# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
## Semester Winter Examination – Dec. - 2019

Branch: Electrical Engineering     Sem.:- V

Subject:- Electrical machines-II (BTEEC501)     Marks: 60

Date:-09/12/2019     Time:- 3 Hrs.

**Instructions to the Students**
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**Q. No.1**

a) Explain with neat sketch constructional features of Synchronous machine    (04)

b) Show by mathematically and vectorially that in a three phase electrical machine a rotating magnetic field is produced when supplied with three phase supply.    (05)

c) Calculate the synchronous speed of a 50 Hz a. c. machine having number of poles P = 2, 4, 6, 8. Plot the speed, Pole characteristic.    (03)

**Q. No.2**

a) Develop a circuit model of an alternator and hence establish the relationship between various voltages. Draw vector diagram for different p.f    (04)

b) Define voltage regulation; explain following method for determination of the same    (05)

    i) Synchronous Impedance method   ii) Potier Triangle method

c) A three phase, 8 pole, 750 rpm synchronous alternator has 72 slots. Each slot has 12 conductors and winding is short pitched by 2 slots. Find pitch factor and breadth factor. If flux per pole is 0.06 Wb, find induced emf per phase.    (03)

**Q. No.3**

a) Define the following terms, derive their suitable expressions and bring significance of each term.    (05)

    i) Synchronizing current   ii) Synchronizing Power &   iii) Synchronizing Torque

            **OR**

b) Derive an expression for current shared by two alternators in parallel using

    i) Impedance method and ii) Admittance method

c) Discuss following torques associated with Synchronous motor    (03)

    i) Starting Torque   ii) Running Torque   iii) Pull in Torque   iv) Pull out Torque

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d) Two three phase, 6.6 kW, star connected alternators supply a load of 3000 kW at 0.8 p. f. lagging. The synchronous impedance per phase of machine A is $(0.5+j10)\ \Omega$. and of machine B is $(0.4+j20)\ \Omega$, the excitation of machine A is adjusted so that it delivers 150 A at a lagging p. f. and the governors are so adjusted that load is equally shared between the machines. Determine the current, power factor, induced emf. and load angle of each machine. **(04)**

## Q. No.4

a) Explain the effect of changing excitation on armature current and power factor of a synchronous motor, draw relevant characteristics **(05)**

b) Obtain an expression for power delivered by synchronous motor and condition for its maximum. **(04)**

c) Discuss the phenomenon of hunting and its effects on the operation of synchronous motor

**OR**

d) A three phase 3300-V, star connected synchronous motor has an effective resistance and synchronous reactance of $2.0\ \Omega$ and $18.0\ \Omega$ per phase respectively. If the open circuit generated e.m.f. is 38800-V between lines , compute (i) the maximum total mechanical power that the motor can develop and (ii) the current and power factor at maximum mechanical power. **(03)**

## Q. No.5

a) Discuss following speed control methods of an induction motor and bring out their advantages and limitations **(05)**
   i) By Injecting an E M F in rotor circuit & ii) Cascade OR Cancacation method

b) Derive an expression for the torque under running condition of an Induction Motor and hence discuss dependence of torque speed curve on supply voltage and frequency.

**OR**

c) With neat sketch Explain the complete torque slip characteristics of an induction motor. **(03)**

d) The results of no load and blocked rotor test on a 400 V 50 hp. 50 Hz, three phase, 4 pole induction motor are as under.

No load Test: $V_o = 400\ V$ , $I_o = 30\ A$, $W_o = 1800\ W$.

Blocked rotor test: $V_{sc} = 110\ V$ , $I_{sc} = 80\ A$, $W_{sc} = 4000\ W$.

The motor has star connected stator having a resistance of $0.1\ \Omega$ per phase. Draw the current locus diagram and determine; full load current, slip, torque and efficiency **(04)**

## Q. No.6

a) Why a single phase induction motor is not self-starting, explain the phenomenon through double field revolving theory. **(04)**

b) Discuss briefly following methods of starting single phase induction motor and discuss their merits and limitations.
   i) Split phase method and capacitor start method

**OR**

c) Develop a circuit model of single phase induction motor and hence S T resultant torque is sum of forward and backward torques. **(04)**

d) Explain the principle of operation & application of following special machines; **(04)**
   i) Reluctance motor and ii) Hysteresis motor

*************Paper End*************

# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

## Semester Winter Examination – Dec. - 2019

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**Branch: ELECTRICAL**       **Sem.:- V**

**Subject:- Power System-II (BTEEC502)**      **Marks:60**

**Date:- 11/12/2019**      **Time:- 3 Hr.**

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**Instructions to the Students**
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
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## Section-I

**Q.1. SOLVE** (12)

**A )** What is mean by economic load dispatch for a power plant having N generator units, derive the equal Incremental cost rule.

