 7 (a)	Explain the different cloud computing opportunities and challenges. Hence explain cloud based smart meter.	04+ 04+ 02	04	L-1	07
Q. 7 (b)	What are the different security challenges in smart grid system? Hence, explain the solution to smart grid cyber security system.	05+ 05	04	L-1	07

BharatiyaVidyaBhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

End Semester Examination June 2024

18/6/24

Program: M. Tech. Electrical (PEPS) **Duration: 3 hrs.**

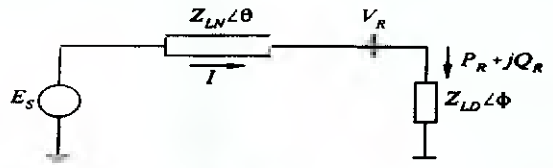
Course Code: PC-MTPX202 **Maximum Points: 100**

Course Name: Power system dynamics and control **Semester: II**

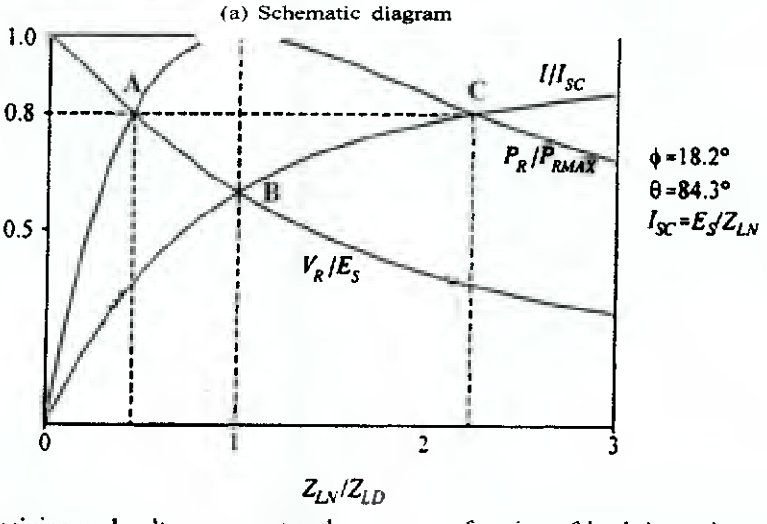
Notes:

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

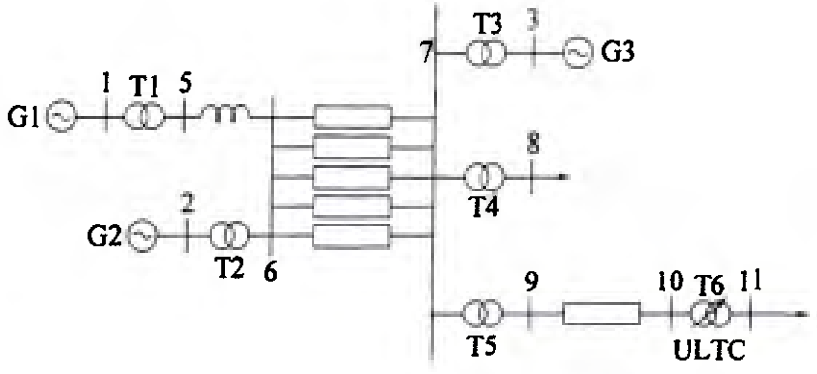
Q. No.	Questions	Pts.	CO	BL	Mod. No.
1.(a)	Explain in detail operating condition for point A, B and C using given graph. Also draw **normal and abnormal operating region** on graph (b).	10	2	L3	6

