Hall Ticket Number :										

R-17

Code: 7G16D

III B.Tech. II Semester Regular Examinations Nov/Dec 2020

Object Oriented Programming Concepts

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

****

			Marks	CO	Blooms Level
1.	a)	Define OOP and what are the merits and demerits of object oriented methodology?	7M	CO1	L1
	b)	Define recursion and write a C++ program for finding factorial of a given number.	7M	CO1	L1
2.	a)	Define data type and explain the different data types in C++.	7M	CO1	L1
	b)	Define destructor and write a C++ program to implement destructor.	7M	CO1	L3
3.	a)	What is meant by overloading? Explain about function overloading with an example.	7M	CO2	L2
	b)	Define inheritance and explain about multiple inheritance with an example.	7M	CO2	L3
4.	a)	What is friend function and what are the merits and demerits of using friend functions.	7M	CO2	L2
	b)	Explain about virtual base class with suitable program.	7M	CO2	L3
5.	a)	Define a class? What is the general form of a class? How objects are declared explain with example.	7M	CO3	L3
	b)	Write a java program for checking Armstrong number.	7M	CO3	L2
6.	a)	What are the differences between packages and inheritance?	7M	CO4	L2
	b)	Discuss the adding class to a package with an example.	7M	CO4	L2
7.	a)	What is multithreading and what are the advantages of multithreading?	7M	CO4	L3
	b)	How to create multiple threads explain with an example?	7M	CO4	L2
8.	a)	Define applet and explain the life cycle of an applet.	7M	CO4	L2
	b)	What are applications and uses of an applet?	7M	CO4	L2

*****

Hall Ticket Number :										

R-17

Code: 7G261

III B.Tech. II Semester Regular Examinations Nov/Dec 2020

Power System Operation and Control

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

****

			Marks	CO	Blooms Level
1.	a)	What is an incremental fuel cost? Draw incremental fuel cost curve. How is it used in thermal plant operation?	6M	CO1	I
	b)	150 MW, 220 MW, and 220 MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations: $dC_1/dP_1 = Rs.(0.11P_1+12)$; $dC_3/dP_3 = Rs.(0.1P_3+13)$; $dC_2/dP_2 = Rs.(0.095P_2+14)$; Where P_1, P_2 and P_3 are the loads in MW. Evaluate the economical load allocation between the three units, when the total load on the station is (i) 350 MW (ii) 500 MW.	8M	CO1	V
2.	a)	Give algorithm for economic allocation of generation among generators of a thermal system taking into account transmission losses. Give steps for implementing this algorithm and also derive necessary equations.	7M	CO1	II
	b)	A power system consists of two 100 MW units whose input cost data are represented by equations below $C_1 = 0.04P_1^2+22P_1+800$ Rs/hr $C_2 = 0.045P_2^2+15P_2+1000$ Rs/hr If total received power P_R=150 MW. Then Determine (i) The load sharing between units for most economic operation (ii) The corresponding cost of operations	7M	CO1	VI
3.	a)	In a two plant operation system, the hydro plant is operated for 12 hrs, during each day and the steam plant is to operate all over the day. The characteristics of the steam and hydro plants are: $CT=0.3PGT^2+20PGT+5$ Rs.hr $WH=0.4\ PGH^2+20PGH\ m^3/sec$ When both plants are running, the power owned from steam plant to load is 300 MW and the total quantity of water is used for the hydro plant operation during 12 hrs is $180x10^6$ m^3. Evaluate the generation of hydro plant and cost of water used.	8M	CO2	V
	b)	What is mean by unit commitment problem? Discuss a method for solving the same.	6M	CO2	II
4.	a)	Obtain the transfer function and block diagram representation of First order turbine model.	7M	CO3	II
	b)	Draw the schematic diagram of a speed governing system and explain the functioning of its components. Also obtain the mathematical model.	7M	CO3	III
5.	a)	Explain how excitation will affect the generator power limits.	7M	CO3	III
	b)	Two turbo alternators rated for 150 MW and 250 MW have governor droop characteristics of 8% from no load to full load. They are connected in parallel to share a load of 20 MW. Determine the load shared by each machine assuming free governor action.	7M	CO3	IV
6.	a)	What is the importance of tie-line bias control? When can we say that the tie line is weak or strong?	7M	CO4	II
	b)	Explain the Load Frequency Control and Economic dispatch control.	7M	CO4	II
7.	a)	Derive the relation between reactive power flow and the voltage of bus.	7M	CO5	II
	b)	Explain the effect of shunt compensation on the transmission line performance.	7M	CO5	II
8.	a)	Explain the reasons for variation of voltages in power systems and explain any one method to improve voltage profile.	7M	CO5	II
	b)	A 440V, 50 Hz, 3-Ø supply delivers 200 KW at 0.7 p.f. lagging. It is desired to bring the line p.f. to 0.9 by installing shunt capacitors. Calculate the capacitance if they are (i) Star connected and (ii) Delta connected.	7M	CO5	IV

