UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination – December, 2018

Course   : Power Transmission and Distribution (PIPM 7003)   Semester – I
Programme : MBA – P.M.
Time   : 3 Hrs
Instruction :   Marks : 100

Section A
Attempt all Questions (True/False)

S No.		Marks	CO
Q-1	The installed capacity of electricity generation in India as on 31st march 2018 is 340GW	**1**	**CO1**
Q-2	Ujwal DISCOM Assurance Yojana (UDAY) scheme of Ministry of power Government of India is for Village Electrification	**1**	**CO1**
Q-3	Demand factor is always less than Unity.	**1**	**CO1**
Q-4	Earth resistance of a Power sub-station is 0.5 ohm	**1**	**CO1**
Q-5	Earth resistance of Distribution Transformer is 5 ohm.	**1**	**CO1**
Q-6	Touch potentials in Earting system is 500 ohms	**1**	**CO1**
Q-7	Step Potential in Earting system is 1000 ohms.	**1**	**CO1**
Q-8	The density of Sulfur hexafluoride (SF6) gas is 5 times of air.	**1**	**CO1**
Q-9	The velocity of sound in Sulfur hexafluoride is one-third of air.	**1**	**CO1**
Q-10	Dielectric strength of Sulfur hexafluoride gas is 3 times of air	**1**	**CO1**
Q-11	Power factor of Electricity Bulb is unity.	**1**	**CO1**

Q-12	Diversity factor is always more than unity.	1	CO1
Q-13	There are 100 No. rules of safety etc. in Indian Electricity Rule 1956	1	CO1
Q-14	There are 18 Sections in Electricity Act 2003	1	CO1
Q-15	There are 195 Sub Sections in Electricity Act 2003	1	CO1
Q-16	The length of small transmission line is Up to 500 km.	1	CO1
Q-17	Core loss of the transformer depends upon the load current of the transformer	1	CO1
Q-18	Winding Losses depends upon the Magnetization of the core	1	CO1
Q-19	Load Factor is always more than unity	1	CO1
Q-20	SCADA system is used for metering Purpose in Distribution Company.	1	CO1

| Section B			
Attempt any four questions.			
Q-1	Analyze the role of Power Factor in Alternating Current Circuit. Explain the term True Power, Apparent Power etc. with diagram.	5	CO2
Q-2	Analyze the Indian Power Distribution System (IPDS) Scheme and Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) Scheme of Government of India to Upgrade the Power System networks and extension to villages in Power Distribution Company	5	CO2
Q-3	Analyze the advantages and disadvantages of High Voltage Direc Current (HVDC) in Electricity Transmission system.	5	CO2
Q-4	Determine the thermal efficiency of a steam power plant and its coal bill per annum using the following data. ○ Maximum demand = 24000 kW ○ Load factor = 40% ○ Boiler efficiency = 90% ○ Turbine efficiency = 92% ○ Coal consumption = 0.87 kg/Unit ○ Price of coal = Rs. 280 per tonne	5	CO3
Q-5 (a) (b)	Draw a single line diagram of a 2*5MVA 33/11 kV substation. Draw a layout of 400 kv substation.	2.5 2.5	CO2

	Section C		
	Attempt any six questions		
Q-1	Evaluate the Purpose of Geographical Information System (GIS) in improving the performance of an electricity distribution Company	**5**	**CO3**
Q-2	Evaluate all the nine new technologies in energy storage systems.	**5**	**CO3**
Q-3	Analyze the various electrical safety rules to be followed in Construction, Operations and Maintenance of Electricity distribution installation system	**5**	**CO4**
Q-4	Analyze and Draw the single line diagram of any three type of bus-bar system of an electricity substation	**5**	**CO3**
Q-5	Analyze and Draw the block diagram of AT&C losses in an electricity distribution system and describe various methods of reduction of Technical losses	**5**	**CO4**
Q-6 **(a)**	Analyze in detail Daily and Yearly Load Curves.	**2.5**	**CO4**
(b)	Evaluate all the six types of transformer losses	**2.5**	
Q-7 **(a)**	Analyze all the 14 No. bench marking parameter to evaluate a Power distribution company.	**2.5**	**CO4**
(b)	Analyze and Draw the Meter to Cash Cycle and also Draw and Describe Pie Chart of AT&C Losses.	**2.5**	

	Section D		
	Attempt any two Questions		
Q-1	Critically, evaluate, and analyze all standards on installation and operation of meters on all four category type of installation (a) All type of Meters (b) Interface Meters (c) Consumer Meter (d) Energy Accounting Meter	**15**	**CO5**
Q-2	Analyze in detail why the power distribution reforms in the state of Delhi are successful and in Orrisa State a failure	**15**	**CO5**

