

Scheme –G
Sample Test Paper-I

Course Name :- Diploma in Mechanical Engineering Group

Course Code :- ME/MH/MI/PG/PT

Semester :- Fourth

17404

Subject Title :- Electrical Engineering

Marks :- 25

Time: 1 hour

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary

Q1. Attempt any THREE

(9 Marks)

- a) Define following terms for A.C.
 - i) Peak value
 - ii) Average value
 - iii) RMS value
- b) State the standard voltages for the followings in India.
 - i) Generating voltage
 - ii) Primary distribution
 - iii) Secondary distribution
- c) State the method of damping used in following meters.
 - i) MI
 - ii) PMMC
 - iii) Dynamometer
- d) State the applications of following DC motors.
 - i) Shunt
 - ii) Series
 - iii) Compound

Q2. Attempt any TWO

(8 Marks)

- a) Draw the three phase star circuit showing line and phase voltages and currents.
- b) Describe the construction of PMMC instrument with the help of diagram.
- c) Describe the working principle of single-phase transformer with the help of diagram.

Q3. Attempt any TWO

(8 Marks)

- a) Find the equation of current i when voltage of $v = V_m \sin \omega t$ is applied to a pure R-L circuit. Draw the waveform for current and voltage.
 - b) Three 50Ω resistors are connected in star across 400 volts, three-phase supply. Calculate the line current, phase current and power taken from the mains. What would be the power taken from the mains, if one of the phase is disconnected.
 - c) A series combination of a resistance and inductance when connected across 100 V d.c. supply dissipates 500 W of power. When connected across 100 V (r.m.s.) a.c. supply of frequency 50Hz, it dissipates 200 W of power. Calculate the values of resistance and inductance of the combination.
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Scheme –G

Sample Test Paper-II

Course Name :-Diploma in Mechanical Engineering Group

Course Code :- ME/MH/MI/PG/PT

Semester :- Fourth

17404

Subject Title :- Electrical Engineering

Marks :- 25

Time: 1 hour

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary

Q1. Attempt any THREE

(9 Marks)

- a) Define following terms.
- i) Slip
 - ii) Rotor speed
 - iii) Synchronous speed
- b) Suggest a suitable single phase motor for following.
- i) Mixer-grinder
 - ii) Bench grinder
 - iii) Bench type drilling machine
- c) State any one application of following motors.
- i) Universal motor
 - ii) Servo motor
 - iii) Stepper motor
- d) State the principle of electroplating.

Q2. Attempt any TWO

(8 Marks)

- a) Describe the construction of manual star delta starter with the help of diagram
- b) Describe the principle of operation of shaded pole motor with the help of diagram.

- c) Describe the torque-slip characteristics of three phase squirrel cage induction motor.

Q3. Attempt any TWO

(8 Marks)

- a) A 8-pole alternator runs at 750 rpm, supplies power to 6-pole, three-phase induction motor, which has a full load slip of 3 percent. Find the full load speed of induction motor.
- b) Three –phase, 4 pole induction motors takes a supply from 50 Hz supply system. Calculate synchronous speed, speed of motor when slip is 4% and rotor current frequency when the motor runs at 600 rpm.
- c) “MCBs are safer than fuse kit-kat”. Justify the statement.
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Scheme –G
Sample Question Paper

Course Name :- Diploma in Mechanical Engineering Group

Course Code :- ME/MH/MI/PG/PT

Semester :- Fourth

17404

Subject Title :- Electrical Engineering

Marks :- 100

Time:3 hour

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1 Attempt any TEN of the following.

(20 Marks)

- a) Define i) RMS value ii) Average value
- b) State the expansion of following terms
 - i) PMMC
 - ii) MI
- c) State any two applications of digital multi- meter.
- d) State working principle of DC motor.
- e) What is transformation ratio? Write its formula.
- f) State any two applications of transformer.
- g) Define i) slip ii) synchronous speed.
- h) State the expansion of following terms
 - i) LED
 - ii) CFL
- i) State any two methods of power factor improvement.
- j) State, how you will reverse the direction of rotation of three-phase induction motor?
- k) State, why alternators driven by steam turbines are non-salient type rotors?
- l) State the working principle of electroplating.

Q2. Attempt any FOUR of the following.

(16 Marks)

- a) Define the following terms related to AC
 - i) Cycle
 - ii) Frequency
 - iii) time period
 - iv) Amplitude
- b) Study the figure 1 and answer following questions.