****

Hall Ticket Number :										

R-17

Code: 7G264

III B.Tech. II Semester Regular Examinations Nov/Dec 2020

Power System Analysis

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

****

			Marks	CO	Blooms Level
1.	a)	What is fundamental cut-set? Explain with an example.	6M		
	b)	Starting from Zbus for a partial network describe step by step how you will obtain the Zbus for a modified network when a new line is to be added to a bus in the existing network	8M		
2.	a)	Derive the expression for bus admittance matrix Y_{BUS} in terms of primitive admittance matrix and bus incidence matrix.	7M		
	b)	Explain the procedure to modify the Z_{Bus} when an element is added to the existing network.	7M		
3.		A 3-Bus Power system is shown in figure. The relevant pu line admittance are indicated on the diagram and the bus data are as follows table 1. Determine the voltages at buses 2 and 3 using G-S method. Also find the line flow solution. Take α =1.6.			

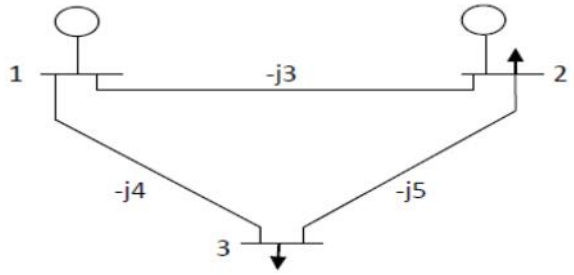

Table1. Bus Data

Bus No	Type	Generation		Load		Bus Voltage	
		P_G	Q_G	P_L	Q_L	$\lvert V\rvert$	δ
1	Slack Bus	-	-	-	-	1.02	0°
2	PQ Bus	0.25	0.15	0.5	0.25	-	-
3	PQ Bus	0	0	0.6	0.3	-	-

14M

4.	a)	Explain the fast decoupled load flow method and write the algorithm	7M		
	b)	What are the three classes of buses of a power system used in power flow analysis? What are the quantities to be specified and to be computed for each class during power flow solution?	7M		
5.	a)	Derive the expression for sequence components of fault currents for L-L-G fault at the terminals of an unloaded generator. How the sequence networks are connected to represent the fault?	7M		
	b)	A single phase resistive load of 100 kVA is connected across lines of BC of a balanced supply of 3 kV. Compute the symmetrical component of line currents.	7M		

6. a) Prove that X= √3 R the maximum power is received in a power system through series impedance Z = R + j X. 6M

   b) Two turbo generators with rating given below are connected via a short line M/c 1 : 4 pole, 50 Hz, 60 MW 0.8 pf lag and moment of inertia 30,000kg-m^2

   M/c 2 : 2 pole, 50 Hz, 80 MW 0.85 pf lag and moment of inertia 10,000kg-m^2. Calculate the inertia constant of single equivalent machine on base of 200 MVA. 8M