**B)** The costs of two units at the busses connected through a transmission line are (with P1 and P2 in MW):

IC1=15+0.125 P1;        IC2=20+0.05 P2

If 125 MW is transmitted from unit-1 to the load at bus-2, at which the unit-2 is present, a line loss of 15.625 MW is incurred. Find the required generation for each of the units and the power received by the load when the system lambda is Rs 24.0 per MWHr.

**Q.2. SOLVE ANY TWO** (12)

A) Solve Gauss seidal method as shown Fig 2.A

• **Using the Gauss-Seidel method, determine the phasor values of the voltage at the load buses 2 and 3, accurate to 2 decimal places**
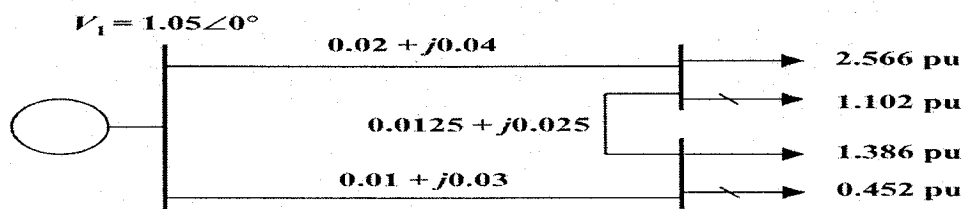
Fig. 2.A

P.T.O.

B) Discuss and derive newton raphson method for load flow solution.

C) Explain the various types of buses and their significance in detail.

## Q.3. SOLVE. (12)

A) What are FACT devices? Enlist different FACT devices. Explain any two with their construction, operation, merits and demerits

B) Discuss excitation control and explain different types of excitation system for alternator.

## Q.4. SOLVE ANY TWO (12)

A) Draw a diagram showing interconnection of sequence network for single line to ground fault. Derive equation for sequence currents.

B) An 11 KV, 25 MVA synchronous generators has positive negative and zero sequence reactances of j0.12, j0.12,and j0.08 p.u respectively. A single line to ground fault occurs at the generators terminals. Estimate a) fault currents b) line to line voltages Assume that the generator was unloaded before fault.

C) Derive an expression for symmetrical components in terms of phase voltages.

## Q.5. SOLVE. (12)

A) Define a stability of power system? Derive expression for swing equation.

B) A generator with constant excitation supplies 30 MW through a step-up transformer and a high voltage line to an infinite bus bar if steady state stability is 60 MW, estimate the maximum permissible sudden increase of generator output (resulting from a sudden increase in prime mover input).if the stability is to be maintained. The resistances of the generator transformer and line may be neglected.

## Q.6. SOLVE. (12)

A) Explain Load dispatch center functions in power system.

B) Explain power quality definition, problems, causes, effects.

Paper End

# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE - RAIGAD -402 103
## Winter Semester Examination - December - 2019

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**Branch: Electrical Engineering**        **Sem.:- V**
**Subject :- Microprocessor & Microcontroller (BTEEC503)**    **Marks: 60**
**Date:- 13/12/2019**                          **Time:- 3 Hr.**

