

**WAMPEEWO NTAKKE S.S**

**S.4 2016 PHYSICS INTERNAL MOCK**

**535/1**

**TIME: 2 HOURS 15 MINUTES**

Answer all questions in both sections A, and B.

Where necessary use;

Acceleration due to gravity =  $10\text{ms}^{-2}$

Specific heat capacity of water =  $4200\text{Jkg}^{-1}\text{k}^{-1}$

Speed of sound in air =  $330\text{ms}^{-1}$

**SECTION A**

1		11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

**SECTION A: (40 MARKS)**

1. Which one of the following statements is related to the process of evaporation is incorrect?
  - A. Evaporation occurs at any temperature.
  - B. Evaporation takes place within the liquid.
  - C. Temperature may change during evaporation.
  - D. No bubbles are formed in liquid during evaporation.
  
2. As pressure is lowered,
  - A. Melting point of ice decreases.
  - B. Melting point of ice increases.
  - C. Boiling point of water increases.
  - D. No change is observed in the melting point of ice or boiling point of water.
  
3. Which of the following have the lowest frequency?
  - A. Radio waves
  - B. Infra red
  - C. Ultra violet
  - D. Gamma rays
  
4. In which of the following is the speed of sound least?
  - A. Liquid
  - B. Solid
  - C. Vacuum
  - D. Air
  
5. A source of frequency 500Hz emit waves of wave length 0.4m, how long does the wave take to travel 600m?
  - A. 3s
  - B. 6s
  - C. 9s
  - D. 12s
  
6. An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the sending and receiving of the wave is 1.6s. What is the depth of the sea if the velocity of sound in the sea water is 1400m/s?
  - A. 1120m
  - B. 560m
  - C. 1400m
  - D. 112m
  
7. 1D is the power of the lens of focal length ..... cm
  - A. 10

B.  $\frac{1}{100}$

C. 100

D.  $\frac{1}{10}$

8. An object is placed 12cm from a convex lens whose focal length is 10cm. The image must be

A. Virtual and magnified

B. Virtual and diminished

C. Real and diminished

D. Real and magnified

9. Two objects of masses  $1 \times 10^{-3} \text{kg}$  and  $4 \times 10^{-3} \text{kg}$  have equal momentum. What is the ratio of their kinetic energies.

A. 2:1

B. 4:1

C. 16:1

D.  $\sqrt{2} : 1$

10. A 40N object is released from a height of 10m. Just before it hits the ground, its kinetic energy in joules is

A. 3920

B. 400

C. 2800

D. 4000

11. The S.I unit of impulse is

A. Ns

B.  $\text{Ns}^2$

C.  $\text{Kgms}^{-2}$

D.  $\text{Kgm}2\text{s}^{-2}$

12. The resultant of action and reaction forces is

A. Greater than zero

B. Less than zero

C. Zero

D. One.

13. The radiation in sunlight that gives us the feeling of hotness is

A. Visible radiation

B. Infra – red

- C. Solar
- D. Ultra – violet

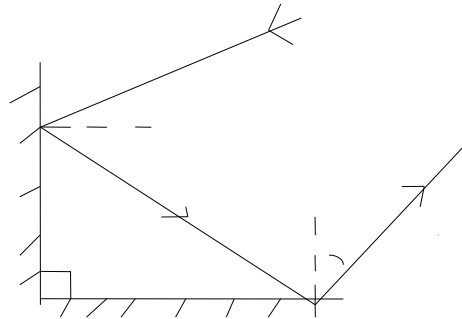
14. Which of these is not a renewable source of energy?

- A. The sun
- B. Wind
- C. Natural gas
- D. Ocean tidal energy

15. A solar cell converts

- A. Heat energy into electrical energy
- B. Heat energy into light energy
- C. Solar energy into light energy
- D. Solar energy into electrical energy.

