

SPPU In-Sem Offline Examination-April 2022

Class: BE Branch: Electrical Engineering Semester: II

Subject: Switchgear and Protection(Code- 403147)

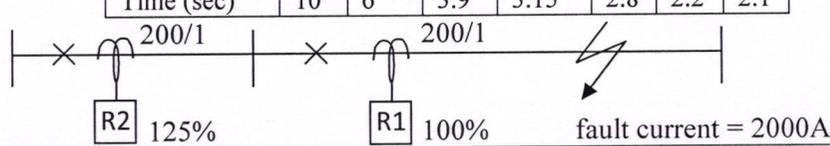
Maximum Marks: 30

Duration: 60 Minutes

Date : 04/04/2022

Special Instructions:

1. Attempt question Nos. 1 or 2, 3 or 4, 5 or 6.
2. Draw neat sketch whenever necessary

Q.No.	Question / Description	Marks	CO																
1 (a)	With neat diagram explain protection of parallel feeders.	4	02																
1 (b)	Determine the time of operation of 5A, over current relay having plug setting of 150% and TMS is 0.4. The CT ratio is 400/5 and the fault current is 6000 A. At TMS = 1, the operating time at various PSM are shown below: <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr> <td>PSM</td> <td>2</td> <td>4</td> <td>5</td> <td>8</td> <td>10</td> <td>20</td> </tr> <tr> <td>Time of operation (sec)</td> <td>10</td> <td>5</td> <td>4</td> <td>3</td> <td>2.8</td> <td>2.4</td> </tr> </table>	PSM	2	4	5	8	10	20	Time of operation (sec)	10	5	4	3	2.8	2.4	6	02		
PSM	2	4	5	8	10	20													
Time of operation (sec)	10	5	4	3	2.8	2.4													
OR																			
2 (a)	Draw and explain trip circuit of a circuit breaker.	4	02																
2 (b)	It is given that fault current is 2000 Amp. The relay 1 is set for 100%. The CT ratio is 200/1. The relay 2 is set for 125% for discrimination the time gradient margin between the relay is 0.5 second. Determine time of operation of the two relay if TSM for relay 1 is 0.2. Also find TSM for relay 2. From IDMT curve (Refer figure 1) <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr> <td>PSM</td> <td>2</td> <td>3.6</td> <td>5</td> <td>8</td> <td>10</td> <td>15</td> <td>20</td> </tr> <tr> <td>Time (sec)</td> <td>10</td> <td>6</td> <td>3.9</td> <td>3.15</td> <td>2.8</td> <td>2.2</td> <td>2.1</td> </tr> </table> 	PSM	2	3.6	5	8	10	15	20	Time (sec)	10	6	3.9	3.15	2.8	2.2	2.1	6	02
PSM	2	3.6	5	8	10	15	20												
Time (sec)	10	6	3.9	3.15	2.8	2.2	2.1												
3 (a)	An 11 KV, 500 MVA 3sec circuit breaker suddenly closes on to a fault. Determine : i) The symmetrical breaking current, ii) The asymmetrical breaking current assuming 50% dc component, iii) The peak making current as per IEC specification, iv) The short time current rating.	4	01																
3 (b)	Derive the expression for restriking voltage and RRRV.	6	01																
OR																			
4 (a)	Explain current chopping phenomena associated with CB with neat diagram.	4	01																
4 (b)	A three phase alternator has the line voltage of 11kV. The generator is connected to a circuit breaker. The inductive reactance upto CB is 5 ohm per phase. The distributed capacitance upto circuit breaker between phase and neutral is 0.01μF. Determine: i) peak restriking voltage, ii) Frequency of restriking voltage, iii) Average rate and restriking voltage, iv) Maximum RRRV.	6	01																

5 (a)	In case of CB, Explain following ratings: i) Making capacity, ii) Breaking capacity	4	01
5 (b)	Explain construction and working of VCB with neat diagram.	6	01
OR			
6 (a)	Explain important properties of SF ₆ gas used in case of SF ₆ CB.	4	01
6 (b)	Explain with neat diagram construction and working of Air blast circuit breaker.	6	01

SPPU In-Semester Offline Examination- April 2022

Class: BE (2015 Course) Branch: Electrical Engineering Semester: II (Even) 2021-22

Subject: Power Electronic Controlled Drives (Code): 403148

Maximum Marks: 30

Duration: 60 Minutes

Date: 05/04/2022

Instructions to candidates:

