

SEAT No. _____

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[24]

E+K

DATE: 29/01/2021
FRIDAY

SARDAR PATEL UNIVERSITY, V.V. NAGAR
B.Sc. SEMESTER:1 Examination
PHYSICS CODE : US01CPHY21
Mechanics-1, Network
Analysis & Optics

TIME:- 2.00 P.M to 4.00 P.M

Total Marks: 70

- N.B : (1) All the symbols and notations have their usual meanings.
(2) Figure at the right hand side of questions indicate full marks.

Q-1) Choose the correct option for the following questions.

[10]

- (1) The dimensional formula of stress is
(a) $[M^1 L^1 T^2]$ (b) $[M^1 L^{-1} T^{-2}]$ (c) $[M^1 L^0 T^{-2}]$ (d) $[M^1 L^1 T^{-2}]$
- (2) A close example of a perfectly elastic material is
(a) putty (b) quartz fiber (c) silver (d) platinum
- (3) The Kater's pendulum is also known as pendulum.
(a) simple (b) conical (c) reversible (d) torsional
- (4) The sound wave having frequency lower than the audible range are called waves.
(a) Infrasonic (b) electromagnetic (c) ultrasonic (d) inverse
- (5) Junction is a point of a network where the number of components connected are
(a) two (b) three (c) two or more (d) three or more
- (6) In an AC bridge the null detector is usually
(a) a galvanometer (b) an ammeter (c) a head phone (d) a voltmeter
- (7) Wien bridge is used to measure the unknown
(a) resistance (b) reactance (c) frequency (d) capacitance
- (8) The working principle of Jamin's Interferometer is based on division of
(a) amplitude (b) frequency (c) wavelength (d) wavefront
- (9) The criterion for resolution of optical instrument was given by
(a) Lord Rayleigh (b) Newton (c) Einstein (d) Young
- (10) The resolving power of a grating having N slits in n^{th} order will be
(a) nN (b) n/N (c) $n + N$ (d) $n - N$

Q-2) Fill in the blanks.

[8]

- (1) The expression for time period of torsional pendulum is
- (2) Any closed path of a network is known as
- (3) The time period of the simple pendulum is
- (4) The resolving power of prism does not depend on the

Write true or false.

- (5) Compressibility of a material is reciprocal of bulk modulus.
- (6) Maxwell bridge is generally used to measure the unknown inductance.
- (7) Ultrasonic waves move with the same velocity as the sound waves.
- (8) Jamin refractometer is used to determine the refractive index of gas at different pressure.



(1)

(P.T.O.)

Q-3) Answer the following short questions.(Any Ten)

[20]

- (1) Draw stress \rightarrow strain diagram for elongation of a wire.
- (2) Define : Young's modulus.
- (3) State Hook's law.
- (4) State voltage divider theorem.
- (5) Draw the circuit diagram for the Wheatstone bridge and write its balance condition.
- (6) State Thevenin theorem.
- (7) State the properties of ultrasonic.
- (8) Give the applications of ultrasonic.
- (9) Explain the centre of oscillation for compound pendulum.
- (10) What is diffraction ? Write the types of diffraction.
- (11) Draw the ray diagram of Jamin's interferometer.
- (12) State the uses of Michelson interferometer.

Q-4) Give Detailed answer of the following questions.(Any Four)

[32]

- (1) Derive the formula for the work done per unit volume in stretching a wire.
- (2) Derive an expression for torsional rigidity of the cylinder.
- (3) What is compound pendulum? Derive an expression for it's time period.
- (4) What is piezoelectric effect ? Explain construction and working of piezoelectric generator.
- (5) Explain two mesh network by mesh current method.
- (6) Discuss schering Bridge with necessary circuit diagram.
- (7) Derive the formula for the resolving power of telescope.
- (8) Explain principle, construction and working of michelson's interferometer.



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