5th Sem. COMMON 2020(W)

Th1- Entrepreneurship and Management & Smart Technology

Full Marks: 80   Time- 3 Hrs

Answer the questions as per the instruction.
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

a.   Write the full form of NABARD.

b.   Enlist at least four characteristics of an entrepreneur.

c.   Why should an entrepreneur prepare the project himself?

d.   Define financial management.

e.   Distinguish between debit and credit.

f.   Define market.

g.   Why does an organization need advertisement?

h.   Differentiate a manager with a leader.

i.   Define IoT.

j.   Define IPR (Intellectual Property Right).

2.   Answer **Any Six** Questions   5 x 6

a.   Differentiate entrepreneur with manager.

b.   What are the factors to be taken into account to select a technology
for an enterprise?

c.   Write the objectives of financial management.

d.   Write the different functions of marketing.

e.   Briefly discuss different types advertising media.

f.   Briefly explain the functions of HRM.

g.   Briefly discuss the smart transportation system, the advantages and

disadvantages related to it.

h. Explain the Maslow's theory of motivation.

3   Answer any three questions   10x3

a. Briefly explain different barriers in entrepreneurship.

b. How do you select a business opportunity? Explain different components (at least five) related to business opportunity.

c. What is PPR (Preliminary Project Report)? Briefly explain the structure of PPR.

d. Explain the five functions of management briefly.

e. Briefly explain the general recruitment process in an organization.

f. Briefly explain different types of budgets.

5TH SEM./ ELECTRICAL/2020(W)NEW
TH2-ENERGY CONVERSION II

Full Marks: 80   Time: 3 Hours

Answer any Five Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.   Answer all the questions   10x2
  a)   Define slip speed in 3 phase induction motor and state its equation.
  b)   What is plugging in 3 phase induction motor?
  c)   Define pitch factor in alternator and state its value.
  d)   What is the purpose of damper windings in alternators?
  e)   State two applications of synchronous motor.
  f)   What are the V-curves in synchronous motor?
  g)   Define step angle in stepper motor and state its value.
  h)   How a single phase induction motor is made self starting?
  i)   What is the function of compensated winding in compensated repulsion motor?
  j)   How the direction of rotation of split phase induction motor can be reversed?

2.   Answer any six questions   6x5
  a)   Explain the principle of operation of synchronous motor in details.
  b)   Describe the power flow stages in 3 phase induction motor with a neat diagram.
  c)   Derive the relation between torque and rotor power factor in 3 phase induction motor.
  d)   Explain about the determination of voltage regulation of alternator by synchronous impedance method.
  e)   Describe about types of rotors in alternators in details.
  f)   Write a short note on capacitor start induction run motors.
  g)   Explain the 1-phase ON or full step operation in variable reluctance stepper motor briefly.

3.   Derive the relationship between rotor input, mechanical power & copper loss in 3-ph induction motor.   10
4.   Explain about the double field revolving theory in 1-phase induction motor with torque-slip graph.   10
5.   Describe the synchronizing of 3 phase alternator using two bright and one dark lamp method.   10
6.   Write a short note on (a)Direct-On-Line starter (b)Parallel operation of alternators.   10
7.   Explain the effect of excitation on armature current and power factor in synchronous motor in details.   10

5TH SEM /ELECTRICAL/ 2020(W)NEW
Th3- Digital Electronics & microprocessor

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions   2 x 10

    a. What do you mean by Radix of a number?

    b. What is the difference between combinational and sequential logic circuit?

    c. What is the function of ALE in 8085 microprocessor?

    d. Define modulus of a counter.

    e. What are the various modes of 8255 programmable peripheral interface?

    f. Distinguish between a multiplexer & a demultiplexer.

    g. Write down the hardware interrupts in 8085 microprocessor.

    h. What is Race around condition in JK flip-flop?

    i. Find the 2's complement of $(110101.01)_2$.

    j. What are the various flag registers available in 8085 microprocessor?

2. Answer **Any Six** Questions   6 x 5

    a. Explain the working of JK flip-flop with the truth table.

    b. What is half adder? Design a full adder circuit using half-adder and OR gate.

    c. State and prove De-morgan's theorem.

    d. Discuss the various types of addressing modes of 8085 microprocessor with suitable examples.

    e. Explain the function of 1:4 Demux circuit with a neat diagram and write its truth table.

    f. Draw the timing diagram for MVI B, 05_H.

    g   Write an assembly language program to add two 8-bit decimal numbers, sum may be of 16 bits.

