7E7041

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021
Electrical Engineering
7EE1A Power System Planning
Common for EE, EX

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 48
Min. Marks: 15

Instructions to Candidates:

Attempt **three questions,** *selecting* **one question each** *from any three* **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 of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) What is strategic planning also explain long, medium and long term strategy? Discuss different stages of Detailed Project Report (DPR) for planning of power project. [8]

(b) Explain the National & Regional planning also write its advantages and disadvantages. Explain the structure of power system with types of transmission and distribution network. [8]

OR

Q.1 (a) What is the need of planning tools? List the various planning tools and explain them. What are the major concern of electricity regulation? [8]

(b) What is electricity forecasting? What are the types of electrical forecasting also explain the factors affecting the forecasting? [8]

UNIT- II

Q.2 (a) Explain the component of rural electrification planning. Explain the concept of rational tariffs. [8]

(b) Explain cogeneration, the types of cogeneration and its advantages. [8]

OR

Q.2 (a) Explain the planning criteria for transmission & distribution planning. Discuss in brief power system economics and power sector finance. [8]

(b) Explain the power pooling and trading in India also discuss on the selection of voltage levels in India for the transmission and distribution. [8]

UNIT- III

Q.3 (a) Explain the automatic generation control and economic load dispatch for system operation planning. [8]

(b) What do you mean by State Estimation? Explain with the help of block diagram the function of state estimation. [8]

OR

Q.3 (a) Explain the types of maintenance for system operation planning. Also discuss in brief load management. [8]

(b) What are the methods of load prediction? Explain on line power flow studies. [8]

UNIT- IV

Q.4 (a) Write short note on greenhouse effect. Also explain its effect and its technological impact. [8]

(b) What is Insulation Coordination? Write principle and procedure for insulation coordination. [8]

OR

Q.4 (a) Explain the Reactive Compensation. What are the reasons that shunt capacitors are employed at substation level? [8]

(b) Explain computer aided process also write its classification and its advantages over manual experience based process planning. [8]

UNIT- V

Q.5 (a) Explain seven modular programs of WASP package with block diagram representation. [8]

(b) Explain steps in optimal power system planning and WASP programme for generation system expansion planning. [8]

OR

Q.5 (a) Explain optimal power system expansion planning. Write memory limitation WASP can consider upto. [8]

(b) Draw the flow chart of least cost planning and explain the formulation of least cost optimization problem incorporating the capital. [8]

7E7042

7E7042

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021
Electrical & Electronics Engineering
7EX2A Power System Analysis
EE, EX

Time: 2 Hours   **Maximum Marks: 48**
                                                               Min. Passing Marks: 15

Instructions to Candidates:

Attempt **three questions,** *selecting* **one question each** *from any three* **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 of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) Derive the expression that per unit impedance of 3-d transformer remains same either refer to primary side or refer to secondary side. Also give the advantages and disadvantages of per unit system.   [8]

(b) For the four bus system parameters are as follows -   [8]

Bus Code	Line Impedance	Charging Admittance
1 - 2	0.2 + j 0.8	j 0.02
2 - 3	0.3 + j 0.9	j 0.03
2 - 4	0.25 + j 1	j 0.04
3 - 4	0.2 + j 0.8	j 0.02
1 - 3	0.1 + j 0.4	j 0.01

Draw the network & find the bus admittance matrix.

Q.1 (a) Explain the procedure for formulation of admittance matrix also explain the modification in admittance matrix. **[8]**

(b) Fig. shows a four bus system. The shunt admittance at the buses are negligible. The line impedance are as follows - **[8]**

Line code	1 – 2	2 – 3	3 – 4	1 – 4
R (P_u)	0.025	0.02	0.05	0.04
X (P_u)	0.10	0.08	0.20	0.16

(i) Assume that the line shown dotted from [bus (to 3)] is not present. Formulate Y_{bus}.