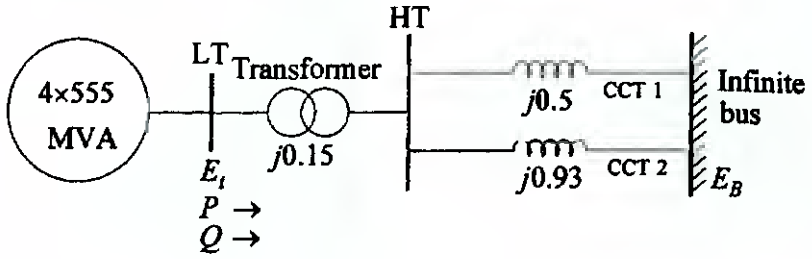


(a) Schematic diagram



(b) Receiving end voltage, current and power as a function of load demand

1.(b)	With the help of Fig.1 comment on voltage stability of each bus bar if the outage of one of the transmission line between bus bar no. 6 & 7 take place.  Fig. 1	**10**	3	L3	**6**
2.	Derive expression for small signal stability of a single machine infinite bus system with the help of following points 1. Classical model representation 2. State space representation 3. Block diagram representation 4. Expression of damping ratio (ζ) and natural frequency (ω_n)	**20**	1	L2	**3**
3.	A 20 MVA, 50 Hz generator delivers 18 MW over a double circuit line to an infinite bus. The generator has kinetic energy of 2.52 MJ/MVA at rated speed. The generator transient reactance is X'_d = 0.35 pu. The first transmission circuit has R = 0 and a reactance of 0.2 pu and second transmission circuit has R = 0 and a reactance of 0.3 pu on a 20 MVA base. $\|E'\|$= 1.1 pu and infinite bus voltage V =1 $0\angle 0^0$. **A three-phase short circuit occurs at the midpoint of second transmission line.** Plot swing curves over the period of 0.5 second if the fault is sustained using **Runge-Kutta (Order-2)** method.	**20**	2	L4	**5**
4.	With the help of neat diagram explain in detail 1. Classical model representation of synchronous machine 2. Higher order model representation of synchronous machine.	**20**	1	L2	**1,2**
5.(a)	Write short note on 1. V-Q Sensitivity analysis 2. Q-V model analysis	**10**	1	L2	**6**
5.(b)	Which are methods of transient stability enhancement? Explain in detail Steam turbine fast valving.	**10**	1	L2	**7**

6.	Fig.2 shows the system representation applicable to thermal generating station consisting of four 555 MVA, 24 KV, 60 Hz units  Fig. 2 The network reactance shown in figure are in per unit on 2220 MVA, 24 KV base. Resistances are assumed to be negligible. Type of fault occur: **Loss of circuit 1 (CCT 1)** The post fault system condition in per unit on the 2220 MVA, 24 KV base is as follows: P = 0.9 Q = 0.3 (overexcited) $E_t = 1.0\angle 36^0$ $E_B = 0.995\angle 0^0$ The generators are modeled as a single equivalent generator represented by the classical model with the following parameters expressed in per unit on 2220 MVA, 24 KV base: $X'_d = 0.3$ $H = 3.5\ MW.s/MVA$ Write the linearized state equation of the system. Determine the Eigen values, Damped frequency of oscillation in Hz, damping ratio and undamped natural frequency for each of the following values of damping coefficient (in pu torque/ pu speed) : $(i)\ K_D = 0$ $(ii)\ K_D = -10.0$ $(iii)\ K_D = 10.0$	**20**	2	L4	**3**
7. (a)	A generator operating at 50 Hz delivers 1 pu power to an infinite bus through a transmission circuit in which resistance is ignored. A fault takes place reducing the maximum power transferable to 0.5 pu whereas before the fault, this power was 2.0 pu and after the clearance of the fault, it is 1.5 pu. By use of equal are criterion, determine the critical clearing angle. (Consider initial mechanical input power 1.0 pu)	**10**	2	L3	**4**
7.(b)	Explain in detail working of **power system stabilizer** in transient stability enhancement.	**10**	1	L2	**7**

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

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

End Semester Examination
June-2024

20/6/24

Max. Marks: **100** Duration: **03 Hours**
Class: **M.TECH** Semester: **II** Program: **M.TECH (PEPS)**
Name of the Course: **Advanced Control of Electric Drives** Course Code: **PC-MTPX202**

Instructions:

- **Solve Any Five Questions**
- Answers to all sub questions should be grouped together
- Figures to the right indicates full mark
- Assume suitable data if required and justify the same.

Ques. No	Description of question	Max. Marks	CO
Q.1a.	Why the control of separately excited DC motor is easy? How the concept of control of DC motor is used in advanced control of Induction motor.	08	01
Q.1b.	Develop the model of three phase induction motor in three phase reference frame.	12	01
Q.2a.	What is rotor flux oriented control of three phase induction motor? (Only phasor diagram and orientation of reference frame is expected) What are the advantages of Rotor Flux Oriented control of three phase induction motor over Stator Flux Oriented control?	08	02
Q.2b.	Develop the model of three phase induction motor in rotor flux oriented control. Draw the equivalent circuit.	12	02.
Q. 3a.	Prove that the magnitude of output voltage of three phase inverter in sine triangle PWM technique plus third harmonic injection is same as the magnitude of output voltage of space vector modulation technique.	10	03

