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	B.Tech. VIII - Semester (Main&Back) Examination, April-2019 Electrical & Electronics Engg. 8EX1A EHV AC/DC Transmission Common With EE,EX	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any Five questions, selecting One question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

Unit - I

1. a) What are the advantages of series compensation in EHV system? What are the problems associated with its use? (08)
- b) Explain the corona Phenomenon and factor influencing the corona losses. (08)

(OR)

1. a) Explain the geometric mean radius of bundle conductor and also derive the necessary formula for it. (08)
- b) Explain the percent power loss and power handling capacity. (08)

Unit - II

2. a) Describe the speed governing system to control the real power flow with the help of neat diagram. (08)
- b) Two generator rated 250Mw and 400Mw are operating in parallel. The drop characteristics of the governors are 4% and 6% respectively. How would a load of 650Mw be shared between them? What will be the system frequency? Assume nominal system frequency is 60Hz and No governing action. (08)

(OR)

2. a) Prove that, for a short transmission line the reactive power transferred to receiving end side is proportional to the voltage drop in the line. (08)

- 6/10
- b) Explain Automatic generation control with all necessary diagram. (08)

Unit - III

3. a) What are the types of tap changing transformer? Describe their function to control the voltage in Power system. (08)
- b) What is shunt compensation? Why it is necessary? Discuss the types of static VAR system. (08)

(OR)

3. a) Explain the static VAR compensator? Describe (TSC-TCR) with the help of all suitable diagram and mathematical formulas. (08)
- b) Explain in detail Synchronous Phase Modifier. (08)

Unit - IV

4. a) Explain Unified Power Flow Controller (UPFC) with suitable diagram. (08)
- b) Explain in detail the application of FACTS devices. (08)

(OR)

4. a) Describe Static Synchronous Compensator (STATCOM). (08)
- b) Explain the benefits of utilizing FACTS devices in detail. (08)

Unit - V

5. a) What are the main advantages and disadvantages of HVDC transmission system? (08)
- b) Explain the principle of DC link control and converter control characteristics. (08)

(OR)

5. a) What is ground return? Why is it used? What are the problems associated with the use of ground as the return conductor? (08)
- b) Explain in detail MULTI-TERMINAL HVDC system in details. (08)
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B.Tech. VIII - Semester (Main&Back) Examination, April - 2019
Electrical & Electronics Engg.
8EX2A Electric Drives and Their Control
Common with EE,EX

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **Five** questions, selecting **One** question from **each** unit. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Differentiate between active and passive load torques with example? (8)
- b) Explain the operation of a closed loop speed control scheme with inner current control loop. (8)

(OR)

1. a) Suggest the suitable conventions about the signs of torque and speed for multi quadrant operations of drives. Also explain the four quadrant operation in motor? (8)
- b) Explain the load equalization in electric drives. (8)

Unit - II

2. a) Explain electric braking of DC separately excited motor with suitable connection diagrams and speed torque curves? (8)
- b) What are the power limitations in armature voltage control in DC drives? (8)

(OR)

2. a) Differentiate between regenerative braking, dynamic braking and plugging. (3)
- b) Explain the construction and working of chopper controlled DC drives. (8)

Unit - III

3. a) The usefull load torque of 3 - phas, 6- pole, 50 Hz induction motor is 162.84Nm. The rotor emf is observed to make 90 cycles per minut ϵ . Calculate:
- i) Motor output
 - ii) Copper loss in motor
 - iii) Motor input
 - iv) Efficiency if mechanical torque lost in windage and friction is 20.36 Nm and stator losses are 830W. (8)
- b) Explain the stator voltage control for speed control of induction motor. (8)

(OR)

3. a) Discuss and explain the dynamic braking in induction motor drives. (8)
- b) Write a short note on operation of Voltage Source Inverter (VSI) (8)

Unit - IV

4. a) Explain using a power circuit, how the speed of an induction motor drive can be controlled by using current source inverter. (8)
- b) Explain the slip power recovery scheme with stator sherbius drive in brief.(8)

(OR)

4. a) Describe the cycloconverter fed induction motor drive. (8)
- b) Draw and explain a closed loop operation for a static kramer controlled drive. (8)