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**Instructions to the Students**
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
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| | | | (Marks) |
|---|---|---|---|
| Q.1. | a) | Draw pin configuration of µp 8085. Explain functions of following pins:<br>    i)      X1, X2    ii) ALE    iii) $S_0, S_1$ | 06 |
| | b) | How is a SIM instruction used to set interrupts? Illustrate with an example. | 06 |
| Q.2. | a) | Explain the need of de-multiplexing of $AD_0$-$AD_7$ in the memory interfacing with µp 8085. Also explain any one memory mapping scheme. | 06 |
| | b) | Interface 4k RAM with µp 8085 using 1k×8 RAM. | 06 |
| Q.3. | a) | What are the types of interrupts in µp 8085? Explain all software interrupts with their vector locations and priorities. | 06 |
| | b) | What is DMA? Draw and explain pin configuration of DMA IC 8237 in details. | 06 |
| Q.4. | a) | What are the types of digital to analog converter? Draw pin configuration of DAC 0808. | 06 |
| | b) | Write an assembly language program to generate square waveform on CRO using an interfacing IC 8255 with µp 8085. | 06 |
| Q.5. | a) | Draw the functional block diagram of micro-controller 8051 and explain each block in detail. | 06 |
| | b) | What is program status word register in µc 8051? Draw structure of program status word and explain each flag. | 06 |
| Q.6. | a) | Explain following instructions of µc 8051:<br>    i)      MOV A,#55H    ii) ADD A,R2     iii) ORG 0H | 06 |
| | b) | Draw and explain DC motor controller using a Darlington Transistor. | 06 |

*************************** Paper End ****************************************

# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

## Winter Semester Examination –Dec,2019

Course: Electrical Engineering                                         Sem: V^th

Subject: Advances in Renewable Energy Sources(BTEEE505B)       Marks: 60

Date: 16/12/2019                                                      Time:3Hr

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**Instructions to the Students**
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
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Q. 1  A)  Explain different technologies to produce biogas. Also discuss the factors affecting the production of biogas.                      (6)

   B)  Write short note on i) Anaerobic Digestion   ii) Pyrolysis     (6)

**OR**

Explain Floating drum types biogas plant.


Q.2  A)  Enlist different types Geothermal resources and explain with neat diagram Flashed steam geothermal power plant.                    (6)

   B)  How geothermal energy is combined with conventional thermal power plant? Explain in brief with neat diagram.                        (6)


Q. 3  A)  What are the various types of hybrid energy system? Draw typical curve to justify the choice and role of renewable energy sources constituting a hybrid system.                                    (6)

   B)  Explain with neat block diagram of PV – propane Gas hybrid system   (6)

for residential application.

OR

Explain Natural convection solar driers in combination with biomass back up heater

Q.4  A)  Explain the effect and control techniques of Nuclear Hazards    (6)

     B)  Describe effects and causes of Global Warming.    (6)

Q.5  A)  What is design for Environment and explain design for environment practices.    (6)

     B)  Describe Environmental impact assessment policy and explain role of key element in EIA process.    (6)

Q.6  A)  What is Biodiversity? what is its significance    (6)

     B)  With neat Diagram explain carbon cycle and oxygen cycle    (6)

*** End of the paper ***

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# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

## Winter Semester Examination – December - 2019

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**Branch: Electrical Engineering**                                   **Sem.:- III**

**Subject: -Testing and Maintenance of Electrical Equipment**        **Marks: 60**
     **(BTEEEC505C)**

**Date: - 16/12/2019**                                               **Time: - 3Hr**

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**Instructions to the Students**
1. Each question carries **12 marks.**
2. Attempt **ANY FIVE** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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                                                       **Marks**

**Q.1** a) State the objectives of testing of machines? Explain in brief **(06)** routine test, type test, special test and supplementary test?

     b) Distinguish between routine and break down maintenance of **(06)** electrical equipments.

**Q.2** a) Explain the maintenance schedule for induction motor as per IS **(06)** 900

     b) Explain the procedure for developing preventive maintenance **(06)** schedule.

**Q.3** a) Explain the vector group test of three phase transformer. Draw **(06)** Vector group connections of Dy11 and Dy7

     b) Explain the blocked rotor test of three phase induction motor **(06)**

**Q.4** a) Explain the transformer oil testing as per IS 1692 **(06)**

b) Define Bus bar scheme. Explain Single bus bar arrangement with **(06)** bus Sectionalization with merits and demerits.

**Q.5** a) What is an Electrical Earthing? Explain the importance of **(06)** Electrical Earthing with suitable example?

b) State the methods of electrical earthing. Draw and Explain Plate **(06)** earthing in detail.