(ii) Which element of Y_{bus} obtained above are affected when the line from 1 to bus 3 added. If the P_u impedance of this line is $0.1 + j\,0.4$. Find the new Y_{bus}.
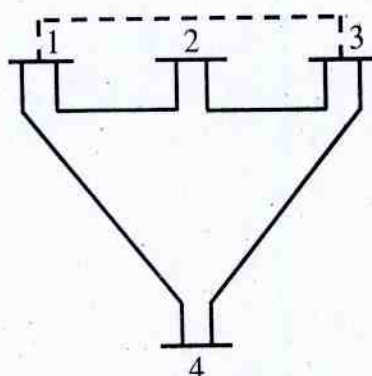

Fig. (1)

UNIT- II

**Q.2** (a) Draw and explain the equivalent circuits of a synchronous machine under the following conditions- **[8]**

(i) Subtransient condition

(ii) Transient condition

(iii) Steady state condition

(b) Give a systematic procedure for formulating Z_{bus} deriving all necessary equations. **[8]**

Q.2 (a) Generator G_1 and G_2 are identical and rated 11kV, 20 MVA and have a transient reactance of 0.25 p.u. at own MVA base. The transformer T_1 & T_2 are also identical and are rated 11/66 kV, 5MVA and have a reactance of 0.06 p.u. to their own base MVA. The tie line is 50 km long, each conductor has a reactance of 0.848 Ω/km. The 3-ϕ fault is assumed at $F_1 = 20$ km from generator G_1 as shown. Find the short circuit current. [8]
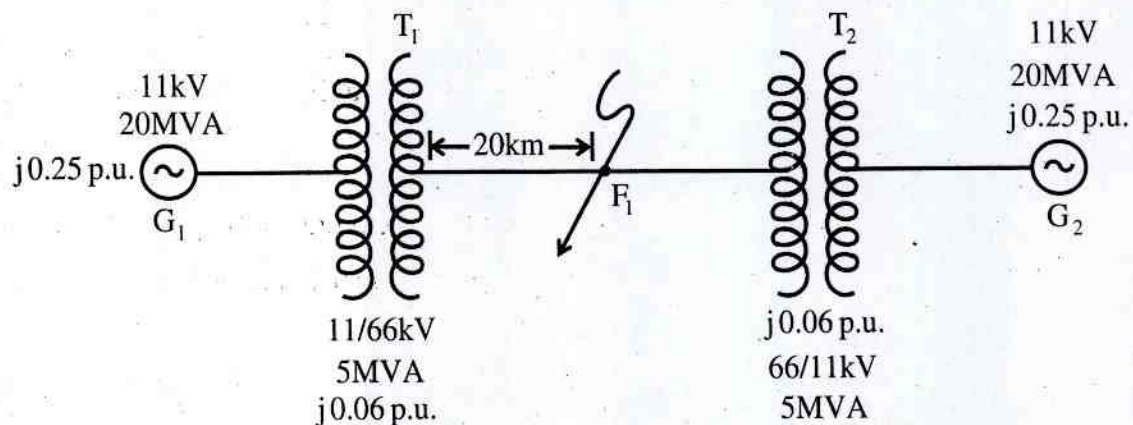
(b) What happens when a sudden transient occurs in a transmission line? Discuss the transient on a transmission line and also explain doubling effect. [8]

UNIT- III

Q.3 (a) Derive the expression for sequence impedance and draw sequence networks of a synchronous machine. [8]

(b) What are the symmetrical components? Explain clearly with the help of vector diagram the positive, negative and zero sequence quantities. [8]

OR

Q.3 (a) Show that the symmetrical component transformation is power invariant. [8]

(b) In a 3-ϕ four wire system the currents in the lines a, b & c under abnormal condition of loading were as follows - [8]

$I_a = 100 \angle 30°, I_b = 50 \angle 300°, I_c = 30 \angle 180°$ A

Calculate the zero positive & negative sequence current in line a & the return current in the neutral conductor.