16. Two plane mirrors are inclined at  $90^\circ$  as shown below.



What is the value of  $k$

- A.  $30^\circ$
- B.  $45^\circ$
- C.  $90^\circ$
- D.  $60^\circ$

17. A ray of light passing through the.....retraces its path.

- A. Principle focus
- B. Centre of curvature
- C. Pole
- D. Aperture

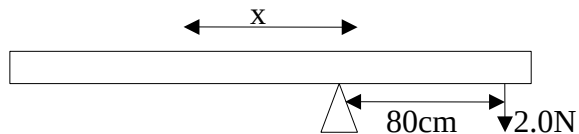
18. A rocket or jet engine works on the

- A. Principal of conservation of energy
- B. Newton's second law of motion
- C. Principal of conservation of momentum

- D. Principal of moments.
19. Three resistors of  $2\Omega$ ,  $3\Omega$ , and  $4\Omega$  are connected so that the equivalent resistance is  $9\Omega$ , the resistors are connected
- A. All in series
  - B. All in parallel
  - C. The  $2\Omega$  and  $3\Omega$  resistors are in parallel and the combination in series with the  $4\Omega$  resistor.
  - D.  $2\Omega$  and  $3\Omega$  are in series and the combination in parallel with the  $4\Omega$  resistor.
20. The work done in moving a positive charge of one Coulomb across two points in an electric circuit is known as
- A. Current
  - B. Potential difference
  - C. Resistance
  - D. Power
21. What is the number of protons contained in an atom of mass number 23 and atomic number 11?
- A. 11
  - B. 12
  - C. 23
  - D. 44
22. A feather and coin released simultaneously from the same height do not reach the ground at the same time. This is due to
- A. Resistance of air
  - B. force of gravity
  - C. difference in mass
  - D. difference in weight
23. A fish in a pond looks at a man standing besides the pond. To the fish the man appears to be
- A. smaller and nearer than he actually is.
  - B. Smaller and further than he actually is.
  - C. Larger and nearer than he actually is.
  - D. Larger and further than he actually is.
24. When substance A and B are both heated with the same heater, the temperature of A rises faster than that of B. This implies that;
- A. A has a higher specific heat capacity than B.
  - B. A has a lower specific heat capacity than B.

- C. A has a higher heat capacity than B.  
D. A has a lower heat capacity than B.
25. Which of the following is the plane mirror image of the word EXAMPLE?  
A. EXAMPLE  
B.  
C.  
D.
26. The pressure exerted by a cubic block is P. Find the pressure if the length of the block is doubled
- A.  $\frac{p}{4}$   
B.  $\frac{p}{2}$   
C. 2p  
D. 4p
27. A building is 512m high. What must be the minimum water pressure in a pipe at ground level in order to get water up to a restaurant on the top floor.  
A.  $1 \times 10^5$  Pa  
B.  $5 \times 10^6$  Pa  
C.  $6 \times 10^5$  Pa  
D.  $5 \times 10^8$  Pa
28. A blue object appear black when illuminated with  
A. Blue light  
B. Cyan light  
C. Yellow light  
D. Magenta light
29. Which of the following is true about static friction?  
(i) It opposes take off objects.  
(ii) It reduces speed of moving objects.  
(iii) It depends on the weight of an object.  
A. (i) only  
B. (i) and (iii) only  
C. (ii) and (iii) only  
D. (i), (ii) and (iii)

30. A heater rated 200W was used to keep a liquid boiling in a vessel for 50 seconds if the mass reduced by 0.05kg, calculate the specific latent heat of vaporization of the liquid.
- $8.0 \times 10^2 \text{ Jkg}^{-1}$
  - $1.0 \times 10^4 \text{ Jkg}^{-1}$
  - $4.0 \times 10^4 \text{ Jkg}^{-1}$
  - $2.0 \times 10^5 \text{ J kg}^{-1}$
31. In an experiment to determine the frequency of a tuning fork, using a resonance method, the first overtone is obtained when the length of the air column is 30cm. What is the estimated frequency of the tuning fork
- 647.06 Hz
  - 161.76 Hz
  - 242.65 Hz
  - 275.00 Hz
32. Umeme charges 600/= per unit of electric energy consumed. What is the total cost of operating four light bulbs at 100W each for five hours?
- sh. 286.7
  - sh. 7500
  - sh. 1200
  - sh. 1,200,000
33. The figure below shows a non uniform bar of mass 3.2kg balancing horizontally. Determine the distance x of its centre of gravity from the pivot.



- 5.0cm
  - 8.0cm
  - 32cm
  - 50cm
34. When using a magnifying glass to see a small object
- An upright image is seen.
  - The object should be at a distance than the focal length.
  - A real image is seen.

Which statement (s) is / are correct?

