GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2020-2021
UTILISATION OF ELECTRIC POWER
EE702A

TIME ALLOTTED: 3 HOURS **FULL MARKS: 70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

		Marks	CO No
(i)	Candela is the unit of (a) Luminous Intensity (b) Intensity of Illumination (c) Luminance (d) Brightness	1	CO1
(ii)	Two fluorescent lamps from the same bracket connected in parallel, one with a series capacitor, are used for (a) Brighter light (b) To avoid stroboscopic effect (c) To reduce cost (d) Less power consumption	1	CO1
(iii)	Resistance welding will require (a) High voltage (b) High frequency supply (c) High value current. (d) Both high voltage and very high current	1	CO2
(iv)	Submerged arc welding makes the welded joint (a) Brittle (b) Weak (c) Smooth (d) Free from atmospheric oxides , sulphides and nitrides of welded metals.	1	CO2
(v)	What is the Faraday number in Electrolytic process (a) 96487 (b) 0.96487 (c) 96.487 (d) 964.87	1	CO3
(vi)	Most suitable alloy for use as heating element in furnace dealing with temperature higher than 1150 degree Celsius is (a)Eureka (b) Kanthal (c) Nichrome (d) Nickel-chromium-aluminum alloy	1	CO2

(vii)	If the resitance to electric train movement is given by $F_r = a+bv+cv^2$ In the given expression *b* is likely to cover (a) air resistance (b) track resistance (c) frictional resistance (d) none of these	1	CO1
(viii)	Electric Traction in comparison to other traction systems has the advantages of (a) Higher acceleration and braking retardation (b) Cleanest system ideally suitable for underground and tube railways (c) Better speed control (d) All of these.	1	CO1
(ix)	The normal value of coefficient of adhesion is (a) 0.25 (b) 0.35 (c) 0.50 (d) 1.50	1	CO1
(x)	The most common system of traction system in India is (a) D.C.Traction(600V) (b) D.C.Traction(750V) (c) A.C. Traction (25 kV) (d) A.C. Traction (1500V).	1	CO1
(xi)	Steel rails are welded by (a) Argon arc welding (b) Thermit arc welding (c) Gas welding (d) Resistance welding	01	CO5
(xii)	Glare may result from (a) Excessive lighting contrast (b) Excessive luminance (c) Both (a) and(b) (d) None of these	01	CO6

GROUP – B
(Short Answer Type Questions)

Answer any ***three*** from the following: **3×5=15**

		Marks	**CO No**
2.	State and establish the inverse square law of Intensity of Illumination with appropriate diagram.	5	CO6
3.	Discuss briefly the influence of skin effect in the phenomena of induction heating.	5	CO5
4.	Draw the diagram of plain angle and solid angle. Establish there relational formula.	5	CO6
5.	What do you mean by electrolytic polishing and how this is effected?	5	CO 5
6.	Explain the coefficient of adhesion and its importance in traction. Explain how adequate adhesion is ensured.	5	CO1

GROUP – C
(Long Answer Type Questions)

Answer any ***three*** from the following: **3×15=45**

			Marks	CO No
7.	(a)	Briefly delineate the phenomena of fluorescence in low pressure mercury vapour lamps to obtain visible radiation.	3	CO6
	(b)	Draw circuit for operation of fluorescent lamp with a glow switch starter.	4	CO6
	(c)	What are the functions of the choke coil in the circuit?	8	CO6
8.	(a)	Considering trapezoidal characteristics for speed - time curve of a train movement from one stop to next stop, deduce the Expressions of average and scheduled speeds.	8	CO2
	(b)	Express the tractive force transmitted to the wheels from the motor, taking the motor pinion teeth to the axle pinion teeth ratio as 'm' and motor to axle power transmission ratio as 'n' .	7	CO2
9.	(a)	State and explain the laws of illumination.	5	CO6
	(b)	Prove that in a filament lamp, the diameter of filament is directly proportional to $I^{\frac{2}{3}}$ where I is the current flowing through the filament.	5	CO6
	(c)	A 110 volt lamp develops 60 C.P. and a lamp of same material working at the same efficiency develops 25 C.P. on 220 volt. Compare the diameter and length of the filament.	5	CO6
10.	(a)	Describe briefly the various types of arc welding processes	06	CO5
	(b)	Difference between carbon and metallic arc welding	03	CO5
	(c)	Two lamps a and b of 120 Cd and 200 Cd respectively and placed 50m apart horizontally. Height of a and b above the ground level are 5m and 8 m respectively. Calculate illumination at midpoint on the ground between two lamps.	06	CO6
11.		Write a short note: (any three of the following)	3x5	
	(a)	High pressure mercury vapour lamp	5	CO6
	(b)	Resistance Seam welding	5	CO6
	(c)	Kando system of electrification	5	CO1
	(d)	Halogen Lamps	5	CO2
	(e)	Linear Induction motor.	5	CO3,CO4