UNIT- IV

Q.4 (a) Explain double line to ground fault with the interconnection of sequence network. [8]

(b) Give the comparison of single line to ground fault and 3 – phase fault current for a fault at generator terminal and transmission line. [8]

OR

Q.4 (a) Discuss the sequence impedance of transformer. Also draw the transformer connection and their equivalent sequence network. [8]

(b) A double line to ground fault occurs at the terminals of generator. The generator is of 30 MVA, 11kV and has $z = z_2 = j\ 0.2$ p.u., $z_0 = j\ 0.05$ p.u. Determine the line currents, fault current and line to neutral voltages under fault conditions. [8]

UNIT- V

Q.5 (a) Discuss classification of buses in a power system in brief. [8]

(b) The procedure by flow chart for Gauss – Seidel method for load flow when system has PQ and PV buses both. [8]

OR

Q.5 (a) Discuss the Newton Raphson method for load flow study in power system in detail. Derive the equations of various element of Jacobian matrix. [8]

(b) Present the comparison of Gauss – Seidel, Newton Raphson and fast decoupled load flow studies describing their suitability, advantages, disadvantages and applications etc. [8]

7E1732

7E1732

B. Tech. VII - Sem. (Main) Exam., Feb.- March - 2021
PEC Electrical Engineering
7EE5 – 11 Wind and Solar Energy Systems

Time: 2 Hours   [To be converted as per scheme]
                                                     Max. Marks: 82
                                                     Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL_____   2. NIL_____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Explain the relation between power generated by a wind turbine and wind velocity.

Q.2 Explain the term 'stall'.

Q.3 Explain the reason for deploying induction generators in a wind turbine.

Q.4 What is a Sun angle?

Q.5 Explain application of MPPT.

Q.6 What is a wind farm?

Q.7 Explain some application of solar thermal power generation.

Q.8 Explain a major difference between monocrystalline & polycrystalline.

Q.9 Explain uses of PV solar module.

Q.10 What is the maximum efficiency of a wind turbine?

PART – B

(Analytical/Problem solving questions)   [4×8=32]

Attempt any four questions

Q.1   Explain the history of wind power and Indian & Global statistics.

Q.2   Explain the generator converter configurations in a wind turbine.

Q.3   Explain working of Doubly fed induction generators in wind generator topologies.

Q.4   Explain estimation of solar energy availability.

Q.5   Explain Betz law and derive its mathematical model.

Q.6   Explain 'Gird Code' and explain its technical requirements.

Q.7   Explain concept of 'Solar Pond' and its application.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [2×15=30]

Attempt any two questions

Q.1   Explain fixed and variable speed wind turbines.

Q.2   Design a power electronic base converters to obtain supply for an Indian active distribution network.

Q.3   With reference to solar resources, explain the following –

   (a)   Earth Sun angle

   (b)   Solar Day length

   (c)   Solar Geometry

Q.4   Explain Hybrid and Isolated operations of Solar PV and wind systems.

Q.5   Write short note on any two –

   (a)   Parabolic trough

   (b)   Fresnel

   (c)   Central Receivers

7E1736

B. Tech. VII - Sem. (Main) Exam., Feb.-March - 2021
OE -I Open Elective-I
7EE6-60.2 Power Generation Sources

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 82
Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]
All questions are compulsory

Q.1 Explain the application of hydro power plant.

Q.2 Explain some challenges with wind turbine plant.

Q.3 Describe the applications of PV system.

Q.4 Explain some example of hybrid system.

Q.5 Explain the application of gasification process.

Q.6 Explain the challenges associated with wave energy.

Q.7 Explain some advantages of renewable energy.

Q.8 What do you mean by sustainable development?

Q.9 Where is fast breeder deployed?

Q.10 Explain uses of boiler in thermal plant.

PART – B

(Analytical/Problem solving questions)   [4×8=32]

Attempt any four questions

Q.1 Explain the world energy status and explain current energy scenario in India.

Q.2 By the help of block diagram explain working of closed cycle gas turbine plants.

Q.3 Explain the basic difference between nuclear fission and nuclear fusion.

Q.4 Explain the concept of solar pumping and describe its application.

Q.5 Explain wind energy conversion system and its site characteristics.

Q.6 Explain recent developments in biomass and energy farming.

Q.7 Explain open and closed OTEC cycles.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [2×15=30]

Attempt any two questions

Q.1 What is renewable energy sources, give its application and challenges, and also explain working of hybrid system?

Q.2 Design a renewable energy sources with its social and environmental aspects and utilization.

Q.3 Explain by help of diagram, how wind energy is converted into electrical energy also explain horizontal and vertical axis wind turbine?

