Code No: RT32022 **R13** SET - 1

III B. Tech II Semester Regular Examinations, April - 2016

SWITCHGEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What are various rating of a circuit breaker?	[3M]
	b)	What is protective relay? Give its fundamental requirements.	[4M]
	c)	What is earth fault?	[4M]
	d)	What is differential protection?	[4M]
	e)	List the advantages of static relays.	[3M]
	f)	Explain the need for a lightning arrester.	[4M]

PART -B

2	a)	Discuss the rate of rise of restricking voltage and explain its importance in arc extinction.	[8M]
	b)	Explain the working of a SF_6 circuit breaker.	[8M]
3	a)	Explain the working of differential relays.	[4M]
	b)	Describe the functionality of a mho relay.	[7M]
	c)	Compare various types of distance relays.	[5M]
4	a)	What are various faults that occur in the rotor of an alternator and how the rotor is to be protected from these faults?	[8M]
	b)	Explain in detail about Bucholtz relay with a neat sketch.	[8M]
5	a)	Draw the schematic diagram of the carrier current protection scheme of lines. Also explain its working principle.	[8M]
	b)	What is the principle of differential relays? Explain their characteristics and limitations?	[8M]
6	a)	List the advantages and disadvantages of microprocessor based relays.	[8M]
	b)	With the help of neat diagram explain the principle of static differential relay?	[8M]
7	a)	Describe the construction, principle of operation and application of valve type lightning arrester?	[8M]
	b)	What are the different types of grounding? Explain the reactance grounding?	[8M]

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Code No:RT32022 **R13** SET - 2

III B. Tech II Semester Regular Examinations, April - 2016

SWITCHGEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 hours Maximum Marks: 70

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What is meant by current chopping?	[3M]
	b)	Why directional feature provided for impedance relay cannot be used for reactance relay?	[3M]
	c)	List the different types of Generator faults.	[4M]
	d)	What is magnetizing in rush current?	[4M]
	e)	Explain the importance of zero cross detector in static relays.	[3M]
	f)	Why is grounding required?	[4M]

PART -B

2	a)	Describe the construction and working of an SF_6 circuit breaker?	[9M]
	b)	A 11 KV, 400 MVA circuit breaker suddenly closes on to a fault. Determine (i) symmetrical breaking current (ii) Asymmetrical breaking current assuming 50% DC component (iii) Peak making current.	[7M]
3	a)	Discuss with necessary circuit diagram, the principle of operation of an induction disc relay. What are the advantages of induction cup relays over induction disc relays?	[8M]
	b)	What is universal torque equation? Using this equation derive the characteristics of (i) impedance relay (ii) reactance relay (iii) mho relay.	[8M]
4	a)	Explain the construction and principle of operation of a Buchholz relay.	[8M]
	b)	Describe with a neat sketch the percentage differential protection of a modern alternator.	[8M]
5	a)	Explain in detail about the Merz price voltage balanced system with a neat single line diagram.	[8M]
	b)	Describe in detail the protection of parallel feeder and ring mains.	[8M]
6	a)	Describe the basic functional blocks of a digital relay.	[8M]
	b)	Explain the working of a static over current relay.	[8M]
7	a)	What is the function of surge absorber? In what way it is different from lightening arrestor?	[8M]
	b)	State the advantages of neutral grounding of an electrical system. Give a connection diagram of typical arc suppression coil.	[8M]

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Code No: RT32022 **R13** SET - 3

III B. Tech II Semester Regular Examinations, April - 2016

SWITCHGEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define restricking voltage?	[3M]
	b)	What type of relays is affected by power swings?	[4M]
	c)	What type of relay is used for loss of excitation of an alternator?	[4M]
	d)	What is the commonly used protection for 3 phase feeders?	[4M]
	e)	What are the advantages of static over current relays?	[3M]
	f)	What is expulsion gap lighting arrester?	[4M]

PART -B

2	a)	Explain the reason for initiation of electric arc during contact separation.	[7M]
	b)	Describe with the aid of neat sketch the working of a air blast circuit breaker.	[9 M]
3	a)	Explain the requirement of primary and back up protection in any equipment.	[8M]
	b)	Explain in detail about the Induction disc type relay with a neat sketch.	[8M]
4	a)	Explain a scheme of protection for failure of alternator excitation.	[8M]
	b)	Discuss the different types of transformer faults. What are various protective schemes available for transformers?	[8M]
5	a)	Explain in detail about the time graded and current graded system.	[8M]
	b)	Explain the construction and principle of operation of a translay relay applied to a single phase system.	[8M]
6	a)	Write the pseudo code for programming the distance relays on the microprocessor.	[8M]
	b)	Explain in detail about the static over current relay.	[8M]
7	a)	Discuss the causes of over voltages in a power system.	[8M]
	b)	Explain the different methods of neutral grounding.	[8M]

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Code No: RT32022 **R13** SET - 4

III B. Tech II Semester Regular Examinations, April - 2016

SWITCHGEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define recovery voltage	[3M]
	b)	What are the merits of over current relays?	[4M]
	c)	List the faults that occur in Rotor of a generator.	[4M]
	d)	What type of relay is used for feeder protection	[4M]
	e)	What are the disadvantages of microprocessor relays?	[3M]
	f)	What is lighting discharge?	[4M]

PART -B

2	a)	Explain in detail about Air blast circuit breaker with a neat circuit diagram.	[4M]
	b)	The following data refers to a 3 phase, 50 Hz generator. EMF between the lines 7.5 kV, reactance of generator and connected systems 4 Ohm, distributed capacitance to neutral 0.01microfarad, calculate the frequency of restricking voltage transient.	[8M]
	c)	Discuss performance of a circuit breaker when capacitive currents are interrupted	[3M]
3	a)	Explain the characteristics of distance relays.	[8M]
	b)	Explain the importance of under voltage/ over voltage relays with an example for each.	[8M]
4	a)	Explain split-phase relaying protection of a 3 phase alternator with relevant diagrams?	[8M]
	b)	Explain the protective scheme for the transformer that takes care of magnetizing inrush current without affecting the sensitivity.	[8M]
5	a)	Elaborate on various methods for protection of feeders.	[8M]
	b)	What is the importance of bus-bar protection? What are the requirements of protection of lines?	[8M]
6	a)	Explain the construction and working of static distance relay.	[8M]
	b)	Explain the different components of static relay with a neat block diagram.	[8M]
7	a)	Discuss the causes of over voltages in a power system.	[8M]
	b)	Explain the characteristics of standard impulse voltage. Why is it needed for testing?	[8M]

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