EC-I Question Bank.

2 Marks Questions.

Chapter-1 (DC Generator).

1. What are the functions of Yoke.
2. What are the functions of Pole core and pole shoe.
3. What are the functions of commutator.
4. Define lap winding and wave winding.
5. Classify DC Generator.
6. What is eddy current loss.
7. Define hysteresis loss.
8. Why Laminated cores are used in DC machine.
9. How hysteresis loss is reduced.
10. Define armature reaction of DC generator.
11. What is interpole.
12. What are the functions of compensating winding.
13. What are the ~~used~~ uses of series generator.
14. What are the uses of separately excited generator.
15. Define critical resistance of shunt generator.
16. What is Build-up voltage of a shunt generator.
17. What are the conditions for parallel operation of DC generator.
18. Why parallel operation of generator is required.
19. What are the function of brush and brush is made up of which type of material.
20. What is Dummy coil.

Chapter-2 (DC Motor)

1. Define Back Emf in DC motor.
2. What is the significance of Back emf.
3. What is the condition for maximum power output of a dc motor.
4. Define Torque of a DC motor.
5. ~~Why~~ Classify d.c series motor.
6. Why a d.c series motor can not start without load.
7. Why starting torque of a d.c is high.
8. Why d.c shunt motor is a constant speed motor
9. What are the applications of d.c series motor.
10. What are the applications of d.c shunt motor.
11. What are the applications of d.c compound motor
12. What are the speed control methods of d.c series motor.
13. What are the speed control methods of d.c shunt motor.
14. What is Brake test of d.c motor.
15. What is swinburne's test of d.c motor.
16. What are the types of d.c motor.
17. Which motor is use in traction system and why.
18. Which motor is used in elevetor and why.
19. Draw the power diagram of a d.c motor.
20. Why a d.c motor called as self-regulated machine.

Single Phase Transformer (Chapter 3)

1. What is the working principle of a transformer.
2. Classify transformer.
3. What is breather of a transformer.
4. What is the function of conservator tank.
5. What is the function of explosion vent.
6. What are the cooling methods of a transformer.
7. Define leakage reactance of a transformer.
8. Define voltage regulation of a transformer.
9. Define all day efficiency of a transformer.
10. What is the condition for maximum efficiency.
11. Why parallel operation of transformers required.
12. What happened if we give dc supply to a transformer.
13. What is the difference between shell type and core type transformer.
14. Why shell type transformers are used for load testing.
15. Define hysteresis loss of a transformer.

Auto Transformer. (Chapter 4)

1. What is the difference between an ordinary ~~for~~ transformer and an auto-transformer.
2. What is the working principle of auto-t/f.
3. What are the advantages of auto transformer over two winding transformer.
4. What are the disadvantages of auto-T/f over two winding T/F.

(5) What is tap changer.
(6) What is on-load tap changer.
(7) What is off-load tap changer.
(8) What are the uses of auto transformer

Chapter-5

Instrument Transformer.

(1) What is Current transformer.
(2) What is potential transformer.
(3) Define ratio error of CT.
(4) Define ratio error of PT.
(5) Define phase angle error of CT.
(6) Define phase angle error of PT.
(7) What are the uses of CT.
(8) What are the used of PT.

5 MARKS QUESTIONS.

Chapter-1 (DC Generator).

(1) Derive Emf Equation of DC generator.

(3) Derive the condition for maximum efficiency of DC generator.

(3) Explain Hysteresis and Eddy current loss

(5) Explain O.C.C of separately excited generator.

(6) Explain O.C.C. of shunt generator.

(7) Explain External and Internal characteristics of series generator.

(8) Explain External characteristics of Compound generator.

(9) ~~Explain~~ ~~para~~ Why parallel operation of generator is necessary and what are the conditions for parallel operation.

(10) What are the conditions for Build-up of emf of DC generator.

(11) What is Critical Resistance and Critical speed of d.c shunt generator.

Chapter-2 (DC Motor)

(1) Derive Torque Equation of DC motor.

(2) Explain characteristics of series motor.

(3) Explain characteristics of shunt motor.

(4) Explain characteristics of Compound motor.

(5) Describe Field flux control method of shunt motor.

(6) Explain speed control by armature voltage Control of shunt motor.

(7) Determine efficiency of d.c ~~shunt~~ motor by ~~break test~~ Brake-test.