Q.4 Explain the following –

(a) Solar Furnaces

(b) Solar Desalination

(c) Solar Dryers

Q.5 Explain the process of producing uses full power by biomass further, by help of a diagram explain family biogas plan.

7E1735

7E1735

B. Tech. VII - Sem. (Main) Exam., Feb.- March - 2021
OE -I Open Elective-I Electrical Engineering
7EE6 – 60.1 Electrical Machines and Drives

Time: 2 Hours

[To be converted as per scheme]

Max. Marks: 82

Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

<u>(Answer should be given up to 25 words only)</u>   [10×2=20]

<u>All questions are compulsory</u>

Q.1 What are the losses that occur during electromechanical energy conversion?   [2]

Q.2 What are the advantage and disadvantage of a separately excited generator over a self-excited generator?   [2]

Q.3 How does sudden changes in load in a D. C. machine cause "flash –over"?   [2]

Q.4 How does higher permeability of magnetic material of a D. C. machine affect its performance?   [2]

Q.5 Why do we use capacitor start-induction motor in applications requiring high starting torque in preference to repulsion induction motor? [2]

Q.6 What is torque speed characteristics of induction motor? [2]

Q.7 What are the reason for load equalization in an electric drives? [2]

Q.8 What are the various factors that influence the choice of electric drives? [2]

Q.9 What is the necessity of controlled rectifier for DC drives? [2]

Q.10 Why stator voltage control is suitable for sped control of induction, motor in fan and pump drives? [2]

PART – B

(Analytical/Problem solving questions) [4×8=32]
Attempt any four questions

Q.1 Explain static rotor resistance control in closed loop speed control. [8]

Q.2 Explain using a power circuit, how the speed of an induction motor drive can be controlled by using current source inverter. [8]

Q.3 Describe the cyclo-converter fed induction motor drive. [8]

Q.4 Explain the basic construction and working of chopper controlled DC drives. [8]

Q.5 Describe the features of DC series generators and distinguish it from the other types of DC generators. Explain. [8]

Q.6 Derive the equation for torque developed under running conditions, by a 3 – phase induction motor. Find the condition for maximum running torque. [8]

Q.7 Draw and explain the equivalent circuit of a single-phase induction motor, based upon double-field revolving theory. [8]

PART – C

Attempt any two questions

Q.1 Draw the torque-slip characteristic of a 3-phase induction motor and explain it. Find condition of maximum torque. Show the effect of rotor resistance on torque slip characteristic.   [15]

Q.2 Establish an expression for the speed of dc motor with the help of neat connection diagram. Explain the method of controlling the speed of dc motor below and above the rated speed. Justify the statement that dc series motors are never started at no load.   [15]

Q.3 Draw the characteristics of armature voltage controlled and field flux controlled D.C. drives. Explain the torque and power limitations in combined armature voltage and field control.   [15]

Q.4 A 230V, 960-rpm, 12.8A separately excited dc motor has armature circuit resistance and inductance 2 ohm, 150 mH respectively. It is fed from a single-phase half controlled rectifier with an ac source of 230V, 50 Hz. Calculate-   [15]

   (a)   Torque for $\alpha = 60$ and speed = 600 rpm.

   (b)   Motor speed for $\alpha = 60$ and T = 20 N-M.

Q.5 A 2200V, 2600 kW, 735 rpm, 50 Hz, 8 pole, 3-phase squirrel-cage induction motor has

following parameters referred to the stator: [15]

$R_s = 0.075\Omega$, $R_r = 0.1\Omega$, $X_s = 0.45\Omega$, $X_r = 0.55\Omega$

Stator winding is delta connected and consists of two sections connected in parallel.

(a) Calculate starting and maximum torque as a ratio of rated torque, if the motor is

started by star-delta switching. What is maximum value of line current during

starting?

(b) Calculate transformation ratio of an auto-transformer so as to limit the maximum

starting current to twice the rated value. What is the value of starting torque?