**Q.6** a) Write Troubleshooting chart of 3 Ph. Induction Motor **(06)**

b) Write Troubleshooting chart of D.C. Motor **(06)**


*********End of the Paper*********

# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
## LONERE – RAIGAD -402 103
### Winter Semester Examination – December - 2019

Branch: **Electrical Engineering**

Subject:- **Electrical Mobility (BTEEOE506A)**

Date:-18/12/2019

Sem.:- V

Marks:60

Time:- 3 Hr.

| Q.1. | | | (Marks) |
|---|---|---|---|
| | a) | State and explain classification of electrical mobility. | (6) |
| | b) | Explain operating principle of types of hybrid electric vehicle. | (6) |
| Q.2. | | | |
| | a) | Compare types of batteries used in electrical mobility. | (6) |
| | b) | Enlist and explain any four battery parameters in detail. | (6) |
| Q.3. | | | |
| | a) | Explain and enlist the types of electrical machines used in electric mobility. | (6) |
| | b) | Draw and explain Brushless DC Motor with characteristics. | (6) |
| Q.4. | | | |
| | a) | Draw and explain single phase inverter with its waveforms based on PWM switching sequence. | (6) |
| | b) | Draw and explain Buck and Boost converter used in electric mobility. | (6) |
| Q.5. | | | |
| | a) | Derive expression for tractive effort while vehicle modelling. | (6) |

| | b) | What are the criteria of electric vehicle chassis or body modelling and design? | (6) |
|---|---|---|---|
| | | | |
| Q.6. | | | |
| | a) | Explain global warming and show characteristics by carbon dioxide emission in atmosphere due to multiple applications from duration 1980 to 1999. | (6) |
| | b) | Explain air pollution in detail and gases produced by hydrocarbon fuel. | (6) |

**PAPER END**

# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
## Winter Semester Examination – December - 2019

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**Branch: Electrical Engineering**                          **Sem.:- V**

**Subject: -Power plant Engineering (BTEEOE506B)**          **Marks: 60**

**Date:18/12/2019 -**                                       **Time: - 3 Hr.**

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**Instructions to the Students**
1. Each question carries 12 marks.
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                                                                    **(Marks)**

**Q.1.**  **a)** Explain Indian energy scenario in detail?                    **(6)**

**b)** Explain methods and types of tariff for electrical energy in power plant
economics?                                                               **(6)**

**Q.2.**  **a)** Draw the schematic layout of a modern thermal power plant and explain
the functions of each component and operation of plant?                   **(6)**

**b)** Classify the different type of reactors and explain pressurized water
reactor (PWR) power plant?                                               **(6)**

**Q.3.**  **a)** Draw the schematic layout of gas turbine power plant and its type also
explain the functions of each component and operation of plant?           **(6)**

**b)** Pelton wheel of 3m runner work under head of 800m if it runs at 60rpm.
The discharge rate in the runner is 3m³/s. Find:
   i) Input power of runner.
   ii) Shaft power from runner having mechanical efficiency ($\eta_m$) of 92%.
   iii) Net power output if generator is 96% efficient.
   iv) Specific speed of turbine.
   v) Number of turbines needed to generate 100MW power.                 **(6)**

**Q.4.**  **a)** Draw the schematic layout of diesel power plant and explain the
functions of each component and operation of plant?                      **(6)**

**b)** A two stroke engine develops 400kW output with mechanical efficiency of 0.82. The rate of fuel consumption is 2.4kg/min and air –fuel ratio used in the engine is 18:1.the heating value of the fuel is 41500 kJ/kg.

find the followings: i) Indicated power

ii) Friction power

iii) Break thermal efficiency

iv) Indicated thermal efficiency

v) Fuel and air consumption per hour **(6)**

**Q.5. a)** Explain in detail Binary vapour cycle? **(6)**

**b)** A generating unit of 10MW capacity supplies following loads:
Domestic consumers with a maximum demand 6MW at load factor of 20%
Small industrial load with a maximum demand 3.6MW at load factor of 50%
Street light load with a maximum demand 400kW at 30% load factor.
Find: overall cost of energy for kWh each type of consumers using
following data: capital cost of the plant = Rs.10,000/kW

Total Running cost = Rs. 36, 00,000/year

Annual rate of interest and depreciation on capital cost = 10% **(6)**

**Q.6. a)** Explain concept of grid and condition to interface different power plant to grid? **(6)**

**b)** Write a short on followings: **(6)**

i) Parallel operation of various generating sources and load sharing.

ii) Topology of grid

———————————————**PAPER END**———————————————