(8) Determine efficiency of d.c motor by swinburne's test.

(9) Explain speed control methods of d.c series motor.

(10) Derive the condition for maximum power output.

Chapter-3 (1-ϕ Transformer)

(1) Derive emf equation of a single phase transformer.

(2) Explain different types cooling arrangement used for transformer.

(3) State the procedures for care and maintenance of a transformer.

(4) Why parallel operation of transformer is necessary and what are the conditions for parallel operation.

(5) Describe short circuit test of transformer.

(6) A 10 KVA, 2400/120V, 50 Hz transformer has a high voltage winding resistance of 0.1Ω and a leakage reactance of 0.22Ω. The low voltage winding resistance is 0.035Ω and leakage reactance is 0.012Ω. Find the equivalent winding resistance and reactance ~~in~~ referred to the

(i) High voltage side.

(ii) Low voltage side.

(7) In a transformer the core loss is found to be 52 Watt at 40 Hz and 90 Watt at 60 Hz measured at same peak flux density. Compute the hysteresis loss and eddy ~~core loss~~ current loss at 50 Hz.

Chapter-4 (Auto Transformer).

(1) Explain construction and working of a Auto transformer.

(2) What are the difference between an ordinary transformer and an auto transformer.

(3) Drive saving of copper in an auto transformer.

(4) An auto transformer supplies a load of 8KW at 110 Volt at unity power factor. If the applied primary voltage is 220 Volt, calculate the power transferred to the load.
(i) inductively (ii) conductively.

Chapter-5 (Instrumentation Transformer).

(1) Explain Current transformer and what are it's uses.

(3) Explain potential transformer and what are it's uses.

10 Marks Questions.

Chapter-1 (DC Generators)

(1) Explain armature Reaction of d.c generators for different load.

(2) Explain Commutation process.

(3) A shunt generator gives full load output of 30kW at a terminal voltage of 200 Volt. The armature and shunt field resistance are 0.05Ω and 50Ω respectively. The iron and friction losses are 1000 Watt. Calculate.
(i) Generated emf (ii) Copper losses (iii) efficiency

(4) A shunt generator has F.L. current of 196A at 220V. The stray losses are 720W and the shunt field coil resistance is 55Ω. If it has a F.L. efficiency of 88%. Find the armature resistance. Also find the load current corresponding to maximum efficiency.

(5) A shunt compound machine has an armature resistance of 0.12Ω and a field resistance of 100Ω. The machine rated terminal voltage is 250V. Find ratio of speeds as a generator and motor of the current is 50A in each case.

Chapter-2 (DC Motor)

(1) What are the drawbacks of three point starter. Describe a four point starter with neat sketch.

(2) Explain speed control methods of shunt motor.

(3) A 120 Volt d.c shunt motor having an armature circuit resistance of 0.2Ω and field circuit resistance of 60Ω, draws a line current of 40A at full load. The brush voltage drop is 3 Volt and rated full load speed is 1800 r.p.m. Calculate the speed at half load.

(4) A 4 pole, 220V shunt motor has ~~450~~ 540 lap-coil conductor. It takes 32A from the supply mains and develops output power of 5.595kW. The field winding takes 1A. The armature resistance is 0.09Ω and flux per pole is 30mWb.
Calculate
(i) The speed
(ii) Torque developed in N-M.

(5) A 4 Pole, 240V, wave connected shunt motor gives 11.19kW when running at 1000 rpm and drawing armature and field current of 50A and 1A respectively. It has 540 conductors. It's resistance is 0.1Ω. Assume a drop of 1V per brush.
Find
(i) Total Torque.
(ii) Useful flux per pole.
(iii) Rotational losses
(iv) Efficiency.

Chapter-3 (1-Φ Transformer)

(1) Explain on-load and off-load tap changer with diagram.

(2) Open circuit and short-circuit tests on a 8KVA 220/440 Volt, 50 Hz, 1-Φ transformer gave the following results.

O.C test : 220 Volt, 2 amp, 100 Watt (L.V side)
S.C test : 40 Volt, 11.4 Amp, 200 Watt (h.v. side)
Determine the efficiency and approximate regulation of the transformer at full load, 0.9 P.f lagging.