Unit - V

5. a) Describe the VSI fed self controlled synchronous motor drive. (8)
- b) Explain the control of synchronous motor with current source inverter. (8)

(OR)

5. a) Explain the braking of synchronous motor with VSI. Draw the speed torque characteristics for regenerative braking. (8)
- b) Write a short note on separately controlled synchronous motor drive. (8)

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B.Tech. VIII Semester (Back) Examination, April-2019
Electrical and Electronics Engineering
8EX3(O) Switchgear & Protection
Common with EE, EX

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

UNIT - I

1. a) Explain Static Relays also explain its merits and demerits. (8)
- b) Explain the working principle of definite time static over Current Relays with help of suitable diagram. (8)

(OR)

1. a) Explain the phenomena of duality between amplitude and phase comparators. (8)
- b) Explain coincidence type phase comparators. (8)

UNIT - II

2. a) Explain a brief description of single phase static differential relay schemes. (8)
- b) By help of a neat diagram explain the working concept of static MHO relay. (8)

(OR)

2. a) Describe the a static differential protection of generator by a suitable diagram. (8)
- b) Explain the working concept of static impedance relay. (8)

UNIT - III

3. a) Write short note on and elliptical relay. (8)
b) For Carrier Current Protection explain its basic apparatus and scheme of power line carrier system. (8)

(OR)

3. a) Explain the connects of quadrilateral relay also explain its characteristics. (8)
b) Explain the effect of power swings on the performance of distance protection. (8)

UNIT - IV

4. a) For a 132kV system, the reactance and capacitance up to the location of the circuit breaker is 3 ohm and $0.015 \mu\text{F}$, respectively. Calculate the following: (8)
i) The frequency of transient oscillation.
ii) The max. value of restriking voltage across the contacts of the circuit breakers.
iii) The Max. value of RRRV.
b) Explain the phenomena of current chopping in a circuit breaker. What measurement are taken to reduce it? (8)

(OR)

4. a) Explain the construction and working principle of minimum oil circuit breakers. (8)
b) In a 220 kV system, the reactance and capacitance up to the location of circuit breaker is 8 ohm and $0.025 \mu\text{F}$, respectively. A resistance of 600ohms is connected across the contacts of the circuits breakers. Determine the following: (8)
i) Natural frequency of oscillation
ii) Damped frequency of oscillation
ii) Critical value of resistance which will give no transient oscillation.

UNIT - V

5. a) Discuss the operational principle of SF_6 circuit breaker. What are its advantage over other type of circuit breakers? (8)
b) By help of block diagram brief description the concept digital relay. (8)

(OR)

5. a) Explain the process of selection of circuit breakers and rating of circuit breakers. (8)
b) Explain Introduction to digital overcurrent for transmission line distance protection. (8)

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B.Tech.VIII Semester (Main&Back) Examination, April - 2019
Electrical And Electronics Engineering
8EX3A Protection of Power System
Common with EE,EX

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

*Attempt any **Five questions**, selecting **One question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Use the following supporting material is permitted during examination.

1. *Scientific Calculator.*

Unit - I

1. a) Justify why overlapping zone of protection are required for protection purpose. Explain importance of primary and backup protection. **(8)**
- b) Describe the transient errors in the CT and CVT by drawing the transient response and giving the suitable mathematical treatment. **(8)**

(OR)

1. a) Justify qualities and functional characteristics required by a relay with respect to protection. **(8)**
- b) Define the following terms concerning to a relay: **(2+2+2+2=8)**
 - i) Discrimination.
 - ii) Reliability of the relay.
 - iii) Selectivity.
 - iv) Sensitivity.