- (i), (ii) and (iii)
  - (i) and (ii) only
  - (ii) and (iii) only
  - (i) and (iii) only
35. A bottle of soda removed from freezing compartment of a refrigerator is wiped dry with a cloth. After some time water droplets form on the bottle surface. This is because

- A. Water droplets come from soda through the bottle.
  - B. Filtration of soda takes place.
  - C. Evaporation of soda takes place.
  - D. Water vapour from the atmosphere condenses on the bottle.
36. A section taken through a progressive wave in which all particles are in phase is called...
- A. Crest
  - B. Wave front
  - C. Wave length
  - D. Trough
37. Which of the following statements is true about concrete?
- A. It is both brittle and ductile
  - B. It is a ductile material
  - C. It is weak under tension and strong under compression.
  - D. It is strong under tension and weak under compression.
38. Aquatic life is preserved in oceans during winter when the temperatures fall below  $-10^{\circ}\text{C}$  because
- A. Ocean water has salt that preserves the creatures
  - B. Water has a maximum volume at  $4^{\circ}\text{C}$  so it sinks.
  - C. Water has a maximum density at  $4^{\circ}\text{C}$  so it sinks.
  - D. Water has a maximum mass at  $4^{\circ}\text{C}$  so it sinks.
39. An athlete completed a 10,000 race in 28 minutes, 40 seconds. Calculate the average speed of the athlete.
- A.  $14.7\text{ms}^{-1}$
  - B.  $6.21\text{ms}^{-1}$
  - C.  $5.95\text{ms}^{-1}$
  - D.  $5.8\text{ms}^{-1}$
40. Which of the following is said to have taken place when waves bend around an obstacle?
- A. Depletion
  - B. Refraction
  - C. Diffraction
  - D. Interference



**SECTION B: ( 40 MARKS)**

41. (a) Define centre of gravity of a body. (1)

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(b)

The figure above shows a glass bottle containing some water and resting on a bench. State and explain what happens as the temperature of the surroundings increases;

(i) To the level of water in the bottle. (1 ½ mks)

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(ii) To the stability of the water bottle. (1 ½ mks)

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42. (a) What is meant by mechanical waves? (1)

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(b) The figure below represents a kind of wave motion in air.

(i) Name the regions of the wave motion labeled a and b (1)

a \_\_\_\_\_

b \_\_\_\_\_

(ii) Calculate the frequency of the wave motion if it takes a particle 5 seconds to move from region P to region Q (1)

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(iii) Calculate the distance labeled c (1)

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43 (a) Distinguish between primary and secondary colours of light and give one example of each (1 ½)

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(b) The figure above shows an equilateral triangular glass prism placed in the path of white light. Complete the diagram to show what is observed on the screen. (1 ½)

c) State the appearance of a yellow shirt with green stripes in red light. (1)

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44. (a) State Archimedes principle. (1)

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(b) A piece of iron weighs 550N in air. When completely immersed in water it weighs 525N and when completely immersed in paraffin, it weighs 528N. Calculate the relative density of paraffin. (3)

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45. (a) State Charles' law

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(b) The volume of a fixed mass of a gas at a pressure of 76cm Hg is 800cm<sup>3</sup>, at 27°C. Find its volume at 90°C and a pressure of 76cm Hg. (2)

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(c) Define absolute zero temperature. (1)

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46. (a) Define the term elasticity (1)

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(b) Two springs of force contents  $20\text{Nm}^{-1}$  and  $50\text{Nm}^{-1}$  are connected in series to form a continuous Spring as shown. Find the extension produced in the combined spring if a load of 10N is suspended on the combined spring. (3)

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47. a) A block and tackle pulley system is used to raise a load of 400N through a distance of 16m. If the work done against friction is 1200J,

Calculate the

(a) Work input (2)

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(b) Efficiency of the system. (2)

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48. (a) What is a magnetic field? (1)

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(b) What is meant by magnetic saturation? (1)

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(c) Explain why a freely suspended bar magnet swings until it points North south?

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49. (a) Name two methods of producing electrons from metal surfaces. (2)

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(b) Describe the composition of  ${}_{92}^{238}\text{U}$  nucleus (2)

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50. (a) Define a fundamental note as applied to sound waves. (1)

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(b) State two factors that affect the frequency of a vibrating string. (2)

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(c) Name the electromagnetic wave with the shortest wave length. (1)

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**END**