(3) Explain all day efficiency of a transformer. Find all day efficiency of 500 KVA distribution transformer whose copper loss and iron loss at full load are 4.5 kW and 3.5 kW respectively during a day of 24 hours. It is loaded as under.

No of hours.	loading in kW.	P.F
6	400	0.8
10	300	0.75
4	100	0.8

(4) No load current of a transformer is 15A at power factor of 0.2 lagging when connected to a 460V, 50 Hz supply. If the primary winding has 550 turns. Calculate.

(i) The magnetising component of no-load current.

(ii) Iron loss

(iv) The Maximum value of flux in the core.

Question Bank

Analog Electronics & Op-amp.

ch-1

(Short question)

1. Define kneevoltage & depleting layer.
2. Difference between Avalanche breakdown and zener breakdown.
3. Draw the VI characteristics of Ideal diode.

Long question

4. Explain the working principle of P.N junction diode.
5. Explain the working of following circuit-
   a) clipping circuit using PN diode
   b) clamping circuit using PN diode.

ch-2

1. Define the following terms.
   a) sensor b) barretters
   c) Thermistor.
2. Explain the working of zener diode with its VI characteristics.
3. Explain the working of tunnel diode with its characteristics curve.
4. Explain the working of PIN diode with its application.

ch-3

1. Define the following terms :
   a) Ripple factor.
   b) peak inverse voltage
   c) Ripple factor.
   d) Transformer utilization factor.
   e) RMS voltage & average voltage
   f) filter circuit.
2. Explain the working of following circuit with input, output waveforms
   a) Halfwave rectifier.
   b) center tapped fullwave rectifier
   c) Bridge type fullwave rectifier.
3. Explain the working of π filter with its advantages & output waveform.

Ch 4

1. what are the modes of operation of transistor with its application.
2. Explain the working of NPN transistor with neat circuit diagram.
3. Explain transistor configuration with input & Output characteristics
   1) CB 2) CE 3) CC.

Ch-5

1. Define biasing and its requirements
2. Define the term stabilization and stability factor.
3. Explain the working of voltage divider biasing method.
4. Define Q. point of transistor.
5. Explain how Q-point affect the stability of a transistor.
6. Explain the working of transistor biasing with ckt diagram.
   a) Base resistor method.
   b) collector to base bias.

Ch-6

1. Explain the working of transistor amplifier circuit with function of different capacitor used in circuit.
2. Define DC Load line, & why it is useful.
3. Define AC Load line & How it is useful in analysis.
4. State how H-parameter analysis is useful for transistor analysis.
5. Draw the simplified h-parameter circuit of NPN transistor.

6- Draw the generalized approximate model of the following circuits.
1) CB 2) CE 3) CC amplifier.

7. Explain the working of multistage R-C coupled amplifier

8. What are the criteria for feedback circuit.

9. State the advantages of negative feedback.

10. What is the function of power amplifier.

11. Write down the difference between power amplifier and voltage amplifier

12. Explain the working of following amplifier circuits.
a) class A push pull amplifier
b) class B push pull amplifier

13. What is the function of oscillators and name different types of oscillator circuit

14. Explain the essentials of transistor oscillator circuit.

15. Discuss the principle of operation of following oscillator circuit
1) tuned oscillator circuit
2) Hartley oscillator circuit
3) colpitt oscillator circuit
4) phase shift oscillator circuit.
5) Wein bridge oscillator circuit

Ch:7

1. Write down the difference between FET & BJT.
2. State why FET is called as field effect transistor.
3. Explain the principle of operation of N channel FET & P channel FET.
4. Define pinch off voltage of FET.
5. State the function of Drain, Source & gate terminals in FET.
6. Define the following terms.
   a) AC drain resistance
   b) DC drain resistance
   c) Trans conductance
7. Explain FET biasing circuit with need circuit diagram.
8. Draw and explain the input, output characteristics of FET circuit.
9. Draw the symbols of N-FET & P-FET.

ch-08

1- Define op-amp.

2- Draw the symbol of op-amp and function of each pin of IC-741.

3. Explain the different stages of operational amplifier.

4- Draw and explain the equivalent circuit of op amp.

5. State the ideal characteristics of op amp.

6- Draw & explain the V-I characteristics of ideal open.

7- Derive the expression of gain for inverting op-amp.

8- Derive the expression of gain for a close loop non-inverting op-amp.

