

# Cumilla Board 2016

Physics

Subject Code 

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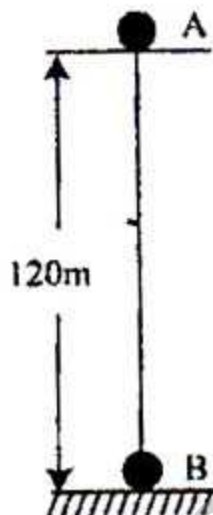
Time — 2 hours 10 minutes

Creative Essay Type

Full marks — 40

[N.B. -The figures in the right margin indicate full marks. Answer any four Questions.]

1 ►



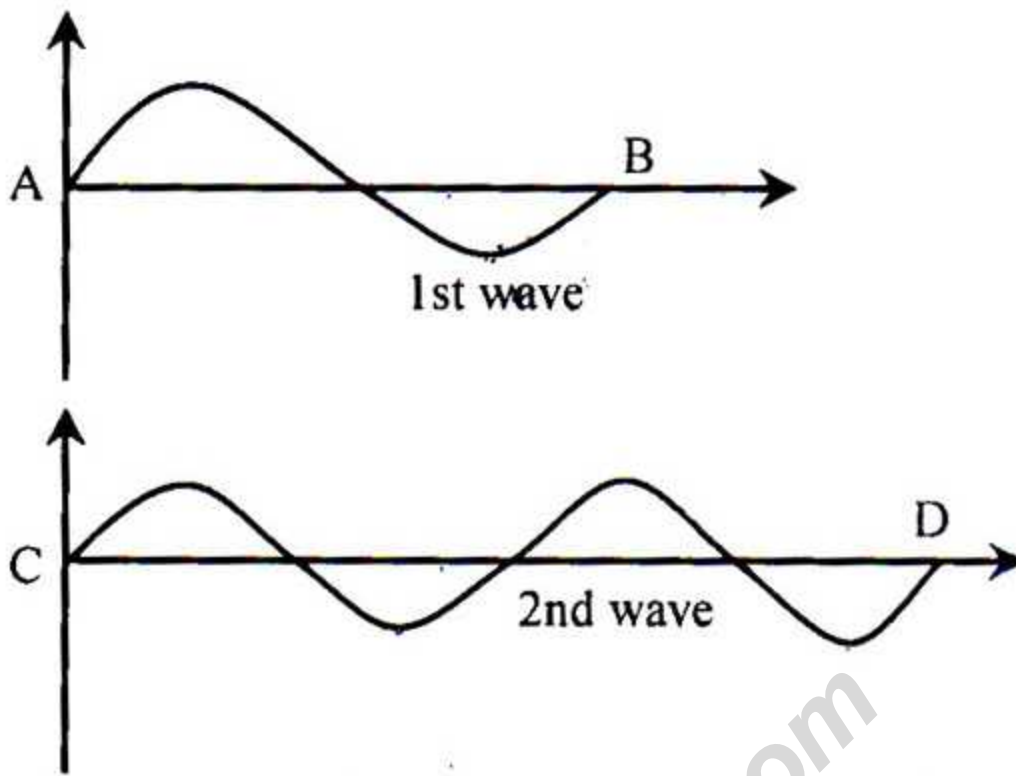
In the fig. a body 'A' is falling from a height 120m. At the same time, another body 'B' is thrown vertically upward with a velocity  $19.6 \text{ ms}^{-1}$ .

- Define efficiency. 1
- What is meant by the force of amount  $6 \times 10^5 \text{ N}$ ? 2
- Determine the velocity of 'A' body after 1.8s. 3
- Except ground, will these bodies meet at any point? State your opinion with mathematical explanation. 4

2. ★ Mina sat with her little brother beside the pond. Her brother hold a ball of mass of 200g and of volume  $250 \text{ cm}^3$ . Suddenly the ball fell down into the pond. The depth of the pond was 3m. (Density of water is  $1000 \text{ kg/m}^3$  and  $g = 9.8 \text{ ms}^{-2}$ ).

