Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF ARCHITECTURE AND PLANNING

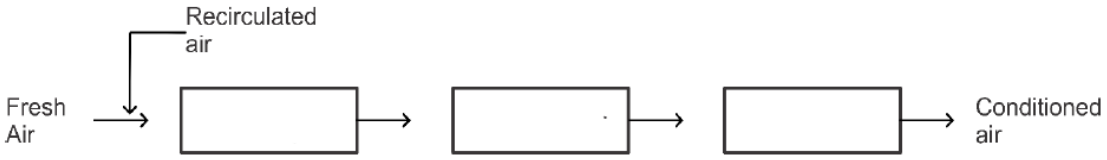
B.Arch./ B.ID/ Winter 2021-22 Examination

Semester: 6 **Date: (02/02/2022)**
Subject Code: (01101353) **Time: 2hrs**
Total Marks: 50

Subject Name: (Building Services and Equipments II)

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever required.
4. Draw suitable sketches wherever required.

Q.1	**A.** An electric power of 3.5 MW is transmitted to a location through transmission lines of total resistance, R = 35 Ω, at two different voltages. One is lower voltage (30 kV) and the other is higher (80 kV). Calculate and compare power losses in both the cases. **B.** List out the factors on which the duct size of an air conditioning system is dependent.	**(6+4)**
Q.2	**Attempt any five out of six. 1, 2, and 3 are compulsory.**	**(20)**
1)	**Fill in the blanks (Answer any 5):** **i.** For a given air velocity of 2m/s, the necessary cross-sectional area of supply-duct will be ____ **ii.** The recommended values of air changes for a hospital ward range from _____ to _____. **iii.** A _____ wire mainly consists of a tinned conductor having rubber coating. **iv.** Provision of a cooler at a window, with or without an exhaust fan at the ventilator is an example of a _____ system of ventilation. **v.** Multiple cooling units is possible in _____ air conditioner. **vi.** _____ are the opening present in the ducts. **vii.** _____ cables are used for the voltage level 132 kV to 25 kV. **viii.** _____ and _____ are the most common types of faults in domestic systems. **ix.** Star rating of an Air Conditioner is determined by _____ **x.** The minimum vertical and horizontal distance of a building from overhead high voltage electric lines of 11 kV – 33 kV should be _____ and _____ respectively.	4
2)	**Write True or False. If False, write the correct statements (Answer any 5).** **i.** A spray washer adds water vapor and increases humidity. **ii.** The generation voltage is usually between 132 kV and 400 kV. **iii.** PVC wires are available in 600, 660, 1100 voltage. **iv.** The operation of the fuse is faster when the fault current is smaller. **v.** Step down transformer converts low-voltage, high-current power into high-voltage, low-current power. **vi.** Busbars are the support system for busducts **vii.** The unit of ventilation heat flow rate is joule/sec or watt. **viii.** The power which is actually consumed or utilized in an AC circuit is called apparent power. **ix.** The electrical wiring system hidden inside the wall, roof, or floor with the help of plastic or metallic piping and plastering is called surface conduit wiring. **x.** The capacity of a split air conditioner is restricted to 2.0 Ton.	4
3)	**Multiple Choice Questions:** **1.** To reduce the energy lost during a long-distance transmission, electricity is	4

	transmitted a. through sub stations b. at low voltage c. through step up transformer d. at high voltage **2.** A cooling room air-conditioner, modifies the moisture content of the air, before letting it out by (a) reducing humidity (b) increasing humidity (c) optimally decreasing as well as increasing humidity (d) none of these, as it does not modify humidity **3.** For the given summer AC line diagram below, select the correct sequence of the blank boxes from the given options.  a. Humidifier, Filter, Reheating b. Filter, Reheating, Dehumidifier c. Filter, Dehumidifier, Reheating d. Dehumidifier, Humidifier, Reheating **4.** The Most common wiring method used in R.C.C structures is (a) Cleat wiring system (b) Wooden casing wiring (c) Conducting (d) Metal sheathed	
4)	**A.** In a house, 6 fans of 50W rating are operated for 6 hours each day, a water geyser of 2 kW rating is operated for 1 hour each day and 3 washing machines of 400W is operated for 2 hours each day. Find the total power consumption of the house (kWh) per week. Also, find the electricity bill for a month (31 days), if one-unit costs Rs 12. **B.** Define 1 Watt	3+1
5)	**A.** A room having dimension 12 m × 10 m × 3.5 m is required to be mechanically ventilated by air-conditioner. The temperature difference between outdoor ambient air and the supply air is 12 deg C. Consider three air exchanges per hour. The volumetric specific heat of the air is 1250 J/cu.m. deg C. Assume one ton of refrigeration (TR) is equal to 3.5 kW. The capacity of the air-conditioner for the room in TR will be _____. **B.** Define 1 Ampere	3+1
6)	**A.** Mention the functions of an Air Handling Unit in a building **B.** Define busbars and busducts	2+2
Q.3	**Attempt any four out of six:**	**(10)**
	1. Define Relative humidity	2.5
	2. Define Thermostat	2.5
	3. Draw Cable and show its inner structures	2.5

	4. Define Backfeeding	2.5
	5. Explain Ventilation rate	2.5
	6. What is the purpose of i. MCB, and ii. Earthing	2.5
Q.4	**Attempt any two out of three.**	**(10)**
1)	**A.** Briefly explain the important steps involved in a mechanical refrigeration cycle with neat and clean line diagram. **B.** A single phase Neutral (SPN) electrical circuit has a power consumption of 350W. Considering a voltage of 120V and power factor of 0.75, the electrical current drawn is _____ Amp.	3+2
2)	**A.** What is a substation. Name the basic components of a substation. Briefly explain the basic components of a substation. **B.** A classroom of 12m x 25m x 4m requires 3 air changes per hour. At an air velocity of 2 m/s, the necessary duct cross section (in sq m) is ____	3+2
3)	**A.** Why reheating is required in summer AC? **B.** Explain the steps involved in electrification flow from generation to the end user.	1+4