9. Draw the circuit of voltage follower using op-amp and where this circuit is used.

10- what the function of Beffer amplified.

11. Explain the working of following circuit using op-amp as
   1) Integrator
   2) Differentiator.

12. Explain the working of summing amplifier using opamp and derive the expression for output.

13. Discuss the working of subtracter circuit using op-amp and derive the expression for output.

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7 marks.

1- Explain PMMC instrument with sketch.
2- Discuss dynamometer type watt meter.
3- Explain single phase induction type energy meter with diagram.
4- Explain inductance measurement by Maxwell Bridge.
5- Explain principle of operation of Megger.
6- Explain measurement of capacitance by Schering Bridge.
7- Explain dynamometer type single phase power factor meter.
8- Write ~~Write~~ principle of operation of mechanical resonance type frequency meter.
9- Explain the measurement of inductance by Maxwell's Bridge Method.
10- Explain the construction and principle of Megger.
11- Explain measurement of capacitance by L.C.R Bridge method.
12- Explain measurement of 3-phase power by two wattmeter method.
13- Explain ~~measurement~~ & construction and principle of single phase dynamometer type power factor meter.
14- Write notes on Digital Multimeter.
15- Write notes on P.M.M.C Instrument.

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16- Explain the working principle of dynamometer type wattmeter.

17- Explain the working principle of attraction type M.I instrument.

18- Explain two types of controlling arrangement in indicating types of instruments.

19- Explain principle of operation of P.M.M.C instrument.

20- Explain principle of operation of Dynamometer type wattmeter.

21- Explain measurement of high resistance by loss of charge method.

22- Explain mechanical resonance type frequency meter.

23- Explain measurement of capacitance by Schering bridge method.

24- Write notes on measurement of inductance by Owen Bridge method.

25- Write notes on Digital voltmeters (DVM)

26- Write notes on Single phase induction type energy meter.

27- Write notes on Synchroscope.

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5-marks.

1- An ammeter having a range of 0-25 A having an internal resistance of 0.1 is to be used to measure upto a range of 0-120 A. Calculate the value of shunt resistance required. Show the connection diagram.

2- What is the speed error of energymeter and how it will be compensated?

3- Explain error in wattmeter due to different connections.

4- State use of P.T.

5- Explain measurement of medium resistance by Wheatstone bridge.

6- Briefly discuss digital multimeters.

7- Explain mechanical resonance type frequency meter.

8- Write principle of operation of potential transformer and state its use.

9- State the various precautions taken in using C.T.

10- Explain the measurement of medium ~~resistance~~ resistance by Wheatstone bridge Method.

11- What is creeping error in energy meter and how it can be reduced.

12- Explain Rectifier type instrument.

13- A milliammeter of range 0-50mA is require to measure a load current of 6A. The milliammeter has an internal resistance of 0.35 ohm. Calculate the value of shunt resistance necessary for it.

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14- Explain phase sequence indicators.
15- State use of C.T and P.T.
16- Explain damping arrangement in indicating instruments.
17- You have an ammeter of internal resistance 100 ohm, which can measure a maximum current of 30A. How can you extend the range to measure a maximum current of 100A. Show the circuit with ammeter.

2 marks.

1- Show the connection diagram of a 1-phase wattmeter.
2- What is deflecting torque?
3- Define Accuracy.
4- Define Resolutions.
5- Define tolerance.
6- Classify resistance.
7- What is phase sequence.
8- What is clamp-on ammeters.
9- What is controlling torque.
10- What is damping torque.
11- What is function of synchroscopes?
12- Why voltmeter is connected in parallel and ammeter in series with the load?
13- What is the use of a tong tester?
14- Classify low, medium and high resistance
15- Why mirrors are provided in measuring instruments?

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GTD
Generation Transmission & Distribution
Question Bank

2 Marks

1. Function of an economiser in a thermal power station?
2. What is the function of air-preheater in thermal power plant?
3. Function of precipitator in thermal power plant?
4. What is the function of surge tank?
5. What is voltage regulation of a transmission line?
6. What is corona? What are the factors affecting corona?
7. Define sag.
8. State the classification of overhead transmission line on it's voltage and distance.
9. What is grading of cable?
10. Define armouring of cable?
11. What is Ring main system.
12. Define load factor
13. Define and explain peak load and base load on power station.
14. Define maximum demand.
15. What is power factor?
16. Define plant capacity factor.
17. Define diversity factor.
18. Define demand factor.
19. What is load curve.
20. What is two-part tariff.