3   Design a 2-Bit magnitude comparator circuit and explain its operation.   10

4   Draw the functional block diagram of Intel 8085 microprocessor and explain the function of each block.   10

5   Simplify and minimise the four variable logic expression using K map: 10

f(A,B,C,D)=∑ m(0,1,2,3,5,7,8,9,10,12,13) & implement the real minimal expression in universal logic.

6   With a neat block diagram design a traffic light controller & write an assembly language program using 8255 Programmable peripheral interface.   10

7   Design a 4-bit Asynchronous counter & draw its timing diagram.   10

5th SEM / ELECTRICAL /2020(W) NEW
TH4-UTILIZATION OF ELECTRICAL ENERGYAND TRACTION

Full Marks: 80   Time : 3 Hours

Answer any Five Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1. **Answer all the questions**   10x2

   a) Define(i) Current efficiency (ii)MHSCP

   b) What do you mean by invert squares law in illumination?

   c) State the groups of systems of electric Traction.

   d) State the applications of three phase synchronous motor.

   e) What is group drive? Give an example.

   f) What is dielectric heating?

   g) State Faraday's First Law of Electrolysis.

   h) What is resistance welding? Give an example.

   i) Name any two types of arc furnaces.

   j) What are polar curves and state their uses.

2. **Answer any six questions**   6x5

   a) Describe about the magnetic braking in electric traction briefly.

   b) Describe the extraction of aluminium in fused electrolyte process briefly.

   c) Describe about the working principle of fluorescent tube with a neat diagram.

   d)   Explain the DC system of track electrification in electric traction briefly.

   e) Explain the operating principle of Indirect Arc Furnace with a neat sketch.

   f) Write a short note on metal arc welding.

   g) Differentiate between DC and AC arc welding.

3. Describe the factors affecting the electro-deposition in electrolytic cell in details.   10

4. Explain the factors on which the design of simple lighting schemes depends.   10

5. Describe the three modes of Heat Transfer in substances briefly.   10

6. Explain about the dielectric heating in charge between parallel metal plates. Also write their   10
   advantages and applications in details.

7. Write a short note on i) Seam welding ii) speed control of DC Traction motors by series-parallel   10
   control method.

Full Marks: 80   Time- 3 Hrs
Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a. Differentiate between DIAC and TRIAC.
   b. Define Phase Angle and Extinction angle of controlled rectifier.
   c. Define latching current and holding current of SCR.
   d. Draw the Snubber circuit to protect SCR.
   e. What is freewheeling diode and why it is needed?
   f. What is SMPS? Why it is preferred in comparison to linear regulator?
   g. What is natural commutation? Where it is used?
   h. Define reliability of SCR and Mean Time Between Failure (MTBF).
   i. What are different modules in PLC?
   j. What is the purpose of latch coil?

2.   Answer **Any Six** Questions   6 x 5
   a. Explain briefly different TURN ON methods of SCR.
   b. Explain briefly R-firing triggering circuit of SCR.
   c. Explain principle of operation of step-up chopper with resistive load with proper circuit diagram and waveform.
   d. Draw the schematic diagram of single phase full bridge inverter (without commutation circuit) and explain its operation.
   e. With neat diagram explain the Class B commutation of SCR.
   f. Draw the ladder diagram for full adder circuit.
   g Explain different types of timers in PLC.

3   Explain operation of single phase full wave converter with RL load &   10
      freewheeling diode.

4   Describe the different chopper configurations (Class A, Class B, Class C, Class D   10
      only)

5   Explain operation of online and offline UPS with neat circuit diagram.   10

6   Explain with a neat circuit diagram, Step-up and Step-down midpoint cyclo-   10
      converter.

7   Draw the block diagram of PLC system and explain each block in detail.   10

TH-II   Energy Conversion-II

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   Write the advantages of short pitch winding over full pitch winding.

   b.   What do you mean by Hunting?

   c.   Why damper bars are used in synchronous motor?

   d.   Write the maintenance schedule of power transformer.

   e.   Why centrifugal switch is used single phase induction motor?

   f.   Define pitch factor and write its value for full pitch winding.

   g.   Name the sources of Harmonics.

   h.   Write the four application of Hybrid stepper motor.

   i.   Why Synchronous motor is not self-starting?

   j.   What are the condition of synchronization 3 phase Transformer.