7E7043

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021
Electrical & Electronics Engineering
7EX3A Artificial Intelligence Techniques
EE, EX

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 48
Min. Marks: 15

Instructions to Candidates:

Attempt **three questions,** *selecting* **one question each** *from any three* **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 of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) Explain artificial intelligence with suitable example. [8]

 (b) Write the characteristics of production system with various types of production system. [8]

OR

Q.1 (a) Write the definition of AI & explain A* & AO* algorithm. [8]

 (b) Discuss comparison between DFS & BFS with various types of control strategies. [8]

UNIT- II

Q.2 (a) Explain computable functions & predicates. [8]

 (b) What is unification algorithm? Explain with example. [8]

OR

Q.2 (a) Explain issues in knowledge representation. [8]

 (b) Explain approaches to knowledge representation using predicate logic with example. [8]

UNIT- III

Q.3 Explain Baeyer's theorem & prove how fuzzy logic is different form binary logic with example. [16]

OR

Q.3 What are the concepts of semantic net in knowledge representation? Explain the theory of conceptual dependency using suitable diagram. [16]

UNIT- IV

Q.4 (a) What are steps in NLP? List & explain them briefly. [8]

(b) Explain the algorithm of minimax search procedure and discuss any two from following- [8]
   (i) Alpha Beta cut-off
   (ii) Secondary search
   (iii) Waiting for quiescence

OR

Q.4 Define the concept of supervised learning and unsupervised learning. Also explain Kohonen's top field network & Algorithm. [16]

UNIT- V

Q.5 (a) What do you mean by expert system? Explain 'MYCIN' in depth with block diagram. [8]

(b) Explain the concept of Hopfield neural network with suitable sketch with its applications. [8]

OR

Q.5 (a) What are the techniques used in measuring? Explain. [5]

(b) How learning by example is different from learning by taking advice? Explain it giving suitable example. [6]

(c) What are the issues of common sense? [5]

7E7044

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021
Electrical & Electronics Engineering
7EX4A Non-Conventional Energy Sources
EE, EX

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 48
Min. Marks: 15

Instructions to Candidates:

*Attempt **three questions,** selecting **one question each** from any three **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 of following supporting material is permitted during examination.
(Mentioned in form No.205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) What do you understand with renewable energy sources and how these are
important in view of today's scenario? What are the advantages and limitations of
the renewable energy sources? [8]

(b) Explain the various methods of tidal power generation. What are the limitations of
two methods? [8]

OR

Q.1 (a) What are the conventional energy sources? Differentiate conventional & non-
conventional sources of energy. [8]

(b) Explain double basin arrangement in tidal power plant. What are the limitations of
tidal energy? [8]

UNIT- II

Q.2 (a) Explain the following terms related to solar radiation geometry. Declination, Hour angle, Altitude angle, Zenith angle, Surface azimuth angle, Solar azimuth angle, Incident angle, Day length and Local apparent time. [8]

(b) What are the principles of solar photo-voltaic power generation? What are the main elements of PV System? [8]

OR

Q.2 (a) How solar radiation on tilted surface can be calculated? Discuss mathematical models used for the same. [8]

(b) What are the advantages and disadvantages of concentrating collectors over flat plate collectors? [8]

UNIT- III

Q.3 (a) Explain the factors on which the wind current depends. How wind blows in coastal areas? How the wind power is calculated. [8]

(b) Explain the advantages and disadvantages of geothermal energy over other energy sources. [8]

OR

Q.3 (a) Explain Wind Energy Conversion System (WECS). What are the basic components of a WECS? [8]

(b) Describe with neat sketch working of a preheat hybrid geothermal power plant. What are the merits and demerits? [8]

UNIT- IV

Q.4 (a) What is the basic principle of fusion reaction? What are future prospects and present problems of fusion energy? [8]

(b) What is plasma confinement? Describe any one method of such confinement. [8]

OR

Q.4 (a) What are the different requirements for nuclear fission and nuclear fusion? [8]

(b) Explain in detail the working of a laser fusion reactor. [8]

UNIT- V

Q.5 (a) What is the origin of biomass energy? What is the present status of development of biomass energy resources in India? [8]

(b) Explain the operation of biogas plant – (any one)

   (i) Deen bandhu biogas plant [4]

   (ii) Pragati design biogas plant [4]

OR

Q.5 (a) Explain the factors that affect fuel generation of biogas. [8]

