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## **B.Tech DEGREE EXAMINATION, DECEMBER 2023**

Fifth, Sixth and Seventh Semester

## 18EEO307T - ELECTRICAL POWER UTILIZATION AND ILLUMINATION

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

## Note:

i. Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40<sup>th</sup> minute.
 ii. Part - B and Part - C should be answered in answer booklet.

Time: 3 Hours			Max. Marks: 100			
PART - A (20 × 1 = 20 Marks) Answer all Questions			Mark	s BL	со	
1.	Which of the following is not a high freque (A) Direct induction heating (C) Dielectric heating	ncy electric heating method?  (B) Indirect induction heating  (D) Direct arc heating	1	1	1	
2.	In central air conditioning system, the reheat (A) In between fan and air washer	(B) In between secondary filter and self-cleaning air filter	1	1	1	
3.	<ul><li>(C) Near the fresh air intake area</li><li>Thermal conductivity of diamond (in W/m-(A) 1000</li><li>(C) 314</li></ul>	(D) In the ducts  -K) is (B) 406.0 (D) 385	1	1	1	
4.	Heat transfer by conduction will not take p. (A) Kept in vacuum (C) At the same temperature	lace when the bodies are (B) Immersed in water (D) Exposed to thermal radiation	1	1	1	
5.	A solid angle is expressed in term of (A) radians/metre (C) steradians	(B) radians (D) degrees.	1	1	2	
6.	The unit of luminous flux is (A) watt/m <sup>2</sup> (C) lumen/m <sup>3</sup>	(B) lumen (D) watt	1	1	2	
7.	Which of the following statements are true (A) In sodium vapour lamp, the leak transf (B) The colour of sodium vapour discharge (A) A alone is true (C) Both A & B are true	ormer is used to stabilize the arc	1	2	2	
8.	In illumination technology, the ratio of the total lumens available after waste of light it (A) Utilisation factor (C) Beam factor	e total lumens emitted by the source to the sequal to  (B) Waste light factor  (D) Absorption factor	e 1	1	2	
9.	is not the process used in the purific (A) Liquation (C) Vapour phase refining	cation of crude metals.  (B) Distillation  (D) Electro-deposition	1	1	3	
10.	The voltage applied to the electrodes for e.  (A) 24 V to 48 V A.C  (C) 1 V to 6 V D.C	lectroplating is in the range of (B) 24 V to 48 V D.C (D) 1 V to 6 V A.C	1	2	3	

11.	Which of the following is not the application (A) Electro plating (C) Electro dynamo	on of electrolytic process? (B) Electro facing (D) Electro metallization	1	1	3
12.	The ability of electrolyte to produce the ev (A) Throwing power (C) Pickling		1	2	3
13.	The disadvantage of I.C engine drive used (A) High initial investment (C) Complex braking system	in traction is  (B) Speed control is complex (D) Limited overload capacity	1	1	4
14.	is not used in railway electrification (A) 600 V DC system (C) 15 kV at 25 Hz	n system presently. (B) 3.3 kV at 16 (2/3)Hz (D) 700V AC system	1	2	4
15.	The DC series motor has compared (A) Higher starting torque (C) Higher interference with communication lines	to AC series motor. (B) Lower running torque (D) Many speeds	1	1	4
16.	The crest speed is defined as  (A) The maximum speed attained by the train during the run	(B) The distance covered between two stops divided by the actual time of run	1	1	4
	(C) The ratio of distance covered between two stops and the total time of run	(D) The ratio of distance covered between two stops and the total time of run including time of stop			
17.	The vehicle speed developed by traction mo (A) Proportional to motor torque	otor is  (B) Proportional to gear ratio of transmission	1	2	5
	(C) Proportional to gear ratio of final drive	(D) Inversely proportional to radius of the drive wheels			
18.			1	1.	5
	Gear ratio of the transmission defined as (A) Input rotating speed/Output rotating speed	(B) Output rotating speed/input rotating speed			
	(C) Torque on the driven wheels/Output rotating speed	(D) Output rotating speed /Torque on the driven wheels			
	Hybrid cars normally have range in c (A) 10-20 km (C) 100-150 km	only electric mode. (B) 30-70 km (D) No limit	1	2	5
20.	is not a common component in electr (A) Battery (C) Generator	ric vehicle and hybrid electric vehicle.  (B) Electric vehicle control unit (ECU)  (D) Internal combustion engine	1	2	5
20	PART - B (5 × 4 = 20 Marks) Answer any 5 Questions		Mar	ks BL	со
21.	Write a short note on electrodes used in the	arc furnaces.	4	2	1
	2. What are the modern trends in electric heating?		4	2	ı
	State and Explain Laws of Illumination.	-	4	1	2
24.	What is Stroboscopic Effect?		4	1	2

25.	Explain the terms "Current efficiency" and "Energy efficiency" used in electrolytic process.	4	1	3
26.	List the disadvantages of conventional traction over modern days drive.	4	1	4
27.	Why do we need to consider the adoption of smart buildings?	4	3	5
	PART - C ( $5 \times 12 = 60 \text{ Marks}$ ) Answer all Questions	Mark	s BL	CO
28.	(a) Explain the different methods of electric welding and their relative advantages.	12	3	1
	(OR) (b) A 4.5 kW, 200 V, single phase resistance oven is to have nichrome wire heating elements. If the wire temperature is to be 1000°C and that of the charge 500°C. Estimate the diameter and length of the wire. The resistivity of the chrome alloy is 42.5 μΩ-m. Assume the radiating efficiency and the emissivity of the elements as 1.0 and 0.9 respectively.			
29.	and the halve of opitable	12	3	2
	(b) i) Write short notes on polar curves and explain the Rousseau's construction for calculating MSCP of lamp [6 marks] ii) Briefly explain the requirement of good lighting scheme [6 marks]			
30.	various non-standard conditions. Derive it (OR)	. 12	3	3
	<ul><li>(b) i. Discuss various factors affecting electro deposition process [6 marks]</li><li>ii. Compare electroplating, electroforming and electrolysis [6 marks]</li></ul>			
31.	(a) Calculate the specific energy consumption of train for a maximum speed of 12.20 m/s for 1525 meters with an acceleration of 0.366 m/s². Assume train resistance during acceleration is 52.6 newton/1000 kg and during coasting, it is 6.12 newton/1000 kg. 10% being allowable for rotational inertia. The efficiency of equipment during the acceleration period is 50 %. Assume a quadrilateral speed-time curve.	12	3	4
	(b) Explain the system of track generally employed for the following services.  Justify your answer and mention the voltages adopted in each case.  1. Electric sub-urban railway services 2. Main line services 3. Tramway service in a busy town area			
32.	scheme of smart buildings.  (OR)  (b) Discuss the different braking methods available for utilization in electric	12	2	5
	cars.			

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