Q. 3b.	Discuss the synthesis of space vector in SPVM. For space vector modulation technique, derive the expression for switching times (T1, T2 and Tz) over a one sampling time Ts.	10	03
Q.4a.	Draw the block diagram and Discuss the stator flux oriented control of three phase induction motor in field weakening mode.	12	02
Q.4b.	Compare the permanent magnet machines with conventional machines.	08	01
Q.5a.	Develop the flux model of VSI in synchronously rotating reference frame.	10	03
Q.5b.	What are the benefits of control of motor in synchronously rotating reference frame? Draw the schematic diagram of synchronous machine and write the equation of stator, rotor and shaft in synchronous reference frame.	10	03
Q.6a.	What is direct torque control (DTC)? Develop the mathematical equations for the implementation of DTC of three phase IM.	14	03
Q.6b.	Compare the Direct Torque Control (DTC) and Field Oriented Control (FOC) of three phase induction motor.	06	03
Q.7a.	What is the working principle of Brushless DC Motor (BLDC)? Discuss the control techniques of BLDC drive.	10	02
Q.7b.	Draw the circuit of dc-dc converter and explain the four quadrant operation of separately excited DC motor drive.	10	01

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

END SEM Exam – June 2024 Examinations

Program: Electrical F.Y. M. Tech (ETCM) PCE 23/6/24

Duration: 3 hours

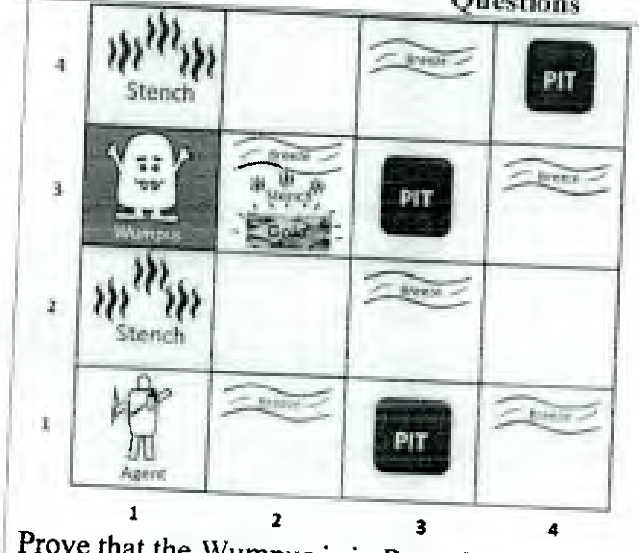
Course Code: OE-MTPX208

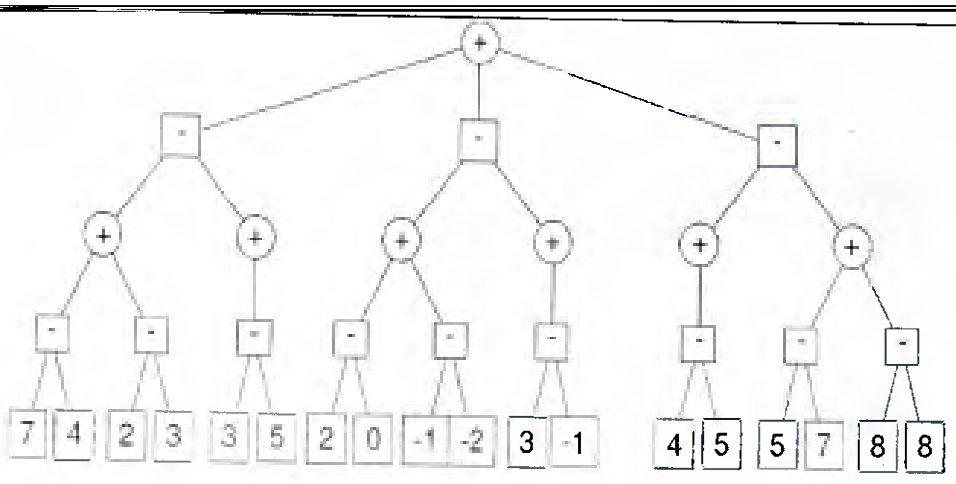
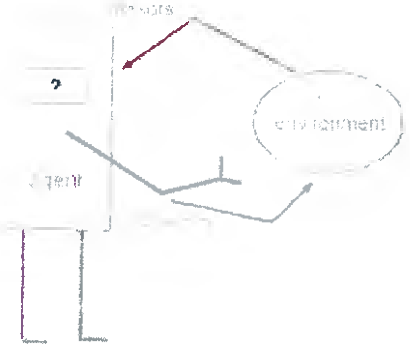
Maximum Points: 100

