GITAM INSTITUTE OF TECHNOLOGY
GITAM UNIVERSITY

(Estd.u/s 3 of UGC Act, 1956)
Accredited by NAAC with 'A'Grade
Rushikonda, Visakhapatnam-530 045(AP)

Ph.D. Admission Test - 2017

ELECTRICAL AND ELECTRONICS ENGINEERING

SYLLABUS

Part A: Research Methodology
What is Research; Definitions, Research Process, Reasons for doing research, Outcome of Research, Sources of Research Ideas, Innovative Research, steps in Developing and Refining Research Problems, Basic vs applied research, Literature survey. Experimental Research, Experimental skills; Data analysis; Modeling skills Technical writing; Technical Presentations; Creativity in Research; Group discussion on Ethics in Research

Part B:

Circuit Theory: Single phase RC, RL, and RLC circuits, resonance, Three phase circuits, Network topology, Network theorems, RC, RL, RLC transients, ABCD, Z and Y parameters, two port networks.

Electro mechanical energy conversion, performance analysis of all types of DC generators and DC motors. Single phase transformers, equivalent circuit efficiency regulation parallel operation.

Induction motor torque calculations slip torque characteristic, equivalent circuit, performance analysis and speed control.

Synchronous generator emf calculation armature reaction regulation calculation using emf, mmf and ZPF methods. Synchronizing torque, parallel operation and effect of change of excitation and mechanical power input. Steady state, transient and subtransient reactances. Synchronous motor torque calculation V and inverted V curves.

Control Systems: Time domain analysis, Routh stability criterion and Root locus technique and frequency domain analysis compensation techniques and state variable method.

Power Systems: Transmission line parameters, performance of short, medium and long lines surges, traveling wave phenomenon, carona, insulators and cables. Power flow studies, economic operation, load frequency control symmetrical and unsymmetrical fault analysis and power system stability. Principles of over current,

differential, impedance mho relays and their application. Different types of circuit breakers. Arc quenching methods, restriking voltage rate of restriking voltage.

Power electronics: Converters and Inverters and Choppers. AC voltage regulators, control of DC motors using single phase and three phase converters and choppers. Control of induction motors with voltage source and current source inverters.

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ELECTRICAL & ELECTRONICS ENGINEERING
Model Question Paper
Ph.D. Admission Test - 2017

Part – A: Research Methodology

Max Marks: 80

Summary, Writing and Citation Style **20 Marks**

Given checklist about Typographical, Plagiarism, References and Technical Content guidelines, write a summary (in 200 words) about your proposed research area of interest.

Multiple Choice Questions 20 Questions with 3 Marks Each 60 Marks

Sample Questions

Q1) Assuming no modelling error, what is the effect of SNR on the quality of parameter estimates?

a) High value leads to poor estimates
b) High value leads to good estimates
c) Low value leads to poor estimates
d) None

Q2) In general, which of the following is used for linearizing a non-linear function?

a) Taylor's series expansion
b) Power series expansion
c) Fourier series expansion.
d) None of the above

Q3) Identify the methods for doing research

a) Transformation of facts
b) To test or disprove a theory
c) To come out with a better way

PART – B - ELECTRICAL & ELECTRONICS ENGINEERING

Max Marks: 80

Twenty Questions: Marks = 1 x 20 = 20 **20 Marks**

1) The presence of earth in case of over head lines will

(a) Increase the inductance (b) Increase the capacitance
(c) Decrease the inductance (d) Decrease the capacitance

2) The core loss, dielectric loss and sheath loss are due to

(a) Thermal breakdown (b) Electrical breakdown
(c) Mechanical breakdown (d) None

3) In symmetrical components theory, the operator 'λ' can be expressed as

(a) -0.866 + j0.5 (b) -0.5 – j0.866

(c) -0.5 + j0.866 (d) -0.866 – j0.5

4) The impulse turbine mostly in use is

(a) Francis type (b) Kaplanar type
(c) Pelton type (d) Propeller type

5) The current which would have flown if the breaker did not open is called

(a) making current (b) short circuit current
(c) maximum momentary current (d) prospective current