2.   Answer **Any Six** Questions   5X6

   a.   Derive the EMF equation of synchronous generator.

   b.   Explain briefly Torque- slip characteristics of 3 phase induction motor with the help of characteristics diagram.

   c.   A 4 pole,3 ph induction motor operates from a supply is 50Hz, calculate
         (i)   The speed at which the magnetic field of the stator is rotating.
         (ii)   The speed of the rotor in which slip is 0.04
         (iii)   The frequency of the rotor currents when the slip is 0.03

   d.   Explain briefly working principle and application of shaded pole induction motor with the help of diagram.

   e.   With the help of diagram explain armature reaction of an alternator and its effect at different power factor of load.

f. Explain briefly the effect of varying excitation with constant load in synchronous motor.

g A synchronous motor having 40% reactance and a negligible resistance is to be operated at rated load at (i) unity p.f (ii) 0.8 p.f lag (iii) 0.8 p.f. lead. What is the value of induced e.m.f?

3 a. Explain briefly working principle and application of Universal motor.   5

   b. Write short note on Plugging.   5

4   A 3 phase induction motor having a 6 pole, star connected stator   10
     winding runs on 240V, 50 Hz supply. The rotor resistance and
     standstill reactance are 0.12Ω and 0.85 Ω per phase. The ratio of
     stator to rotor turns is 1.8. Full load slip is 4%. Calculate the
     developed torque at full load, maximum torque and speed at
     maximum torque.

5   From the following rest results, determine the voltage regulation of   10
     a 2000V, 1-phase alternator delivering a current of 100A at (i) unity
     p.f. (ii) 0.8 leading p.f. and (iii) 0.7 lagging p.f.
     Test results: Full – load current of 100 A is produced on short circuit
     by a field excitation of 2.5A. An e.m.f of 500v is produced on open
     circuit by the same excitation. The armature resistance is 0.8Ω.

6   Write the condition for parallel operation of an alternator and   10
     explain it by using dark and bright lamp method.

7   Calculate the R.M.S value of the induced e.m.f per phase of a 10-   10
     pole, 3-phase, 50Hz alternator with 2 slots per pole per phase and 4
     conductors per slot in two layers. The coil span is 150 degree. The
     flux per pole has a fundamental component of 0.12wb and a 20%
     third component.

TH-III DIGITAL ELECTRONICS AND MICROPROCESSOR

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   Which codes are known as self-correcting codes and why?

   b.   Why de-multiplexers are referred to as data distributors?

   c.   Define racing condition.

   d.   State De- Morgan's theorem.

   e.   Write down the truth table of a 2 input Exclusive-OR gate?

   f.   Solve $(1010)_2$-$(1010)_2$ using 1's complement.

   g.   What is the function of ALU in 8085 microprocessor?

   h.   What do you mean by program counter?

   i.   Why interfacing is required in microprocessor?

   j.   Define opcode and operand.

2.   Answer **Any Six** Questions   6 x 5

   a.   Explain the working of 4:2 encoder with diagram.

   b.   With a neat diagram explain the operation of SISO and PIPO register.

   c.   Show the logic diagram of a clocked SR flip flop. Explain its working with a functional table.

   d.   Which gates are referred to as universal gates and why? How other gates can be realized using NOR gates?

   e.   Define stack, stack top and stack pointer and why it is essential.

   f.   Draw the timing diagram of MOV A instruction of 8085 microprocessor with neat sketch.

   g   Write an assembly language program for addition of two 8-bit number and sum is 16-bit using 8085 instructions.

3   Design a MOD-10 counter and explain it.   10

4   Draw the functional block diagram of 8085 microprocessor and explain function   10
         of each block.

5   Simplify and minimize the four variable logic expression using k-map   10
         F(A,B,C,D)=ΣM(2,3,4,5) +d(10,11,12,13,14,15)

6   Design a 2 bit comparator circuit whose outputs are P>Q, P<Q and P=Q where P   10
         and Q are each 2 bit nos.

7   Design a traffic light controller with a neat interfacing diagram with 8085   10
         instruction and explain it.