- State the law of elasticity of Robert Hook. 1
- What is meant by the work done 250J? 2
- Determine the pressure of water at the bottom of the pond. 3
- Will the ball sink into the water? — Explain your opinion mathematically. 4

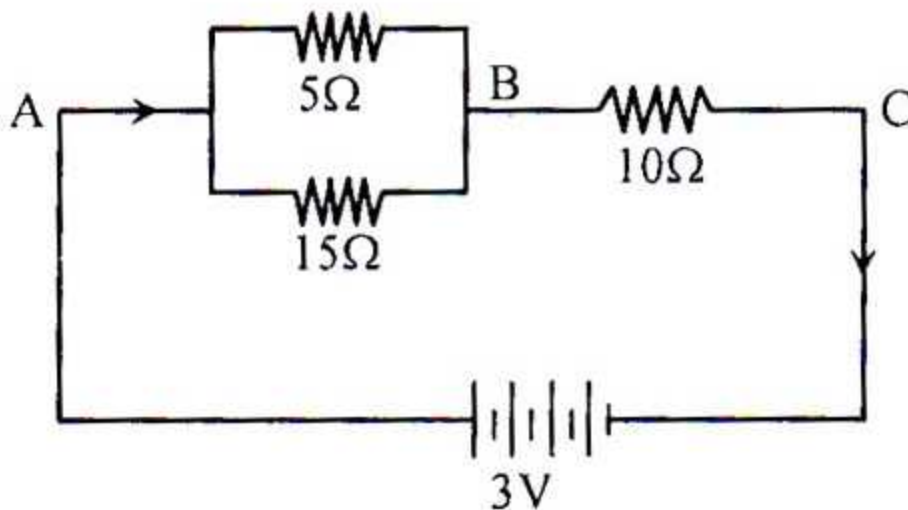
3. ▶



The time taken to reach A to B for 1st wave and C to D for 2nd wave are respectively 0.05s and 0.08s. Velocity of 1st wave is  $300 \text{ ms}^{-1}$ .

- Define the range of audibility. 1
- "Whenever a sound is created at one end of a long hollow steel pipe, then at the other end, the sound is heard two times."— Explain why? 2
- Determine the displacement after 10sec for 1st wave. 3
- Compare the frequencies of the above given two waves. 4

4. ★



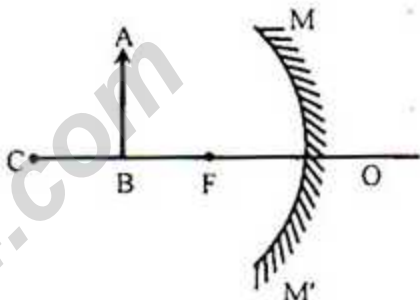
Potential difference between B and C point is 2.2V.



- a. Define electric induction? 1
- b. If a positively charged body is kept in contact with a negatively charged electroscope, then what will happen?— Explain. 2
- c. Determine the amount of flow of current through  $10\Omega$  resistance. 3
- d. How can you arrange the given resistances to get a equivalent resistance  $7.5\Omega$ ? Explain mathematically. 4
5. ► Area of a copper plate and a steel plate at  $10^\circ\text{C}$  is  $9\text{m}^2$  each. After applying heat, temperature becomes  $50^\circ\text{C}$  and due to this the area of steel body becomes  $9.012024\text{m}^2$ . (Co-efficient of superficial expansion of copper is  $22.0 \times 10^{-6}\text{K}^{-1}$ ).
- a. Define 1 kelvin. 1
- b. The rotation of earth around the sun is which type of motion? Explain. 2
- c. Determine the co-efficient of volume expansion of copper. 3
- d. By increasing the temperature is it possible to place the copper plate on the steel plate equally? Explain your opinion mathematically. 4
6. ★ Grandfather of Nafis cannot see the nearer object. Eye specialist gave him a glass of lens of power  $+2.25\text{D}$  and suggest him to wear it.
- a. What is lens? 1
- b. "If in front of eye, flare is moved suddenly, then in eye a circle of fire will be seen".—Explain. 2
- c. Determine the focal length of the glass of grandfather. 3
- d. Why he (Grandfather of Nafis) was prescribed a glass of positive power?—Explain this logically with figure. 4



[Fill the circle completely (●) with the correct or most appropriate answer, corresponding to the question number. Make sure to use a ball point pen. Each question carries 1 mark.]