(b) Explain the process of ethanol production. What are the uses of ethanol in power sector? [8]

7E7045

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021
Electrical & Electronics Engineering
7EX5A Power System Engineering
EE, EX

Time: 2 Hours

Maximum Marks: 48
Min. Passing Marks: 15

Instructions to Candidates:

Attempt **three questions**, *selecting* **one question each** *from any three* **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 of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL   2. NIL

UNIT- I

Q.1 (a) Briefly write on heat curve and incremental fuel cost curve of a thermal power station. [8]

    (b) Describe the dynamic programming solution for unit commitment. [8]

OR

Q.1 (a) Draw and discuss input – output curve for thermal generating unit. [8]

    (b) Briefly describe Economic distribution of load between power stations. [8]

UNIT- II

Q.2 (a) A 50 Hz, 4 pole turbo alternator rated 150 MVA, 11kV has an inertia constant of 9 MJ/MVA. Find –

    (i) Stored energy at synchronous speed [4]

    (ii) The rotor acceleration if the input mechanical power is raised to 100 MW when electric load is 75 MW [4]

    (iii) The speed at the end of 10 cycles if acceleration is assumed constant at the initial value [4]

    (b) What condition are to be satisfied for stable operation of generation. [4]

Q.2 Obtain the power angle relationship and the generator internal emf for –

    (a) Classical model   [8]

    (b) Salient pole model with following data -   [8]

        $x_d = 1.0$ pu : $x_q = 0.6$ pv : $V_t = 1.0$ pu : $I_a = 1.0$ pu at upf

UNIT- III

Q.3 (a) Find out equation for critical clearing angle if an auto reclose circuit breaker is used in a system having two transmission live in a parallel and a fault occurs at the midpoint of one of the parallel lines.   [8]

    (b) What are the factors which affect power system stability and methods to improve stability?   [8]

OR

Q.3 Write a note on –

    (a) Transient stability   [4]

    (b) Equal area criterion   [4]

    (c) Critical clearing angle   [4]

    (d) Critical clearing time   [4]

UNIT- IV

Q.4 (a) Explain AC excitation system for synchronous machine in detail.   [8]

    (b) Explain Rotating thyristor excitation scheme with its block diagram.   [8]

OR

Q.4 (a) Briefly explain isolated and interconnected power system.   [8]

    (b) Write a short note on power system interconnection in India.   [8]

UNIT- V

Q.5 (a) Explain working and uses of phase shifting transformer.   [8]

    (b) Write a short note on Tap-changing transformer.   [8]

OR

Q.5 Write a short note on the following –

    (a) Protection of series capacitor   [5]

    (b) Series compensation   [6]

    (c) Power system security   [5]

7E7047

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021

Electrical & Electronics Engineering

7EE6.2A Computer Aided Design of Electrical Machines

Common for EE, EX

Time: 2 Hours   **Maximum Marks: 48**

                                            Min. Passing Marks: 15

Instructions to Candidates:

*Attempt **three questions,** selecting **one question each** from any three **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 of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL_____   2. NIL_____

UNIT- I

Q.1 (a) Give the classification of Insulating material used in electrical machine in relation to their thermal stability as per ISI. [8]

(b) Write the main factors affecting the design of electrical machines. What are the limitation imposed on design of electrical machine? [8]

OR

Q.1 (a) Write short notes on-

(i) Magnetic materials [3]

(ii) Graphical method of finding mmf for tapered teeth. [3]

(b) Determine the mmf required for the air gap of a d.c machine having open slots given the following particulars- [10]

Slot pitch = 4.3 cm; Slot opening = 2.1 cm,

Gross length of core = 48 cm; Pole arc = 18 cm; Air gap length = 0.6 cm;

Flux per pole = 0.056 Wb; There are 8 ventilating ducts each 1.2 cm wide;

Carter's Co-efficient for slot and ducts = 0.41 & 0.28.