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Th4 - Utilization of Electrical Energy and Traction

Full Marks: 80   Time 3Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   What is Lambert's Cosine Law in illumination?
   b.   State any two applications of three phase induction motor.
   c.   What is Faraday's Second Law of Electrolysis?
   d.   What are the groups of systems of electric Traction?
   e.   Define(i) Energy efficiency (ii)MHSCP
   f.   Name any two types of arc welding.
   g.   State Stephen's law in electrical heating and the mode of heat transfer associated with it.
   h.   Write any two advantages of Vertical core type Induction furnace.
   i.   What is resistance welding? Give an example.
   j.   Write any two differences between DC and AC arc welding.

2.   Answer **Any Six** Questions   5X6
   a.   Describe the extraction of aluminium in fused electrolyte process briefly.
   b.   Describe about the working principle of gas-filled lamp with the help of a neat diagram.
   c.   Explain the speed control of DC Traction motors by Series-Parallel control method.
   d.   Write a short note on Individual Drives.
   e.   Explain the single phase AC system of track electrification briefly.
   f.   Describe about the polar curves in illumination, and their uses with a neat diagram.
   g   Explain the working principle of Indirect Arc Furnace with a neat sketch.

3   Describe the constructional features and operation of High Pressure   10
        Mercury Vapour lamp in details

4   Write a short note on i)spot welding ii) single phase AC system of   10
        track electrification.

5   Describe the three modes of Heat Transfer in substances briefly.   10

6   Write a short note on i) projection welding ii) speed control of DC   10
        Traction motors by Tapped field control method.

7   Explain the factors on which the design of simple lighting schemes   10
        depends.

5th Sem./ETC/ELECTRICAL/EME/EEE/ ELECTRICAL(INST & CTRL)/ECE/ 2021(W)

Th5 Power Electronics & PLC

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.　　　Answer **All** questions   2 x 10

a.　Define latching current and holding current.

b.　Write the full form of GTO & IGBT.

c.　Define firing angle (α), Conduction angle (γ) and Extinction angle (β).

d.　Differentiate between DIAC and TRIAC

e.　Define Snubber circuit.

f.　Write down the need of a freewheeling diode in a circuit.

g.　Define inverter and write any two applications of inverter.

h.　Define SMPS and mention any two of its advantages over voltage regulators.

i.　Draw the symbol for NO, NC and Output Coil.

j.　List down any two applications of PLC.

2.　　　Answer **Any Six** Questions   6 x 5

a.　Describe briefly different Turn ON Methods of SCR.

b.　Explain the operation and construction of IGBT and its application.

c.　With neat circuit diagram explain the working of Step-down Chopper.

d.　Explain the operation of single phase half bridge voltage source inverter with resistive load.

e.　Draw the block diagram of SMPS and explain its operation.

f.　Draw the ladder diagrams of AND, OR, NAND, NOR & XOR gates.

g　Explain different parts of PLC by drawing the Block diagram and also explain the purpose of each part of PLC.

3　　Explain the construction, operation of SCR and draw its V-I characteristics curve.　　10

4　　With neat circuit diagram and waveforms explain about RC-firing of SCR.　　10

5　　Explain with circuit diagram and waveforms of the operation of fully (full wave) controlled single phase bridge converter with Restive load.　　10

6　　Draw the diagram of a single phase to single phase Step down Cyclo-converter (mid-point) with pure Resistive load and explain and draw its waveform　　10

7　　Define UPS & Explain the working of on-line and off-line UPS system.　　10

5TH SEM./ COMMON / 2022(W)

Th-1 ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY

Full Marks: 80　　　　　　　　　　　　　　　　　　　Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right-hand margin indicates marks.