Q-3 Calculate the voltage drop of a 11kV line at following point

    i.   Point J
    ii.   Point M

The 11kV line main conductor is ACSR weasel and in Tap line ACSR squirrel for which regulation constants per 100 kVA KM are 0.0840 and 0.1169 respectively, diversity factory is 2.5, and power factor is 0.8, loads in kVA and distances in KM.
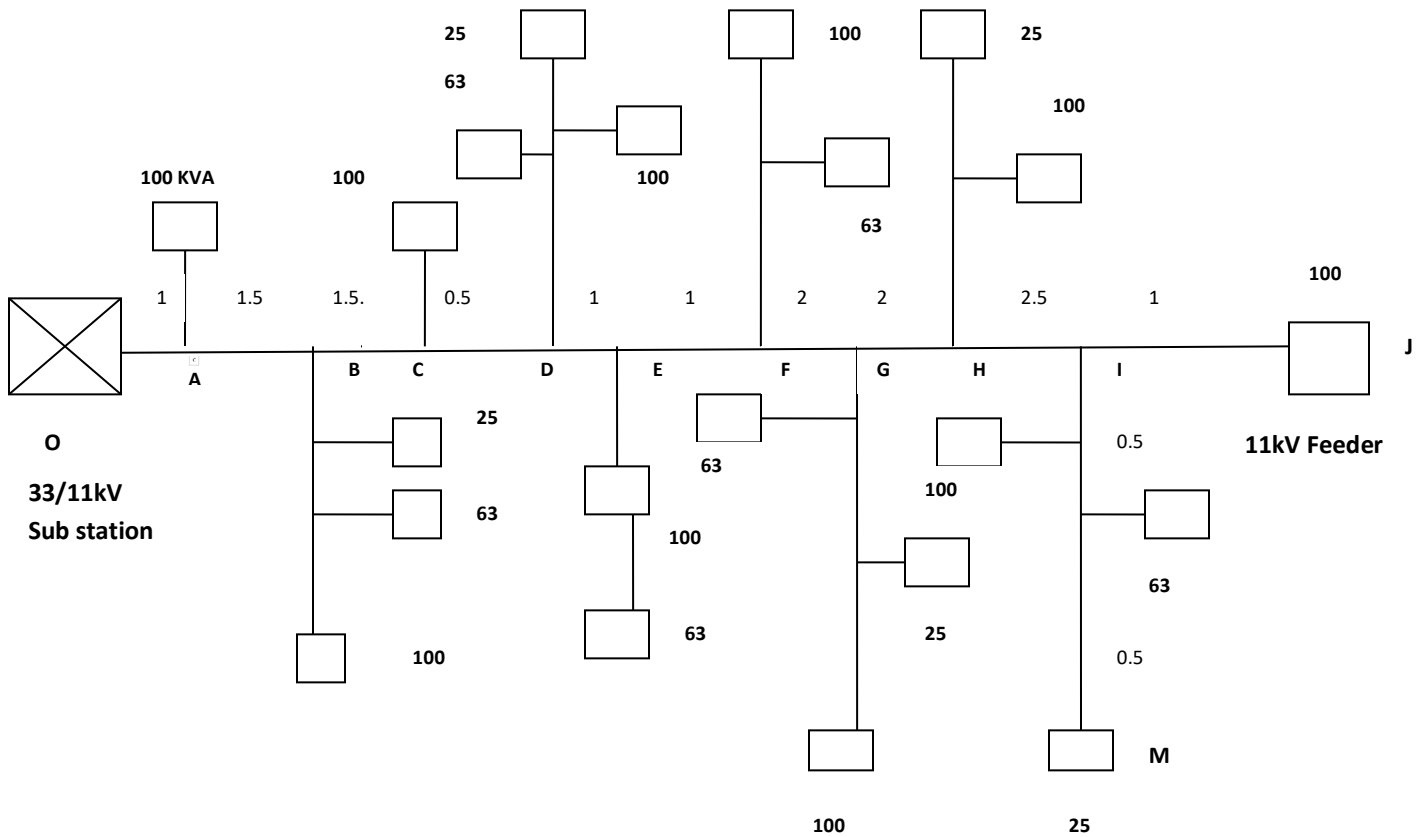
(15 marks) CO5

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Section A

Attempt all Questions (True or False)

S No.		Marks	CO
Q-1	There are 38 Discoms in India	**1**	**CO1**
Q-2	The Power factor of induction motor is unity.	**1**	**CO1**
Q-3	DDUGJY is for Power system Upgradation.	**1**	**CO1**
Q-4	Saubhagya Scheme is for upgradation of power system network	**1**	**CO1**
Q-5	The touch voltage in earthling system is considered as 523 volts.	**1**	**CO1**
Q-6	The alternating current transmission lines of length more than 250 km are classified as medium transmission lines.	**1**	**CO1**
Q-7	The scope of IT applications in power sector is more in distribution sector than transmission sector.	**1**	**CO1**
Q-8	In power line carrier communication capacitor is used as open circuit point for power frequency (50 cycles) AC power.	**1**	**CO1**
Q-9	The ten delta (di electric dissipation factor) of new transformer is unity (1.0).	**1**	**CO1**
Q-10	The Myrex index number (MIN) of new transformer oil is 1000.	**1**	**CO1**
Q-11	Acetylene gas (C_2H_2) is evolved when paper insulation of transformer is overheated.	**1**	**CO1**
Q-12	Thermal imaging camera is not useful for detecting actual hot spot in a transformer.	**1**	**CO1**
Q-13	A direct current line can carry 2 times of power in comparison to alternating current line.	**1**	**CO1**

