Reg. No. :

Question Paper Code: 51206

B.E. / B.Tech. DEGREE EXAMINATION, JUNE 2016

Second Semester

Civil Engineering

15UPH206 – BUILDING PHYSICS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The three modulus are connected by the relation of $\frac{9}{Y} = \frac{1}{K} +$ _____.

    (a) $\frac{3}{\eta}$ (b) $\frac{\eta}{3}$ (c) $\frac{2}{\eta}$ (d) none of these

2. The bending moment of the beam is equal to

    (a) $YRIg$ (b) $\frac{Y}{R}Ig$ (c) $\frac{YR}{Ig}$ (d) none of these

3. _____ is the frequency of the audible sound waves.

    (a) 20Hz-200Hz   (b) 20Hz-20MHz
    (c) 20Hz-20KHz   (d) none of these

4. The audible intensity level is _____ to _____ dB.

    (a) 0 to 100   (b) 0 to 120   (c) 0 to 140   (d) none of these

5. The liquid is drawn into the crack in liquid penetrant testing due to

    (a) capillary action   (b) surface tension
    (c) high viscosity   (d) all the above

6. In which the following factors are affected by thermography measurements.

   (a) emissivity, operating frequency and atmosphere

   (b) emissivity, surroundings and atmosphere

   (c) emissivity, surface nature of object and temperature

   (d) none of these

7. The dramatic increase in amplitude near the natural frequency of the system is

   (a) damping   (b) critical damping   (c) resonance   (d) none of these

8. The superposition of two waves of the same frequency moving in the same direction is called

   (a) interference   (b) diffraction   (c) deflection   (d) all the above

9. Ball milling containers are rotated at high speed from _____ to _____ rpm around their own axis.

   (a) 200 to 300   (b) 300 to 600   (c) 600 to 900   (d) 800 to 1000

10. Sol-gel process is a

    (a) wet chemical   (b) dry chemical

    (c) vapour chemical   (d) both (a) and (b)

PART - B (5 x 2 = 10 Marks)

11. Define elastic limit.

12. Define absorption coefficient of a materials.

13. Write the advantages of liquid penetrating method?

14. What are the three conditions for the occurrence of simple harmonic oscillators?

15. Write the principle of ball milling method?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) State Hooke's law of elasticity. Draw stress-strain diagram and discuss the behavior of ductile material under loading. (10)

    (ii) Discuss the factor affecting the elasticity of a material. (6)

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(b) (i) Explain with theory, the determination of Young's modulus of elasticity of the material of a beam, supported at its end and loaded at both end. (12)

(ii) A lathe of width $2cm$ and thickness 3mm, supported horizontally on knife-edges $80cm$ apart, is loaded with weight of $10gm$ hung from its ends which project $15cm$ beyond the knife edges. If the centre of lathe is there by elevated by $2mm$. Calculate the Young's modulus of its material. (4)

17. (a) (i) Derive the expression for growth and decay of the energy density inside a hall and hence deduce Sabine's mathematical relation for reverberation time of the hall. (14)

(ii) Calculate the reverberation time of hall with volume of $1500m^3$ and total absorption is equivalent to $80m^2$ sabine. (2)

Or

(b) (i) Discuss the following factors affecting the acoustics of building with their remedies: (a) Echo (b) Resonance (c) Noise (d) Loudness. (12)

(ii) What are the factors to be followed for good acoustics of building? (4)

18. (a) (i) Differentiate destructive and non-destructive testing methods. (4)

(ii) Explain the process of non-destructive testing of materials using ultrasonic waves by (a) pulse echo system (b) through transmission techniques. (12)

Or

(b) (i) Draw the diagram of thermo graphic camera and mention the parts. (4)

(ii) Write an essay on the thermography principle, working and applications both in industry and medicine. (12)

19. (a) (i) What is SHM? Show that for a simple harmonic oscillator, mechanical energy remains constant and it is proportional to the square of the amplitude. (10)

(ii) Write the characteristic of simple harmonic motion. (6)

Or

(b) (i) Define the following terms: (a) damping (b) weak damping (c) heavy damping. (6)

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(ii) Derive Snell's law to describe the diffraction of two medium with necessary diagram. (10)

20. (a) (i) Distinguish between physical vapour deposition and chemical vapour deposition. (4)

   (ii) Describe the fabrication of nanomaterials by physical vapour deposition method. (12)

Or

(b) (i) Explain the principle, construction and working of transmission electron microscope with neat diagram. (12)

   (ii) Differentiate between scanning electron microscope and transmission electron. (4)

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