1.	Answer **All** questions	2 x 10
a.	Name two barriers in entrepreneurship.	2
b.	Write two advantages of preliminary project report.	2
c.	Write two techniques /models of inventory management.	2
d.	How does branding helps manufacturers, retailer and consumers?	2
e.	Name two symptoms of bad management.	2
f.	Write two primary responsibilities of Human Resource Department in an industry.	2
g.	Write two functions of a leader.	2
h.	Name four personal protective equipment used in industry.	2
i.	Write two applications of break-even analysis.	2
j.	Write two applications of smart agriculture.	2
2.	Answer **Any Six** Questions	6 x 5
a.	Compare between an entrepreneur and manager	5
b.	Write a short note on a successful Indian Entrepreneur. Mention any five quality in him/her.	5
c.	Explain the role of District Industry Center in promoting enterprises. List any five supports provided by DIC to entrepreneur.	5
d.	What are the parameters used to decide the plant capacity in a project?	5
e.	What is TQM? Explain the need of TQM in small enterprises.	5
f.	Write any five safety provisions in Factory Act,1948?	5
g	Explain the techniques of motivation.	5
3	a. What is Technology Business Incubator? Explain with example. b. Explain the success story of an Indian start up.	10
4	Explain the components of Techno economic feasibility report.	10
5	Explain delivery schedule, market need and inventory control in production planning and control.	10
6	Write the Concept of IoT and how does it work.	10
7	Explain the management of working capital	10

Th2   Energy Conversion-II

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

a.   Define distribution factor.

b.   What are the effects of armature reaction?

c.   Define hunting in a synchronous motor.

d.   Write two applications of synchronous motor.

e.   Define slip and slip speed.

f.   Write down the condition of maximum torque in 3-phase induction motor.

g.   What are the methods to change the direction of rotation of capacitor start, capacitor run motor?

h.   What are the types of stepper motor?

i.   Write down two applications of series motor.

j.   Write down two advantages of grouping of winding in 3-phase transformer.

2.   6 x 5

a.   Derive the expression of distribution factor of an alternator.

b.   Write a short note on V-curve of synchronous motor.

c.   What are the losses of an induction motor? Draw the power flow diagram of an IM.

d.   Draw and explain torque-sip characteristic of 3-phase induction motor.

e.   Explain the construction and working principle of universal motor.

f.   Briefly explain about the working principle of hybrid stepper motor.

g   What are the conditions of parallel operation of 3-phase transformer?

3   a.   A 500 volt, 50 kVA alternator having effective resistance of 0.2Ω, if an excitation current   05
of 10 A produces 200 A armature current on short circuit and an emf of 450 volts on
open circuit then calculate the value of synchronous reactance.

b.   A 4-pole, star connected alternator is rated at 15 kVA , 415 volt. The synchronous   05
reactance is 5Ω/phase. The dc voltage of 25 volt applied across the terminal causes a
current of 25 A. Calculate the voltage regulation for a load of 10 kVA at 0.8 p.f lag .

4   A slip ring IM develops a maximum torque of 4 times the full load torque at a slip of 0.2.   10
The per phase rotor resistance is 0.04Ω. The stator resistance and rotational losses are
negligible. Calculate (i) the slip at full load torque.(ii) the external resistance to be added
to obtain maximum torque at starting.

5   Explain double revolving field theory to produce starting torque of 1-phase induction   10
motor.

6   Explain the construction, working principle and torque-speed characteristic of a shaded   10
pole motor.

7   Explain the construction, working principle & running characteristic of single phase   10
series motor.

Th-3 Digital Electronics & Microprocessor

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   - a. Construct the truth table of NAND and XOR gate.
   - b. Convert the following hexadecimal numbers to binary.
        - (i)   F297   (ii)   E79A.6A4
   - c. Simplify the expression $F = BD + BC\bar{D} + A\bar{B}\bar{C}\bar{D}$
   - d. Why is a multiplexer called a data selector?
   - e. What do you mean by toggling?
   - f. Write down the transition table for D-flipflop.
   - g. Write down the function of following signal of 8085.
        - (i)   HOLD   (ii) S_0& S_1
   - h. How many machine cycles are required by the following instructions of 8085?
        - (i)   IN 08H;
        - (ii)   LXI H, 2450H;
        - (iii)   MVI B,15H;
        - (iv)   MOV C,M;
   - i. Give 2 example of instructions for data transfer group and logical group.
   - j. What are different operating modes of 8255?