- How much gram is equal to one tera gram?  
 (a)  $10^9$  (b)  $10^{12}$   
 (c)  $10^{15}$  (d)  $10^{18}$
  - ★ Which one is vector quantity?  
 (a) Speed (b) Electric intensity  
 (c) Work (d) Temperature
  - What is the dimension of momentum?  
 (a)  $ML^2T^{-2}$  (b)  $ML^2T^{-3}$   
 (c)  $MLT^{-1}$  (d)  $MLT^{-2}$
  - What is the unit of potential energy?  
 (a) Pascal (b) Newton  
 (c) Watt (d) Joule
  - Before releasing an arrow which type of energy is stored in arrow and bow?  
 (a) Kinetic energy  
 (b) Potential energy  
 (c) Chemical energy  
 (d) Heat energy
  - For a particular liquid if the depth is made three meter to nine meter then how many time the pressure will be increased?  
 (a) 3 times (b) 6 times  
 (c) 9 times (d) 12 times
  - What is the relation between the coefficient of linear ( $\alpha$ ), superficial ( $\beta$ ) and volume ( $\gamma$ ) expansion?  
 (a)  $3\alpha = 2\beta = \gamma$  (b)  $\alpha = 6\beta = 2\gamma$   
 (c)  $6\alpha = 3\beta = 2\gamma$  (d)  $6\alpha = 3\beta = 3\gamma$
  - While measuring the length of a rod, found main scale reading and vernier super imposition are 8 cm and 4 respectively. If the vernier constant is 0.01 cm then what is the length of the rod?  
 (a) 12 cm (b) 8.04 cm  
 (c) 8.01 cm (d) 7.96 cm
  - A body of mass 10 kg was moving with a velocity  $2ms^{-1}$ . After applying force,  $2ms^{-2}$  acceleration is created. After 2sec, what will be the change of momentum?  
 (a)  $0 kg ms^{-1}$  (b)  $20 kg ms^{-1}$   
 (c)  $40 kg ms^{-1}$  (d)  $60 kg ms^{-1}$
  - ★ Opposite quantity of conductivity is called—  
 i. specific resistance  
 ii. resistivity  
 iii. resistance  
 Which one is correct?  
 (a) i & ii (b) i & iii  
 (c) ii & iii (d) i, ii & iii
  - What is the density of ice?  
 (a)  $920 kgm^{-3}$  (b)  $1000 kgm^{-3}$   
 (c)  $1260 kgm^{-3}$  (d)  $7800 kgm^{-3}$
  - Which one is correct?  
 (a)  $\frac{C}{5} = \frac{F}{9}$  (b)  $\frac{C}{9} = \frac{F - 32}{3}$   
 (c)  $\frac{F - 32}{9} = \frac{K - 273}{5}$  (d)  $\frac{C}{5} = \frac{K - 273}{9}$
  - What is the velocity of sound in water at  $20^\circ C$  temperature?  
 (a)  $344 ms^{-1}$  (b)  $1350 ms^{-1}$   
 (c)  $1400 ms^{-1}$  (d)  $1450 ms^{-1}$
  - Which type of image is formed in plane mirror?  
 (a) Virtual and erect  
 (b) Virtual and magnified  
 (c) Real and erect  
 (d) Real and magnified
  - What is the angle between the direction of vibrating particle and the direction of propagation of wave in transverse wave?  
 (a)  $90^\circ$  (b)  $45^\circ$   
 (c)  $30^\circ$  (d)  $0^\circ$
  - 

In figure, where will be the position of image of the object AB?  
 (a) Between O and F  
 (b) Between C and F  
 (c) Between C and infinity  
 (d) At infinity
  - In 12s a boy crosses 6m high stair. If the mass of the boy is 40 kg, then what is the power of the boy?  
 (a) 20W (b) 32.67W  
 (c) 196W (d) 2352W
  - If the volume of a body of mass 10 kg is  $0.5 m^3$ , then what is its density?  
 (a)  $0.005 kgm^{-3}$  (b)  $0.05 kgm^{-3}$   
 (c)  $5 kgm^{-3}$  (d)  $20 kgm^{-3}$
- Based on the stem given below answer questions No. 19 and 20 :—  
 3N and 2N force is applied on a body of mass 5kg in the same direction and at the same time. And after 2sec, these forces are released.
- What is the acceleration?  
 (a)  $1 ms^{-2}$  (b)  $1.67 ms^{-2}$   
 (c)  $2.5 ms^{-2}$  (d)  $25 ms^{-2}$
  - After 3 sec, which one is correct?  
 (a) Acceleration will decrease  
 (b) Momentum will decrease  
 (c) Velocity will remain same  
 (d) Body will be stopped



21. For any critical angle, what is the amount of angle of refraction?

- (a)  $0^\circ$  (b)  $45^\circ$   
(c)  $90^\circ$  (d)  $180^\circ$

22. Which one is the technology to examine blockage in a fine blood vessel?

- (a) Angioplasty (b) Angiogram  
(c) ECG (d) ETT

23. What is the value of Coulomb's constant?

- (a)  $9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$   
(b)  $9 \times 10^8 \text{ Nm}^2\text{C}^{-2}$   
(c)  $9 \times 10^7 \text{ Nm}^2\text{C}^{-2}$   
(d)  $9 \times 10^6 \text{ Nm}^2\text{C}^{-2}$

24. What is the relation between the potential difference (V) of the two terminals of a conductor and flow of current (I)?

