Reg. No. :

Question Paper Code: 50026

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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. A spiral spring is stretched by a weight attached to it. The strain will be

    (a) elastic   (b) bulk   (c) shear   (d) tensile

2. The ratio of lateral contraction to longitudinal strain, when a body undergoes a linear tensile strain is known as

    (a) modulus of elasticity   (b) Young's modulus
    (c) bulk modulus   (d) Poisson's ratio

3. The walls of a hall built for music concerns should

    (a) amplify sound   (b) reflect sound
    (c) transmit sound   (d) absorb sound

4.   The unit of absorption is

    (a) decibel   (b) phon   (c) sabine   (d) bel

5. Cracks as narrow as _____ can be detected by liquid penetrating testing.

    (a) 120 nm   (b) 150 nm   (c) 130 nm   (d) 140 nm

6. If 'v' is the velocity of ultrasonic waves in the material, then the distance of the defect from the surface of the object is given by

    (a) $d = vt$ (b) $d = \dfrac{vt}{3}$ (c) $d = \dfrac{vt}{2}$ (d) $d = \dfrac{vt}{4}$

7. The energy given out by a vibrating source of sound is proportional to

    (a) first power of its amplitude   (b) square root of its amplitude

    (c) second power of its amplitude   (d) fourth power of its amplitude

8. Which of the following phenomena cannot take place with sound waves?

    (a) reflection   (b) interference

    (c) diffraction   (d) polarisation

9. A nanometer is _____ million of a metre.

    (a) one hundred   (b) one tenth

    (c) one thousand   (d) none of these

10. Materials that have one dimension in the nano scale are

    (a) nanowires   (b) nanolayers

    (c) nanotubes   (d) nanoparticles

PART - B (5 x 2 = 10 Marks)

11. State Hooke's law.

12. Define absorption coefficient.

13. What is the goal of NDT?

14. What are forced vibrations?

15. Mention the advantages of sol-gel process.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Derive an expression for the depression at the free end of a cantilever due to load.   (10)

    (ii) Explain stress-strain diagram.   (6)

Or

    (b) (i) Describe an experiment to measure the Young's modulus of the given beam by uniform bending.   (10)

    (ii) What is an I-section girder? Why are they preferred?   (6)

17. (a) Derive Sabine's formula by using growth and decay method.   (16)

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(b) Explain various factors affecting architectural acoustics and their remedies. (16)

18. (a) (i) What are the objectives of NDT? (6)

(ii) Describe the working of ultrasonic flaw detector for non destructive testing. Mention its advantages. (10)

Or

(b) (i) What are the essential steps of liquid penetrant testing method? (6)

(ii) Explain in detail "pulse echo technique" of the Non destructive testing method. (10)

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

(ii) Explain the principle of superposition. (6)

Or

(b) (i) (i) What is resonance? Give some important examples of resonance. (6)

(ii) Discuss the under-damped, over-damped and critically damped motion of a damped oscillator. (10)

20. (a) (i) With a neat sketch, explain ball milling process for synthesis of nano particles. (8)

(ii) Explain sol-get synthesis for producing nano materials with a neat diagram. (8)

Or

(b) (i) Explain the working of scanning electron microscope with a neat sketch. (10)

(ii) Give the applications of nano materials. (6)

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