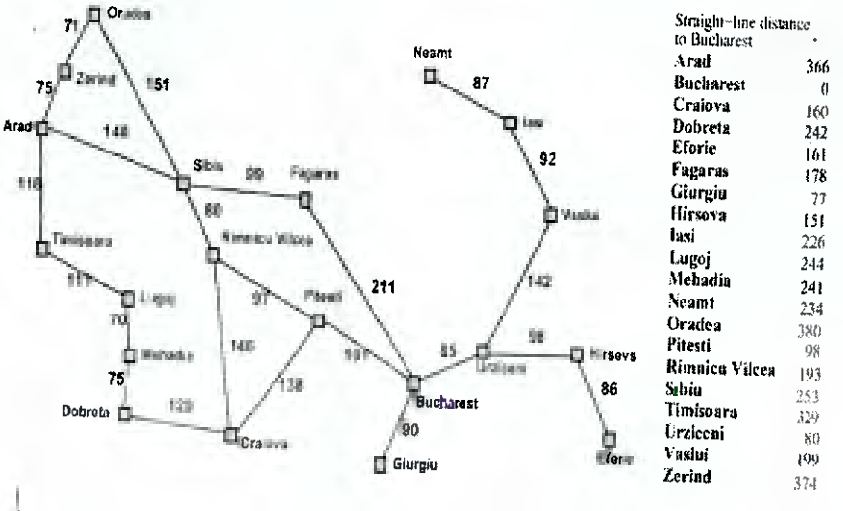
Course Name: Artificial Intelligence

Semester: II

- Attempt **any 5** out of 7.
- Make suitable assumptions wherever necessary

Q.No.	Questions	Points	CO	BL
1 a.	 Prove that the Wumpus is in Room31 using Propositional Logic.	10	3	3
1 b.	How do we perceive intelligence? How is machine intelligence different from human intelligence? When can we say that the machine is intelligent? Differentiate between weak AI and strong AI.	10	1	2
2 a.	Discuss the various characteristics/dimensions of environment.	10	1	2
2b.	Discuss the following rules of inference 1. Modus Tollens 2. Hypothetical syllogism 3. Universal Instantiation 4. AND introduction 5. Unification	10	3	2

3a..	 To the above gaming tree apply the **alpha beta pruning algorithm** and hence fine the gaming path.	10	2	3
3b.	 A typical agent is given in the above figure. If a utility based agent is to be designed then what modifications are required in place of the question mark? How it is different from simple reflex agent?	10	1	2
4a.	Explain the supervised and unsupervised learning with proper examples.	10	3	2
4b.	Hill climbing can lead to local maxim. Discuss at least 2 algorithms which help in overcoming the problem of local maxima.	10	2	3
5a.	Discuss the current trends in AI.	10	1	2

5b.	Romania with step costs in km  Straight-line distance to Bucharest Arad 366 Bucharest 0 Craiova 160 Dobreta 242 Eforie 161 Fagaras 178 Giurgiu 77 Hirsova 151 Iasi 226 Lugoj 244 Mehadia 241 Neamt 234 Oradea 380 Pitesti 98 Rimnicu Vilcea 193 Sibiu 253 Timisoara 329 Urziceni 80 Vaslui 199 Zerind 374 We need to travel from Arad to Bucharest in minimum cost. Apply A* algorithm to find the least cost path.	10	2	3
6a.	Discuss the different uninformed search algorithms with respect to completeness, space complexity, time complexity, and optimality.	10	2	2
6b.	Give a outline of a typical PDDL description model with an example of block world problem.	10	3	2
7a.	Discuss the Expert System Architecture.	10	3	2
7b.	<table><tr><th>Age</th><th>Competition</th><th>Type</th><th>Profit</th></tr><tr><td>Old</td><td>Yes</td><td>software</td><td>Down</td></tr><tr><td>Old</td><td>No</td><td>software</td><td>Down</td></tr><tr><td>Old</td><td>No</td><td>hardware</td><td>Down</td></tr><tr><td>Mid</td><td>Yes</td><td>software</td><td>Down</td></tr><tr><td>Mid</td><td>Yes</td><td>hardware</td><td>Down</td></tr><tr><td>Mid</td><td>No</td><td>hardware</td><td>Up</td></tr><tr><td>Mid</td><td>No</td><td>software</td><td>Up</td></tr><tr><td>New</td><td>Yes</td><td>software</td><td>Up</td></tr><tr><td>New</td><td>No</td><td>hardware</td><td>Up</td></tr><tr><td>New</td><td>No</td><td>software</td><td>Up</td></tr></table> Built Decision Tree for the above data using ID3 algorithm.	10	3	5