7. a) Derive the expression for Inertia Constant from fundamentals. 6M

   b) Find the steady state stability limit of a power system consisting of a generator of direct axis reactance of 0.6 pu connected to an infinite bus through a series reactance of 1.0 pu. The terminal voltage of the machine is held constant at 1.1 pu. And the voltage of the infinite bus 1.0 pu. 8M

8. a) Derive the swing equation of single machine connected to infinite bus and also write the assumptions to derive it. 6M

   b) A balanced 3-phase fault occurs at middle poi[illegible] of lin[illegible]e 2 whe[illegible] the pow[illegible]er is 1.5 pu in the system of Figure. E=1.2, V=1, [illegible] $X'_d = 0.2$, [illegible] $X_1 = X_2 = 0.4$ [illegible]er transf $pu.$

   i. Determine whether the system is stable for a sustained fault
   ii. The fault is cleared at δ=60^0. Is the system stable? If so, find the maximum rotor swing
   iii. Find the critical clearing angle

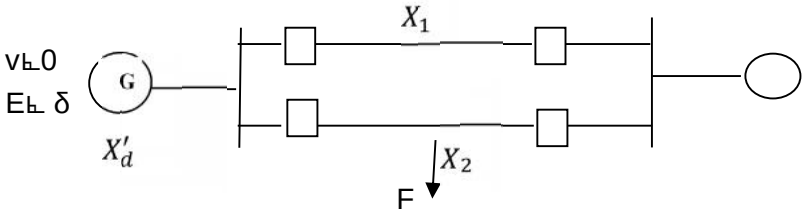

Figure A machine connected to an infinite bus through an inter-connector 8M

******

Hall Ticket Number :										

R-17

Code: 7G263

III B.Tech. II Semester Regular Examinations Nov/Dec 2020

Switch Gear and Protection

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

****

			Marks	CO	Blooms Level
1.	a)	What is the role of circuit breakers in substations? Explain the specifications of circuit breakers.	7M	1	I & II
	b)	In a system of 132kV, the line to ground capacitance is 0.03μF and the inductance is 7H. Determine the voltage appearing across the pole of a Circuit Breaker. If a magnetizing current of 8 amps (instantaneous value) is interrupted, determine also the value of resistance to be used across the contacts to eliminate the restriking voltage.	7M	4	V
2.	a)	Explain the terms recovery voltage, restriking voltage and RRRV. Derive an expression for restriking voltage in terms of system capacitance and inductance	7M	4	II & VI
	b)	Explain about the working of vacuum circuit breakers and List its advantages.	7M	1	I & II
3.	a)	Explain the operation of directional over current relay with a neat circuit diagram.	7M	2	II
	b)	Explain the Impedance relay by means of its characteristic on R-X plane.	7M	2	II
4.	a)	Explain the operation of Buchholtz relay with a neat diagram.	7M	2	II
	b)	A 3-phase transformer rated for 33kV/6.6kV is connected star-delta and the protecting current transformer on the low voltage side have a ratio of 400/5. Determine the ratio of the current transformer on the HV side and also draw the circuit diagram.	7M	4	V
5.	a)	What are the main faults that occur in generators? Explain the protection of generators against rotor faults.	7M	3	I & II
	b)	The neutral point of a 11 kV alternator is earthed through a resistance of 12Ω, the relay is set to operate when there is out of balance current of 0.8 A. The C.T.s has a ratio of 200/5. Estimate the percentage of the winding is protected against earth faults? Evaluate the minimum value of earthing resistance required to give 90% of protection to each phase?	7M	4	VI
6.	a)	Explain about Zinc-oxide lighting arrestor.	7M	3	I & II
	b)	Discuss the protection of a parallel feeder.	7M	2	VI
7.	a)	Explain 3-zone distance protection of a transmission line.	7M	3	II
	b)	Explain with diagram the high impedance bus bar differential protection scheme.	7M	3	II
8.	a)	Discuss the phenomena of a lightning stroke.	7M	2	VI
	b)	Explain the working of valve type lightning arrester.	7M	2	II

****

Hall Ticket Number :										