(21) Define flat rate tariff.

(22) What are the advantages of EHV transmission?

(23) What are the drawback of low power factor.

(24) Where shackle insulators are used?

5 Marks

(1) State and explain Kelvin's law for economical size of conductor.

(2) What is corona ? State methods of reducing corona.

(3) Explain different types of insulators used in overhead lines.

(4) Draw the layout of transmission and distribution scheme.

(5) Discuss various types of line supports.

(6) State advantages and limitation of HVDC transmission system.

(7) Derive the expression for voltage regulation and efficiency for medium transmission line using nominal T-method.

(8) Explain different types of D.C. distributors.

(9) With neat diagram, explain the construction of an underground cable.

(10) Define tariff. State the different types of tariff with its desirable characteristics.

(11) What are the causes of low power factor and how it can be improved ?

(12) The following two tariffs are offered,
(i) Rs. 100 plus 15 paise per unit
(ii) A flat rate of 30 paise per unit
At what consumption is first tariff economical ?

(13) Give a layout of L.T substation.

10 Marks

(1) Explain thermal power station with a neat sketch.

(2) Explain with block diagram the working of a nuclear power plant.

(3) Explain Hydro power station with a neat sketch.

(4) Derive an approximate expression for sag in overhead line when (a) supports are at equal levels and
(b) supports are at unequal levels

(5) The tower of height 50 mt. and 90 mt. respectively support a transmission line conductor at water crossing. The horizontal distance between the tower is 500 mt. if the tension in the conductor is 1600 kg. Find the minimum clearance of the conductor and water and clearance mid-way between the support. weight of conductor is 1.5 kg/mt. Base of the tower can be considered to be at water level.

(6) An over-head transmission line conductor having a parabolic configuration weighs 1.925 kg/mt. of length. The area of X-section of conductor is 2.2 cm^2 and the ultimate strength is 8000 kg/cm^2. The supports are 600 mt. apart having 15 mt. difference of levels. Calculate the sag from the taller of the two supports which must be allowed. So that the factor of safety shall be 5. Assume that ice load is 1 kg per mt. run and there is no wind pressure.

(7) A transmission line has a span of 214 mt. Between level supports. The conductors have a cross-sectional area of 3.225 cm^2, calculate the factor of safety under the following condition.

vertical sag = 2.35 mt
wind pressure = 1.5 kg/m (run)
Breaking stress = 2540 kg/cm^2
weight of conductor = 1.125 kg/m (run)

(8) What is the maximum length in km for a 1-ϕ transmission line having copper conductor of 0.775 cm² cross-section over which 200 kw at unity p.f and at 3500 volt are to be delivered? The efficiency of transmission is 90%. Take Specific resistance as 1.725 μΩ-cm.

(9) A medium single phase transmission line 100 km long has the following constant.

Resistance/km = 0.25Ω

Susceptance/km = 14×10^{-6} siemen

Reactance/km = 0.8Ω

Assuming that the total capacitance of the line is localised at the receiving end alone, determine

(i) sending end current
(ii) the sending end voltage
(iii) The voltage Regulation
(iv) supply power factor.

(10) A two-wire d.c distributor AB, 600 mt long is loaded as under:

Distance from A (in mt) :	150	300	350	450
Load in Ampere :	100	200	250	300

The feeding point A is maintained at 440 V and that of B at 430 V. if each conductor has a resistance of 0.01Ω per 100 mt, calculate

(i) The current supplied from A to B
(ii) The power dissipated in the distributor.

(11) A 2-wire DC distributor AB is 300 mt long. It is fed at point A. The various loads and their position are given below.

At point	Distance from A in mt.	Concentrated load in Amp
C	40	30
D	100	40
E	150	100
F	250	50

If the maximum permissible voltage drop is not to exceed 10V, find the cross-sectional area of the distributor.

Take $\rho = 1.78 \times 10^{-8}$ Ω mt.

(12) Describe the murray loop test for location of fault in the under ground cable for both earth fault and short-circuit fault.

(13) Describe the various methods of lying underground cables. What are the relative advantages and disadvantages of each method.

(14) Draw layout of E.H.T substation and write function of its components.