UNIT- II

Q.2 (a) Express the term "Continuous rating", "Intermittent rating" and "Short term rating" as applicable to electrical machines. [8]

(b) Briefly explain various types of cooling system for rotating machine and what is the importance of hydrogen cooling? [8]

OR

Q.2 (a) During a heat run test of a 100kVA transformer, the temperature rise after 1 hour and 2 hours is found to be 24°C and 34°C respectively. Calculate the heating time constant and final steady temperature rise. [6]

(b) Write short notes on-

(i) Heat flow equations [5]

(ii) Newton's law of cooling [5]

UNIT- III

Q.3 (a) Explain with neat sketches the following types of windings used for transformer- [8]

(i) Cylindrical

(ii) Cross over

(iii) Helical

(iv) Disc

(b) Estimate the main core dimensions for a 50Hz, 3-Phase, 200 kVA, 6600/500 Volts, star/mesh core type transformer. Use the following data: [8]

Core limb section to be 4-stepped for which the area factor = 0.62;

Window space factor = 0.27

(Height of window) / (width of window) = 2

Current density = 2.8 A/mm^2

Voltage per turn = 0.5

Maxi. Flux density = 1.25 Wb/m^2.

Q.3 (a) Explain power transformer and distribution transformer. [6]

(b) Determine the dimensions of the core and yoke for a 100 kVA, 50 Hz, Single phase, Core type transformer. A square core is used with distance between the adjacent limbs equal to 1.6 times the width of the laminations, assume voltage per turn 14 Volt. Maxi. flux density 1.1 Wb/m², window space factor 0.32 and the current density 3A/mm². Take stacking factor = 0.9, flux density in the yoke to be 80% of flux density in core. [10]

UNIT- IV

Q.4 (a) Explain the term "Short Circuit Ratio" and its effects on the performance of synchronous machine. Show that the Short Circuit Ratio (SCR) of synchronous machine is inversely proportional to its synchronous reactance. [8]

(b) Develop an expression for the output equation of an alternator. [8]

OR

Q.4 (a) (i) Explain three types of synchronous machine. [4]

(ii) What are the factors affecting the choice of specific electric loading? [4]

(b) Find the main dimensions of 2500 kVA, 187.5 rpm 50 Hz, 3-phase, 3 kV salient pole synchronous generator using- [8]

Specific magnetic loading = 0.6 Wb/m²

Specific electric loading = 34000 A/m

Circular poles with ratio core length to pole pitch = 0.65.

UNIT- V

Q.5 (a) (i) The rotor slots of squirrel cage induction motor are skewed. Explain the reason. [5]

(ii) Draw the flow chart for design of Induction motor. [5]

(b) Give a relation between frequency, number of poles and synchronous speed in case of 3-phase induction motor. [6]

OR

Q.5 (a) Deduce the output equation of a 3-phase induction motor in terms of its specific loadings. Why the length of air gap in induction motor is kept as minimum as possible? [8]

(b) Explain the design of stator core and winding of Induction machines in brief. [8]

7E7132

7E7132

B. Tech. VII - Sem. (Back) Exam., Feb.-March - 2021
Electrical Engineering
7EE6.3A Economic Operation of Power Systems

Time: 2 Hours   [To be converted as per scheme]
                                                          Max. Marks: 48
                                                          Min. Marks: 15

Instructions to Candidates:

Attempt **three questions,** *selecting* **one question each** *from any three* **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 of following supporting material is permitted during examination.
(Mentioned in form No.205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) With the help of a suitable example, explain the economics in plant selection. [8]

     (b) Explain the factors affecting economics of generation.   [8]

OR

Q.1 (a) Define the economics of different types of generating plant.   [8]

     (b) Explain the power plant cost analysis.   [8]

UNIT- II

Q.2 (a) Describe the output and heat rate characteristics.   [8]

     (b) Explain the method of loading turbo generators.   [8]

Q. 2 For a power system having two generating stations, the B-coefficients are

$B_{11} = 0.001$ MW^{-1}, $B_{12} = -0.0005$ MW^{-1} and $B_{22} = 0.0024$ MW^{-1} and the incremental

costs of the two stations are $\dfrac{dC_1}{dp_1} = 0.08P_1 + 16$ Rs/MW-hr

$$\dfrac{dC_2}{dp_2} = 0.08P_2 + 12 \text{ Rs/MW-hr}$$

Calculate economic outputs of the generating stations P_1 and P_2 for $\lambda = 20$. Also calculate

the transmission losses and the load demand for this value of λ. [16]

UNIT- III

Q. 3 (a) Explain the advantages of combined operation. [8]

(b) Explain hydro thermal scheduling methods and their applications. [8]

OR

Q. 3 A system consists of two plants connected by a transmission line. The load is at plant-

2. The transmission line loss calculation reveals that a transfer of 100MW from plant-1

to plant-2 means a loss of 15MW. Find the required generation at each plant for $\lambda=60$.