Q-14	AT&C losses are higher than technical losses.	1	CO1
Q-15	Bucholz relay in a transformer protects it from overloading by electricity consumers.	1	CO1
Q-16	Silica gel is used to protect the transformer from atmospheric air.	1	CO1
Q-17	Transformer oil is a mineral oil of good electrical conductivity.	1	CO1
Q-18	The earth resistance of the earth pipe used in earthling practices is one ohm.	1	CO1
Q-19	Instrument transformer is used to measure the efficiency of transformer.	1	CO1
Q-20	There are 38 Discoms in India	1	CO1

Section B			
Attempt any four questions.			
Q-1	Analyze the advantages and dis-advantages of high voltage direct current system.	5	CO2
Q-2	Evaluate the golden rules for preventing of power transformer failures and describe all 8 number maintenance schedules for transformer.	5	CO2
Q-3	Analyze why Reforms were necessary in Power Distribution Industry. Describe in details the Distribution reforms and their restructuring	5	CO2

Q-4	The maximum (peak) load on a thermal power plant of 60 mW capacity is 50 mW at an annual load factor of 50%. The loads having maximum demands of 25 mW, 20 mW, 8 mW and, 5 mW are connected to the power station. Determine:
	   (a) Average load on power station
	   (b) Energy generated per year
	   (c) Demand factor
	   (d) Diversity factor
		5	CO3

Q-5 (a) (b)	Draw a single line diagram of a 220/132 kv substation. Evaluate the method of improving power factor in alternating current systems (AC system)	2.5 2.5	CO2

Section C			
Attempt any six questions			
Q-1	Analyze the new technologies in electricity power transmission	5	CO3
Q-2	Evaluate all the various electricity energy storage Technologies	5	CO3
Q-3	Analyze the earthling in electricity system what are the points to be earthed in an electricity substation. Why black metal is used in electricity substation switch yards.	5	CO4
Q-4	Analyze the merit order operation of power house related with frequency for power grid operations	5	CO3
Q-5	Analyze and Draw the diagrams of various naturals cooling of transform oil I n transforms and its temperature distributions	5	CO4
Q-6	Any undertaking consumes 6×10^6 kWh per year and its maximum	5	CO4

		demand is 2000 kW. It is offered two tariffs. Calculate the annual cost of energy. (a) Rs. 80 per kW of maximum demand plus 3 paise per kWh. (b) A flat rate of 6 paise per kWh.		
Q-7	**(a)**	Evaluate the capitalized cost of transformer with factors affecting the evaluation of the cost of different transformers.	**2.5**	**CO4**
	(b)	Analyze the all electricity power Quality parameters with their cause, effects on electricity distribution supply systems etc	**2.5**	

		Section D		
		Attempt any two Questions		
Q-1		Analyze, Evaluate and Compare the Central Electricity Authority (Installation and Operation of Meters) Regulations – 2006. On all relevant 20 No. points in details	**15**	**CO5**
Q-2		Analyze, critically and evaluate all the four Electricity Acts with their Purposes of Change (a) Indian Electricity Act 1910 (b) Electricity Act 1948 (c) Electricity Regulatory Commission Rules 1998 (d) Electricity Act 2003	**15**	**CO5**
		(a) Calculate the voltage drop and power loss of a single circuit line having following particulars at point X? **132/33KV** O 33 K.V. Line 33K.V. Load 11M.W. Substation Length – 16 K.M. X Receiving end load = 11000 K.W, 50c/s, 3-phase Power Factor = 0.8 lagging Length = 16 km Line Voltage (Receiving end) = 33kv	**7.5**	

		(b) Calculate the voltage regulations at the tail end load at Point X of the following L.T. rural feeder of A.A.C., ANT conductor [7/3.31]
		
		11/.4 KV Transformer 7.5 HP 5 HP 5 HP
		    0.3 KM 0.2 KM 0.2 KM
		X
		    O 0.2 KM 0.1 KM 0.25 KM 0.1 KM
		
		    5 HP 7.5 HP 7.5 HP 10 HP
		
		(a) Load in H.P.
		(b) Distance in KM.
		(c) Diversity factor 2.5
		(d) Power factor 0.8
		(e) Regulation constant is 38.16 for 7/3.31 MM AAC ANT conductor
			7.5	

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