Unit - II

2. a) Describe the construction, principle of operation of a directional over current relay. And how the 30°, 60° and 90° connections of directional over current relay are obtained. **(6)**

- b) Distinguish over current relay on the basis of definite time, inverse definite minimum time (IDMT) characteristics. (6)
- c) Describe Time setting, Plug setting and Current setting of over current relay. (4)

(OR)

2. a) Describe the construction and principle of operation of Disc type induction over current relay. Derive torque equation. (6)
- b) The current rating of a relay is 3A. PSM is 1.0; CT ratio is 300/3, fault current is 3000A. Find the operating time of the relay for a TMS = 0.3. At TMS = 1, the operating times at various PSM are : (6)

PSM	2	4	6	7	8	10
Operating Time(S)	8	6	5	3	2.8	2.4

- c) Discuss the protection scheme for feeders. (4)

Unit - III

3. a) What are the consequences of failure of prime mover of an alternator? How the protection against such fault is implemented. (8)
- b) Explain the protection of alternator against overheating of stator. (8)

(OR)

3. a) Explain with neat diagram of connections, the principle of operations of current balance type differential protection of generator against earth and inter phase fault. (8)
- b) Describe the rotor earth-fault protection and loss of excitation protection schemes for generator. (8)

Unit - IV

4. a) Draw and explain the construction and working of Buchholz's relay. Against which fault Buchholz's relay gives the protection? State its advantages and Disadvantages. (10)
- b) What is over fluxing in transformer? When it occurs? What are the different methods to overcome this? (6)

(OR)

4. a) What is magnetizing inrush current? What measures are taken to distinguish between the fault current and magnetizing inrush current? Discuss the protective scheme which protects the transformer against faults but does not operate in case of magnetizing inrush current. (10)
- b) Explain high impedance relay scheme for bus-bar protection. (6)

Unit - V

5. a) What are the possible causes of earth faults in an induction motor? Explain the application of earth fault relay for the protection of induction motor. (8)
- b) Explain the importance and basic principle of distance protection of a transmission line. (8)

(OR)

5. a) Describe and compare characteristics of impedance, reactance and mho relay with respect to arc resistance and power swings. (8)
- b) Give the Scheme of distance protection of a three phase line. (8)
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8E8044**8E8044**

B.Tech. VIII - Semester (Main & Back) Examination, April-2019
Electrical & Electronics Engg.
8EX4.1A Utilization of Electrical Power
(Common with EE, EX)

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

*Attempt any **Five questions**, selecting **One question** from **each unit**. All Questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) Describe with the help of neat sketch, the working of a vertical core type Induction furnace. Give the applications of high frequency Eddy current heating. (08)
- b) Compare in detail, electric arc welding with resistance welding. Explain with the help of a neat sketch the process of spot welding. (08)

(OR)

1. a) Calculate the efficiency of a high frequency induction furnace which takes 15 minutes to melt 2kg of aluminium. Input to the furnace using 5kW and initial temperature 20°C. Specific heat of aluminium=0.88 kJ/kg°C;
 Melting point of aluminium = 660°C;
 Latent heat of fusion of aluminium = 32kJ/kg;
 $1\text{kJ} = 2.78 \times 10^{-4}\text{kwh}$. (08)
- b) Explain welding transformer with a suitable diagram. (08)

Unit - II

2. a) Discuss the law of illumination and its Limitations. (08)
- b) Describe with the help of a neat diagram the construction and working of a high pressure mercury vapour lamp. (08)

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(OR)

2. a) What is photometry? Describe photovoltaic method of photometry and discuss its limitations. (08)
- b) Write a short note on street lighting and flood lighting. (08)

Unit - III

3. a) Explain the extraction process of Aluminium with a suitable diagram. (08)
- b) What is meant by 'anodizing'? Explain process of 'anodizing' and describe the equipments used for it. (08)

(OR)

3. a) Explain "reverse current process" in electroplating? Discuss its advantages. (08)
- b) Calculate ampere-hours required to deposit a coating of silver 0.06mm thick on a sphere of 10cm radius. Assume electrochemical equivalent of Silver = 0.001118 and density of Silver to be 10.5. (08)

Unit - IV

4. a) Compare DC and AC system of railway electrification from the point of main line and suburban line railway service. (08)
- b) Write a short note on overhead equipment including current collectors for overhead systems and conductor rail system. (08)

(OR)

4. a) Discuss Merits and Demerits of DC system track electrification. (08)
- b) Describe the suitability of DC series Motor for its application in electric locomotive for traction duty. (08)

Unit - V

5. a) What is tractive effort of a train and what are its functions? Derive an expression for tractive effort developed by a train unit. (08)
- b) Discuss the advantage of series-parallel starting against the ordinary rheostatic for a pair of DC traction motors. (08)