2.   Answer **Any Six** Questions   6 x 5
   - a. Obtain the real minimal expression for f = $\sum m(0,2,4,6,7,8,10,12,13,15)$ and implement it using universal gates.
   - b. Given $\overline{AB} + \bar{A}B = C, find\ \overline{AC} + \bar{A}C$.
   - c. Discuss half adder circuit, truth table and implement by using NOR gate.
   - d. Design 4-bit asynchronous counter with logic diagram, timing diagram and truth table.
   - e. What are various status flags provided in 8085 microprocessor and discuss their role.
   - f. Draw the timing diagram for the instruction MVI C,12H.
   - g. Write an assembly language program to add two 8-bit numbers, the sum may be of 16 bits.

3	With a neat block diagram explain the architecture of 8085 microprocessor and explain function of each block.	10
4	Explain different addressing modes of 8085 microprocessor with examples.	10
5	Draw the block diagram of PPI 8255 and describe each block.	10
6	With neat diagram explain the working of serial-in serial-out and parallel-in serial-out shift registers with truth table.	10
7	Draw the circuit diagram of edge triggered JK flip-flop and explain its operation with the help of a truth table. How is the race around condition eliminated?	10

5TH SEM./ELECTRICAL /2022(W)

Th-4   Utilization of Electrical Energy and Traction

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

a.   State Faraday's First Law of Electrolysis.
b.   Define(i) Energy efficiency (ii)MHSCP
c.   Write any two advantages of Vertical core type Induction furnace.
d.   State the groups of systems of electric Traction.
e.   Why primary winding coils are made hollow in coreless induction furnace?
f.   What do you mean by invert squares law in illumination?
g.   Write any two applications of electrolysis.
h.   State Stephen's law in electrical heating and the mode of heat transfer associated with it.
i.   What are the applications of DC motors?
j.   What is resistance welding? Give an example.

2.   Answer **Any Six** Questions   6 x 5
a.   Describe about the polar curves in illumination in details.
b.   Write a short note on metal arc welding using a neat circuit diagram.
c.   Explain the extraction of zinc from zinc oxide in electrolyte process briefly.
d.   Explain about the magnetic braking in electric traction briefly.
e.   Describe the operating principle of dielectric heating with its applications.
f.   Describe about the working principle of gas-filled lamp with a neat diagram.
g   Differentiate between DC and AC arc welding.

3   Explain the factors on which the design of simple lighting schemes depends.   10
4   Explain the three modes of Heat Transfer in substances briefly.   10
5   Explain the speed control of DC Traction motors by Metadyne control method   10
     briefly.
6   Describe the factors affecting the electro-deposition in electrolytic cell in details.   10
7   Write a short note on i)Projection welding ii) Single phase AC system of track   10
     electrification.

5TH SEM./ ELE & MECH/ ELE AND ETC/ ELECTRICAL/ EE(INST & CONT) / ETC & COMM./ ETC & TELECOMM / 2022(W)

Th-5   Power Electronics and PLC

Full Marks: 80   Time- 3 Hours

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.	Answer **All** questions	2 x 10
a.	Define pinch off voltage of MOSFET.	
b.	Why power factor of semi converter is better than full converter?	
c.	What is meant by commutation of SCR and list its types.	
d.	What is meant by phase control?	
e.	What is constant frequency control of chopper?	
f.	What is the function of feedback diodes in bridge inverter?	
g.	What is cycloconverter? List its types.	
h.	Name any two applications of SMPS.	
i.	Draw a neat sketch of battery charger.	
j.	List any four logical and arithmetic instructions in PLC.	

2.	Answer **Any Six** Questions	6 x 5
a.	Discuss why TRIAC is rarely operated in I quadrant with -ve gate current and in III quadrant with +ve gate current.	
b.	Discuss the operation of single-phase half wave-controlled converter with RL load with neat diagram.	
c.	Explain the operation of step up chopper and derive an expression for its output voltage.	
d.	Explain gate triggering of thyristor by R-C firing.	
e.	Explain single phase full wave AC regulator.	
f.	Develop ladder diagram of DOL & STAR-DELTA starter.	
g	Explain CTD & CTU instruction of PLC.	

3	Describe the UJT triggering circuit with neat sketch.	10
4	Explain the working of Semi Converter. Draw and find out the expression for the output voltage.	10
5	Write a short note on the following: (a) Step-up cyclo-converter (b) Series Inverter	10
6	Explain speed control for DC shunt motor using converter and chopper.	10
7	Explain switching characteristics of SCR with necessary diagram.	10

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