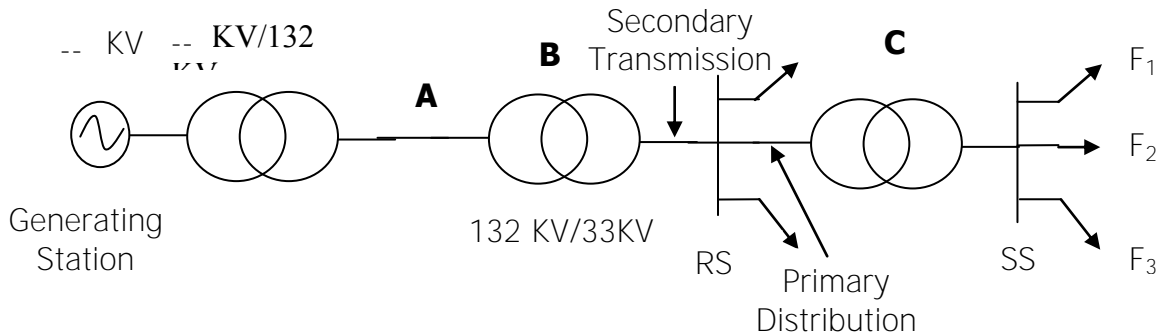


Figure 1

- (i) What is the generating voltage in India?
- (ii) Which part is shown by 'A'?
- (ii) State the meaning of symbol shown at 'B' point.
- (iii) State the voltage rating of equipment at point 'C'.
- c) State relation between phase and line current and phase and line voltage of the following system:
 - i) Star connected balanced system
 - ii) Delta connected balanced system
- d) A pure resistance R is connected in series with a coil of pure inductance L connected to AC supply V. Answer the following.
 - i) Draw the circuit diagram showing current, voltages.
 - ii) Write the formula for the voltage across resistance and inductance.
 - iii) Draw the wave form for the same.
- e) Three resistances of 25 ohm each connected in delta to a 3 phase 400 volt ac supply. Draw the circuit diagram. And calculate its line & phase current & phase voltage.
- f) Describe the working of electro-dynamometer type wattmeter with the help of diagram.

Q3. Attempt any FOUR of the following.

(16 Marks)

- a) Draw the speed-torque characteristics of DC shunt and series motor. And State why, series motor is used as a traction motor.
- b) Write EMF equation of a single phase transformer and state the meaning of each term in it.
- c) What is auto transformer? Draw its diagram. Is it different than variac and dimmerstat? If, yes state the difference.
- d) An alternating current i is given by-
$$i = 141.4 \sin 314t$$

Calculate the maximum value, frequency, time period and the instantaneous value when t is 3ms.
- e) A coil having a resistance of 7 ohm and the inductance of 31.8 mH is connected to 230 V, 50 Hz supply. Calculate the circuit current, phase angle, power factor and power consumed.
- f) Draw the experimental set up for direct loading test on single-phase, 1 KVA, 230/115 V transformer. List the proper ratings of meters with their ratings for the same.

Q4. Attempt any FOUR of the following.

(16 Marks)

- a) Define voltage regulation and efficiency of single phase transformer.
- b) State any one application of following single-phase motors:
 - i) Resistance split phase motor
 - ii) Capacitor start- induction run motor
 - iii) Shaded pole motor
 - iv) Universal motor
- c) State necessity of starter for three phase induction motor. Which types of starter you will be suggest for following motors.
 - i) Three-phase, 440 V, 3 HP squirrel cage induction motor.
 - ii) Three-phase, 440 V, 15 HP squirrel cage induction motor.
- d) State any four types of enclosures with one application each used for electric drives.
- e) Describe the construction of universal motor with the help of diagram.

- f) Describe the construction of salient pole type rotor of an alternator with the help of diagram. State, why this type of rotors are suitable for alternators of water turbines.

Q5. Attempt any FOUR of the following.

(16 Marks)

- a) Describe the speed control of three-phase induction motor using VFD drive with the help of block diagram.
- b) Describe the working of DOL starter used for three phase induction motor, with the help of diagram.
- c) State different types of electric heating methods. Describe any one with the help of diagram.
- d) A 50 Hz, four pole, three-phase induction motor has a rotor current frequency of 2 Hz. Determine slip and speed of the motor.
- e) State the basis for preferring Flash butt welding to upset butt welding?
- f) “Electrical drives are preferred over mechanical drives”. Justify the statement.

Q6. Attempt any FOUR of the following.

(16 Marks)

- a) Describe electric arc welding. Also State its types.
 - b) Describe plate earthing with the help of diagram.
 - c) Compare kit-kat fuse and MCB on the basis of
 - i) Cost
 - ii) operation
 - iii) safety
 - iv) service
 - d) Draw the complete circuit of fluorescent lamp and state the functions of starter and choke.
 - e) Which resistance heating method, will you use in salt bath furnaces? State reasons.
 - f) A circular wood saw machine installed in a workshop is having a three phase induction motor with DOL starter. When a start button of a starter is pressed motor starts and run in satisfactory condition. When a wooden stick is inserted slowly saw cuts the wooden stick. If wooden stick is inserted giving more pressure on stick, motor stops suddenly. State the causes and remedies for such fault.
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