(OR)

5. a) What are the advantages and disadvantages of the regenerative braking of electric traction Motor? (08)
- b) Explain the terms 'adhesive weight' and coefficient of adhesion and what do you understand by train resistance? (08)
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8E 8106

B.Tech. VIII Semester (Main&Back) Examination, April. 2019

Electrical Engineering

8EE4.2A FACTS Devices & Their Applications

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **Five questions**, selecting **One question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) What is FACTS? Explain the problems associated with AC transmission system in detail. Also describe some of the methods to resolve these problem. (10)
- b) What are the basic types of FACTS controllers? Explain in short. (06)

(OR)

1. a) Write and explain the factors which limits the loading capability. (08)
- b) Describe the power flow control of an AC Transmission line. (04)
- c) Explain the advantages of FACTS Technology. (04)

Unit - II

2. a) Explain mid point and end point voltage regulation of transmission line. (08)
- b) Describe the basic concepts of voltage - sourced converters and also explain the single phase bridge convertors. (08)

(OR)

2. a) Write short note on power factor control. (05)
- b) Explain the transformer connection for 12 - pulse operation. (06)
- c) Compare STATCOM with SVC. (05)

Unit - III

3. a) Describe by help of operation, characteristics and applications of a static synchronous series compensator. (08)
- b) Write short note on :
- i) Voltage stability. (04)
- ii) Sub-Synchronous oscillation damping. (04)

(OR)

3. a) Describe Thyristor Switched Series Capacitor (TSSC) with the help of neat diagram. (08)
- b) What is the use of Thyristor Controlled series capacitor (TCSC)? Explain its operation with a neat circuit diagram. (08)

Unit - IV

4. a) Describe the method of improvement of stability by phase angle regulator. (08)
- b) Explain Thyristor controlled braking resistor in brief. (08)

(OR)

4. a) What do you mean by phase angle regulation? Explain the "Thyristor Controlled Phase Angle Regulator" (TCPAR) in detail. (08)
- b) Explain thyristor controlled voltage limiter in brief. (08)

Unit - V

5. a) What is UPFC? Explain its principle of operation with its basic diagram. (08)
- b) Give the comparison of UPFC to series compensator and phase angle regulator? Also write the various application of UPFC. (08)

(OR)

5. What is Interline power flow controller? How is it different from unified power flow controller? Explain the operating principle of IPFC and discuss its application. (16)

8E4112

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8E4112**B.Tech. VIII-Semester (Back) Examination, April-2019****Electrical and Electronics Engineering****8EX4.3(O) Non Conventional Energy Sources****Common with EE, EX****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

UNIT -I

1. a) By help of effective statics explain World energy situation. (8)
- b) Explain Components of tidal power plants with its advantages and disadvantages. (8)

(OR)

1. a) Explain Indian energy scene with respect to conventional and non-conventional energy sources. (8)
- b) Explain the Prospects of tidal energy in India. (8)

UNIT -II

2. a) By help of suitable diagram explain solar radiation on tilted surface. (8)
- b) Explain basic photo-voltaic power generating system. (8)

(OR)

2. a) Write short note on Solar pond. (8)
- b) Explain the construction and working of a Solar energy collector. (8)

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UNIT -III

3. a) Explain the basic principle of wind energy conversion. (8)
b) Describe advantages and disadvantages of geothermal energy also explain applications of geothermal energy. (8)

(OR)

3. a) Describe a basic comparison between horizontal axis and vertical axis wind turbines. (8)
b) Explain the scenario of Geothermal energy in India. (8)

UNIT -IV

4. a) Explain the working principle of Tokamak reactor. (8)
b) Explain basic requirements for nuclear fusion. (8)

(OR)

4. a) Explain the concept of Fusion hybrid and cold fusion. (8)
b) Describe magnetic confinement and inertial confinement of Plasma confinement. (8)

UNIT -V

5. a) By help of suitable diagram explain working of Bandhu biogas plant. (8)
b) Write short note on Ethanol production and energy application. (8)

(OR)

5. a) By help of suitable diagram explain working of Pragati design biogas plant. (8)
b) What is Biogas generation explain its energy application. (8)
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