- (a)  $V = \frac{1}{R}$  (b)  $I = \frac{R}{V}$   
(c)  $R = \frac{1}{V}$  (d)  $R = \frac{V}{I}$

25. If  $n_b = 2.4$ , then—


- i. "b" medium is denser than "a" medium  
ii. incident angle is equal to refracted angle  
iii. velocity of light is less in "b" medium

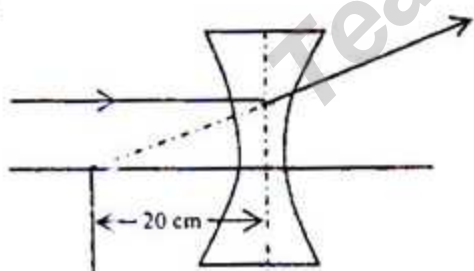
Which one is correct?

- (a) i & ii (b) i & iii  
(c) ii & iii (d) i, ii & iii

26. If the distance between two charged body  $q_1$  and  $q_2$  is made 1.5 times, then what will be the change in force between them?

- (a)  $\frac{1}{1.5}$  times (b)  $\frac{1}{2.25}$  times  
(c) 1.5 times (d) 2.25 times

27. 



An object is placed more than 50cm away from a person who cannot see the distant object distinctly, then he—


- i. needs a lens which is given in stem  
ii. needs a lens which has more focal  
iii. needs a lens of power  $-2\text{D}$

Which one is correct?

- (a) i & ii (b) i & iii  
(c) ii & iii (d) i, ii & iii

28. No. of turn of primary and secondary of a transformer are 36 and 180 respectively. if the flow of current through primary coil is 10A, then what will be the flow through secondary coil?

- (a) 0.05A (b) 0.02A  
(c) 0.5A (d) 2A

29.  If the thermal capacity of a body of mass 10 kg is  $4000 \text{ JK}^{-1}$ , then what is the specific resistance of the body?

- (a)  $40000 \text{ Jkg}^{-1}\text{K}^{-1}$   
(b)  $400 \text{ Jkg}^{-1}\text{K}^{-1}$   
(c)  $40 \text{ Jkg}^{-1}\text{K}^{-1}$   
(d)  $2.5 \times 10^{-3} \text{ Jkg}^{-1}\text{K}^{-1}$

30. Transformer works following which process?

- (a) Electric induction  
(b) Thermal effect of electricity  
(c) Magnetic effect of electricity  
(d) Electromagnetic induction

31. What is the mass of beta particle?


- (a)  $9.11 \times 10^{-31} \text{ kg}$   
(b)  $9.11 \times 10^{31} \text{ kg}$   
(c)  $1.6 \times 10^{-19} \text{ kg}$   
(d)  $1.6 \times 10^{19} \text{ kg}$

32. What is meant by the speed of a body  $18 \text{ ms}^{-1}$ ? The body travels—

- i. 18 m in 1s  
ii. 36 m in 2s  
iii. 54 m in 3s

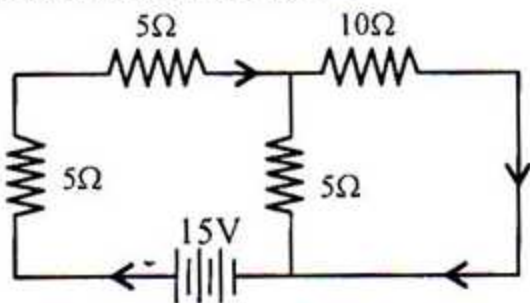
Which one is correct?

- (a) i & ii (b) i & iii  
(c) ii & iii (d) i, ii & iii

33.  What is the relation between action force ( $F_1$ ) and reaction force ( $F_2$ )?

- (a)  $F_1 = F_2$  (b)  $-F_1 = F_2$   
(c)  $F_1 + F_2 = 0$  (d)  $F_1 > F_2$

Based on the figure given below, answer questions No. 34 and 35 :—



34. What is the equivalent resistance of the circuit?

- (a)  $7.5 \Omega$  (b)  $13.33 \Omega$   
(c)  $17.5 \Omega$  (d)  $25 \Omega$

35. If  $10\Omega$  resistance is removed from the circuit, then—

- i. flow of current will be decreased  
ii. equivalent resistance will be increased  
iii. potential difference of the two terminals of each resistance will be equal

Which one is correct?

- (a) i, ii & iii (b) i & ii  
(c) ii & iii (d) i & iii

Ans.	1	(b)	2	(b)	3	(c)	4	(d)	5	(b)	6	(a)	7	(c)	8	(b)	9	(c)	10	(a)	11	(a)	12	(c)	13	(d)	14	(a)	15	(d)	16	(c)	17	(c)	18	(d)	19	(a)	20	(c)
	21	(c)	22	(b)	23	(a)	24	(d)	25	(b)	26	(b)	27	(d)	28	(d)	29	(b)	30	(d)	31	(a)	32	(d)	33	(c)	34	(b)	35	(a)										