6) The cost which is dependent on the maximum demand but is independent of energy output is known as

(a) Fixed cost (b) running cost
(c) semi – fixed cost (d) operating cost

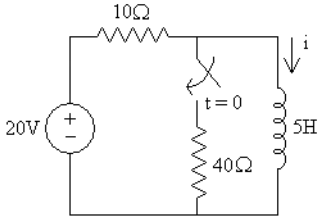
7) Almost all forms of cranes and hoisting mechanisms come under

(a) Impact loads (b) pulsating loads
(c) short time intermittent loads (d) short time loads

Twenty Questions: Marks = 3 x 20 = 60 **60 Marks**

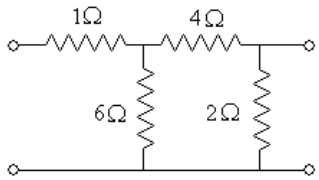
1) For the circuit shown in the figure, the value of i(t) for t > 0 is

(a) 1A (b) 2A (c) 4A (d) 8A



2) The 'z' parameters of the two – port network shown in figure are

(a) $\left[\begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix} \Omega \right]$ (b) $\left[\begin{bmatrix} 4 & 1 \\ 1 & 2 \end{bmatrix} \Omega \right]$ (c) $\left[\begin{bmatrix} \mathbf{4} & \mathbf{1} \\ \mathbf{1} & \mathbf{1.667} \end{bmatrix} \Omega \right]$ (d) $\left[\begin{bmatrix} 4 & 1 \\ 2 & 1.667 \end{bmatrix} \Omega \right]$



3) A 11 KV 1100KVA transformer gave the following test results:
OC test: 11 KV.10 A, 24.3KW, SC test : 11 KV.10 A, 24.3KW.

The maximum efficiency will occur at

(a) 100% full load (b) 81% full load (c) 90% full load (d) 75% full load

4) A unity feedback system is given by its forward- path transfer function

$$G(s) = \frac{8}{s^2 (s^2 + 4s + 8)(s^2 + 3s + 12)}$$

Then the steady state error coefficients for inputs (i) r(t) = 5 and (ii) r(t) = 2t. are

(a) [$e_{ss} = 0$; $e_{ss} = 24$] (b) [$e_{ss} = 10$; $e_{ss} = 2$] (c) [$e_{ss} = 0$; $e_{ss} = 4$]
(d) [$e_{ss} = 10$; $e_{ss} = 24$]

5) The system is whose characteristic equation is given by

$$F(s) = s^6 + 4s^5 + 12s^4 + 16s^3 + 41s^2 + 36s + 72$$

Then. using R- H criterion, the system is

(a) Stable (b) Unstable (c) Marginally stable (d) Critically stable

6) For a 3 - ϕ, 50 c/s, 500km long, transmission line has the line constants per km as:
resistance / phase (r) = 0.25 ohm
reactance / phase (x) = 0.8 ohm
shunt leakage conductance per phase (g) = 0 ohm
shunt leakage susceptance per phase (b) = 5×10^{-6} mho.
Then the complex angle per unit length θ' is
(a) $2.047 \times 10^{-3} \angle 81° 19.5'$ (b) $2.047 \times 10^{-4} \angle 88° 20'$ (c) $2.047 \times 10^{-3} \angle 45°$ (d) $2.047 \times 10^{-4} \angle 45$

7) Analytically the symmetrical components of voltage $V_a = 100 \angle 0°$; $V_b = 33 \angle -100°$; $V_c = 38 \angle 176.5°$ are

(1) $V_{a1} = (50.65 + j14.32)$
$V_{a2} = (30.55 - j4.26)$
$V_{a0} = (18.79 - j10.06)$

(2) $V_{a1} = (30.55 - j4.26)$
$V_{a2} = (50.65 + j14.32)$
$V_{a0} = (18.79 - j10.06)$

(3) $V_{a1} = (18.79 - j10.06)$
$V_{a2} = (50.65 + j14.32)$
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(4) $V_{a1} = (30.55 - j4.26)$
$V_{a2} = (18.79 - j10.06)$
$V_{a0} = (50.65 + j14.32)$