1. Attempt Q. 1 or Q. 2, Q. 3 or Q. 4 and Q. 5 or Q. 6.
2. Figures to right indicate full marks.

Q. No.	Questions	Marks	CO
1 a)	State different components of load torque? Draw their characteristics and write the final expression.	5	1
1 b)	A drive has the following parameters: $T = 150 - 0.1N$, Nm where N is speed in RPM. Load torque $T_l = 100$, Nm. Initially the drive is operating in steady state. The characteristics of the load torque are changed to $T_l = -100$, Nm. Calculate initial and final equilibrium speeds.	5	1
2 a)	What are stable and unstable equilibrium points? State the condition for stability of drive.	5	1
2 b)	A weight of 500 kg is being lifted up at a uniform speed of 1.5 m/s by a winch driven by a motor running at a speed of 1000 RPM. The moment of inertias of the motor and winch are 0.5 kg-m ² and 0.3 kg-m ² respectively. Calculate the motor torque and the equivalent moment of inertia referred to the motor shaft. In the absence of weight, motor develops a torque of 100 Nm when running at 1000 RPM.	5	1
3 a)	How plugging of separately excited DC motor is carried out? Draw circuit diagram and write relevant equations.	5	2
3 b)	A 230 volts, 870 RPM, 100 A separately excited motor has an armature resistance of 0.05 ohm. It is coupled to an overhauling load with a torque of 400 Nm. Determine the speed at which motor can hold the load by regenerative braking.	5	2
4 a)	Explain with neat block diagram the scheme for closed loop speed control for separately excited dc motor, below and above base speed.	5	2
4 b)	A 220 volts, 1500 RPM, 10 A separately excited dc motor is fed from single phase fully controlled rectifier with an AC source voltage of 230 V, 50 Hz. Armature resistance is 2 ohm. Conduction can be assumed continuous. Calculate firing angle for half the rated torque and 500 RPM.	5	2
5 a)	How regenerative braking of three-phase induction motor is carried out? Draw characteristics.	5	3
5 b)	A 400 volt, star connected, three-phase 6 pole induction motor has following parameters referred to stator: $R_s=R_r'=1$ ohm, $X_s=X_r'=2$ ohm. For the regenerative braking operation of this motor determine maximum overhauling torque it can hold and range of the speed for the safe operation.	5	3
6 a)	For variable frequency control of Induction Motor explain why (v/f) ratio is maintained constant below base speed operation? How speeds above rated speed can be obtained?	5	3
6 b)	Compare CSI and VSI control of induction motor with their relative merits and demerits.	5	3

SPPU In-Sem Offline Examination-April 2022

Class: BE Branch Electrical Engineering Semester: II

Subject : HVDC and FACTS (Code- 403149(B))

Maximum Marks: 30

Duration: 60 Minutes

Date : 07/04/2022

Special Instructions:

1. Attempt question Nos. 1 or 2, 3 or 4, 5 or 6.
2. Draw neat sketch whenever necessary

Q.No.	Question / Description	Marks	CO
1 (a)	Explain effect of commutation overlap on dc voltage of six pulse bridge rectifier. Draw the equivalent circuit of bridge rectifier to simulate the drop in voltage due to overlap	6	01
1 (b)	Compare HVDC System with EHV AC system	4	01
OR			
2 (a)	Draw Graetz circuit. Label various parts. Derive an Expressions for dc voltage with ignitions angle α	6	01
2(b)	Compare CIA, CC and CEA control of HVDC system.	4	01
3 (a)	Explain characteristics harmonics produced by HVDC system. State remedial actions to control them	6	02
3 (b)	Explain non-characteristics harmonics produced by HVDC system. State remedial actions to control them	4	02
OR			
4 (a)	Draw HVDC layout of components and explain function of each component	6	02
4 (b)	Explain converter operation as inverter. Define extinction advance angel and ignition advance angle.	4	02
5 (a)	Write note on Back to Back converter and state its applications	4	01
5 (b)	Compare current source converter and voltage source converters	6	01
OR			
6 (a)	Draw neat diagrams of radial and mesh type multi terminal HVDC system and compare between them.	6	02
6 (b)	Explain protection against over voltage in HVDC System.	4	02

SPPU In-Sem Offline Examination-April 2022

Class: B.E Branch: Electrical Semester: II

Subject : Smart Grid (Code: 403150(A))

Maximum Marks: 30

Duration: 60 Minutes

Date : 8/4/2022

Special Instructions:

- *Solve Ques.1 or Ques.2 ,Ques.3 or Ques.4 and Ques.5 or Ques.6*
- *Draw neat diagrams whenever necessary.*
- *Use of non-programmable calculator is allowed.*

Q. No.	Question	Marks	CO
1	a) Define Smart Grid and state its function?	5	1
	b) Write a short note on Smart cities?	5	1
OR			
2	a) Compare conventional and smart grid.	6	1
	b) Describe the concept of Self-Healing Grid.	4	1
3	a) Explain Plug in Hybrid Electric Vehicles in detail.	5	2
	b) Write a note on Remote Terminal Unit with block diagram and write a function of each block	5	2
OR			
4	a) Write short note on smart storage and application of Compressed Air Energy Storage(CAES)	5	2
	b) Write a short note on Vehicle to home (V2H)	5	2
5	a) Explain how Automatic Meter Reading can make the system Smarter	5	3
	b) Draw & Explain Outage Management System (OMS).	5	3
OR			
6	a) Describe Real –time pricing.	5	3
	b) Discuss about Home and Building Automation.	5	3