CLASS: BE   SEMESTER : VII
BRANCH: EEE   SESSION : MO/18

SUBJECT: EE8221 UTILISATION OF ELECTRICAL POWER

TIME: 3 HRS.   FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	What is coefficient of adhesion? In what way is it different from the coefficient of friction.	[2]
Q.1(b)	Explain the duty cycle of an electric train with the help of speed - time, torque - time and power - time diagrams.	[4]
Q.1(c)	An electric train weighing 500 tonnes climbs an up-gradient with G = 10 and with following speed-time curve: (1) Uniform acceleration of 1.5 kmphps for 100 sec (2) Constant speed for 60 min (3) Coasting for 3 min (4) Dynamic braking at 2 kmphps to rest. Train resistance is 30 N/tonne, rotational inertia effect 10% and combined efficiency of transmission, motor and power modulator is 85%. Determine the specific energy consumption.	[6]
Q.2(a)	List any four advantages of semiconductor converter controlled drives.	[2]
Q.2(b)	Explain the operation of diesel engine driven three phase alternator supplying dc motors.	[4]
Q.2(c)	Explain the operation of PWM VSI squirrel cage induction motor drive which makes use of a synchronous link converter(SLC) for regenerative braking.	[6]
Q.3(a)	What are the requirements of a good heating material?	[2]
Q.3(b)	Explain percussion welding and carbon arc welding.	[4]
Q.3(c)	With neat sketches describe the construction, principle of operation, application and control methods of a direct arc furnace.	[6]
Q.4(a)	Explain the following terms: Luminance and depreciation factor.	[2]
Q.4(b)	A lamp of 300 c.p.is placed 1.5 m below a plane mirror which reflects 85% of the light falling on it. Determine the illumination at a point 5 m away from the foot of the lamp which is hung 4 m above ground.	[4]
Q.4(c)	Describe the construction and principle of operation and application of a sodium vapour lamp.	[6]
Q.5(a)	What are reference designators? Give examples.	[2]
Q.5(b)	Explain the two handed Anti - Tie Down, Anti - Repeat operation. Draw the ladder diagram and explain.	[4]
Q.5(c)	Explain the single cycle operation of a machine with the help of a Cam operated limit switch. Also draw the ladder diagram and explain.	[6]
Q.6(a)	What is the difference between physical components and program components in a PLC?	[2]
Q.6(b)	Draw and explain the ladder diagram for an R-S Flip Flop. Write down its truth table.	[4]
Q.6(c)	Draw the ladder diagram and write the mnemonic programming code for AND, OR, AND OR and OR AND lamp circuit (each separately).	[6]
Q.7(a)	Draw the diagram of an electromagnetic type contactor and explain its working.	[2]
Q.7(b)	Explain the push button interlocking arrangement for forward and reverse operation of a three phase induction motor.	[4]
Q.7(c)	Draw the power circuit and control circuit for the direct reversing of a three phase induction motor and explain its working.	[6]

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