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Question Paper Code: 92006

B.E./B.Tech. DEGREE EXAMINATION, AUGUST 2021

Second Semester

Civil Engineering

19UPH206 – BUILDING PHYSICS

(Regulation 2019)

Duration: 1.45 hrs

Maximum: 50 Marks

PART A (Answer Any Ten)

10*2 = 20 Marks

1. Illustrates the benefits of thermal insulation CO2 – U
2. A black wood stove with surface area 4.6 m² is made from cast iron which is 4 mm thick. Its interior wall is at 650°C while the exterior is at 647°C. Calculate the rate of heat loss by radiation from the stove? CO1 – U
3. Give a short note on Heat Exchange processes between a building and the external environment CO2 – U
4. A spherical container of negligible thickness having heat loss by ventilation is 6K and by infiltration is 10K. The total heat loss is about 15K. Estimate the overall heat loss. CO1 – U
5. The intensity of sound produced by thunder is 0.1 Wm⁻². Calculate the intensity level in decibel. CO1 – U
6. Prove that an increase of sound intensity level by 1 dB would increase the intensity by 26% CO5– App
7. List out the characteristics of musical sound. CO2 –U
8. Classify sound waves based on the frequency. CO2– U
9. Illustrates the advantages of shape memory alloys. CO2– U
10. State the disadvantages of shape memory alloys. CO2– U
11. Give classification of ceramics based on crystal structure. CO2 – U
12. Mention the steps for the processing of ceramic materials. CO2– U
13. Mention different forms of nanomaterials CO2 – U

- 14 What are two routes through which nanoparticles can be synthesized? CO2 – U
- 15 Mention few techniques for synthesis of nano phase materials. CO2– U
- PART B (Answer Any Three) 3*10 = 30 Marks
16. The walls are constructed from an inner fire brick wall 25 cm thick of thermal conductivity 0.4 W/mK. Calculate the rate of heat loss through the vertical walls of a boiler furnace of size 4 m breadth 3 m high. Its overall heat transfer coefficient 1000 and the inside temperature of the fire brick layer was measured at 6000°C and the temperature of the outside of the insulation 600°C. CO1-App (10)
- 17 i) A hall has a volume of $1.3 \times 10^5 \text{m}^3$. It has a reverberation time of 1.4 second. What is the average absorption coefficient of the surface if total absorbing surface is 25,000m². CO5-App (10)
- ii) Calculate the reverberation time for an auditorium in which sound decays by absorption through 40 dB in 1.2 second.
- 18 Derive expressions for growth and decay of energy density inside a hall and hence deduce Sabine's formula for the reverberation time of the hall. CO2- U (10)
- 19 Explain the preparation, types, properties and applications of metallic glasses. CO2- U (10)
- 20 Describe the carbon nano tubes with properties and applications. CO2- U (10)