R-17

Code: 7G265

III B.Tech. II Semester Regular Examinations Nov/Dec 2020

Utilization of Electrical Energy

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

****

			Marks	CO	Blooms Level
1.	a)	Explain the classification of Electric drives. List their limitations.	7M	CO1	2
	b)	A 220V DC shunt motor has armature and shunt field resistances of 0.05 ohms and 220 ohms respectively. Motor draws a full load current of 21A running at 1000 rpm. What resistance must be included in the field such that the motor runs at 1500 rpm for the same torque?	7M	CO1	4
2.	a)	What are the characteristics of heating element? Explain the design of heating element is resistance heating.	10M	CO2	2
	b)	Discuss various methods of controlling the temperature in Dielectric heating.	4M	CO2	1
3.	a)	Name and describe various resistance welding process	7M	CO2	1
	b)	List different welding electrodes and explain in detail.	7M	CO2	2
4.	a)	State and explain Laws of Illumination	7M	CO3	2
	b)	Discover the differences between tungsten filament lamps and fluorescent tubes	7M	CO3	3
5.	a)	Explain the working of sodium vapor lamp	7M	CO3	2
	b)	Explain why now a days the LED lamps are preferred over other forms of lamps by the governments. Give the comparison with respect life, cost and maintenance.	7M	CO3	4
6.	a)	Discuss about system of track electrification.	7M	CO4	2
	b)	Examine advantages of electric traction in detail.	7M	CO4	4
7.	a)	Define Specific Energy Consumption and discuss the factors which affect specific energy consumption of trains operating at a given scheduled speed	7M	CO4	2
	b)	A train runs at an average speed of 50 kmph between stations situated 25 km apart. Traction accelerates at 2 kmphps and retardation at 3 kmphps. Find its maximum speed assuming simplified trapezoidal speed time curve	7M	CO4	3
8.	a)	Explain socio &environmental importance of hybrid electric vehicles.	7M	CO5	2
	b)	Describe the importance of modern drive trains.	7M	CO5	1

*****

Hall Ticket Number :										

R-17

Code: 7G262

III B.Tech. II Semester Regular Examinations Nov/Dec 2020

Microprocessors and Microcontrollers

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* questions from the following (5 x 14 = 70 Marks)

****

			Marks	CO	Blooms Level
1.	a)	Explain the following instruction set of 8086 microprocessor with examples: (i) Data Transfer Instructions (ii) String Instructions (iii) Processor Control Instructions (iv) Iteration Control Instructions.	8M	1	2
	b)	Write an assembly language program in 8086 to multiply a 16-bit unsigned number by an 8-bit unsigned number.	6M	1	3
2.	a)	Explain any four types of addressing modes of 8086 microprocessor with examples.	7M	1	5
	b)	Explain about the special and general purpose registers organization in 8086 processor in detail.	7M	1	2
3.	a)	Draw the block diagram of 8259 and explain each block.	8M	2	6
	b)	Explain the need of DMA. Discuss in detail about DMA data transfer method.	6M	2	2
4.	a)	Draw the block diagram of 8257 and explain about each block.	8M	2	6
	b)	Explain the interrupt response sequence of 8086 with the help of a block diagram. Also explain the purpose of 8086 interrupt vector table.	6M	3	2
5.	a)	Draw an internal architecture of USART 8251 and explain its different status and modes and control formats neatly.	8M	4	6
	b)	Draw the logic diagram to convert TTL to RS232C conversion and explain the operation.	6M	4	5
6.	a)	Draw the pin diagram of 8051 microcontroller and describe about each pin in detail.	7M	5	6
	c)	Write a program to find 8-bit subtraction using 8051 microcontroller.	7M	5	3
7.	a)	Explain various addressing modes supported by 8051 microcontroller.	4M	5	5
	b)	Explain the function of the timers in 8051 microcontroller	6M	5	5
	c)	Write a program to add 16 bit numbers using 8051 microcontroller.	4M	5	3
8.	a)	Draw the diagram of ARM architecture and explain the function of each block along with different features in it.	7M	5	5
	b)	Explain the features in available ARDUINO microcontroller.	7M	5	5

****