Assuming that the incremental costs of the two plants are given by -

$$\dfrac{dC_1}{dp_1} = 0.02P_1 + 22 \text{ Rs/MW-hr}$$

$$\dfrac{dC_2}{dp_2} = 0.15P_2 + 30 \text{ Rs/MW-hr}$$

Also find the saving in Rs per Hour by scheduling the generation by considering the

transmission loss rather than neglecting the transmission loss in determining the output

of the two generators. Assuming Load of 285 MW connected at a bus of plant-2. [16]

UNIT- IV

Q. 4 (a) With the help of a suitable diagram explain synchronizing current. [8]

(b) Explain the operating characteristics of a cylindrical alternator rotor. [8]

OR

Q. 4 (a) Describe the working operation of two parallel alternators. [8]

(b) Describe the following - [8]

(i) Infinite bus

(ii) Active and Reactive power control

UNIT- V

Q. 5 (a) Explain the concept of physical and financial efficiencies of electrical goods and services. [8]

(b) Describe the economics of power supply and demand. [8]

OR

Q. 5 Write short notes on any four - [4×4=16]

(a) Minimum Cost Analysis

(b) Linear and Non Linear break even

(c) Load sharing

(d) River run off

(e) Application of coordination equation

7E1730

7E1730

B. Tech. VII - Sem. (Main) Exam., Feb.- March - 2021
OE -I Open Elective-I Electronics & Communication Engineering
7EC6 – 60.1 Principle of Electronic Communication

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 82
Min. Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]
All questions are compulsory

Q.1 Define depth of modulation.   [2]

Q.2 What are the degrees of modulation?   [2]

Q.3 Define Detection or Demodulation?   [2]

Q.4 Why PSK is always preferable over ASK in coherent detection?   [2]

Q.5 Discuss the utility of Wireless LAN.   [2]

Q.6 Describe the function of core & cladding in optical fiber.   [2]

Q.7 Differentiate between GSM and CDMA.   [2]

Q.8 Define RFID communication.   [2]

Q.9 What do you mean by paging?   [2]

Q.10 State Snell's Law and TIR.   [2]

PART – B

(Analytical/Problem solving questions)   [4×8=32]

Attempt any four questions

Q.1 Define QPSK modulation & demodulation scheme.   [8]

Q.2 Derive the relationship between index profile (n_1 & n_2) and acceptance angle a.   [8]

Q.3 A modulating signal $m(t) = 10 \cos (2\pi \times 10^3 t)$ is amplitude modulated with a carrier signal; $e(t) = 50 \cos(2\pi \times 10^5 t)$. Find the modulation index, the carrier power and power required for transmitting AM wave.   [8]

Q.4 Differentiate between attenuation, distortion and noise.   [8]

Q.5 What is a 'PoE'? Can we connect non-PoE devices to the PoE Switch's PoE ports?   [8]

Q.6 What do you mean by Zigbee network.   [8]

Q.7 Differentiate between PAM, PWM and PCM.   [8]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [2×15=30]

Attempt any two questions

Q.1 (a) Discuss FSK modulation technique with suitable diagram and required expression.   [10]

     (b) List out the need of modulation.   [5]

Q.2 (a) Explain the construction and working of Token ring LAN.   [10]

     (b) Discuss the utility of Internet and Telephony.   [5]

Q.3 Draw and explain satellite communication system. What do you mean by Satellite sub-systems?   [15]

Q.4 (a) Explain wave length division multiplexing with suitable diagrams.   [8]

     (b) Write short note on cellular telephone system AMPS.   [7]

Q.5 Briefly explain following terms with reference to Wireless Technologies-   [15]

     (a) WiMax

     (b) UWB

     (c) Infrared Wireless Networks