

MOTION OPEN SCHOLARSHIP TEST

SESSION - 2020-21

CLASS : 12th Moving

SAMPLE PAPER

CANDIDATE'S NAME : _____

DURATION: 60 MINUTES

TOTAL QUESTIONS: 40

MAXIMUM MARKS : 160

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| <p>1. The paper consists of four sections :- Physics (10 Questions), Chemistry (10 Questions), Biology (10 Questions) and Mental ability (10 Questions) .</p> <p>2. All questions are compulsory and carry four marks each. One mark is deducted for wrong answer.</p> <p>3. There is only one correct answer hence mark one choice only.</p> | <p>4. Darken your choice in OMR Sheet with Blue/ Black Ball Point Pen.</p> <p>5. Rough work should be in the blank space provided in the question paper.</p> <p>6. Return the OMR Sheet to the invigilator at the end of the exam.</p> |
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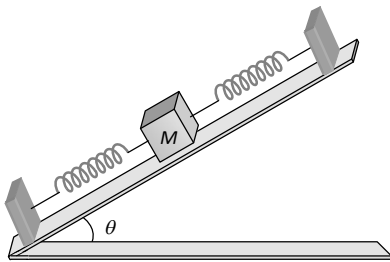
PHYSICS

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| <p>1. The upper half of an inclined plane of inclination θ is perfectly smooth while lower half is rough. A block starting from rest at the top of the plane will again come to rest at the bottom, if the coefficient of friction between the block and lower half of the plane is given by :</p> <p>(A) $\mu = \frac{2}{\tan\theta}$</p> <p>(B) $\mu = 2 \tan\theta$</p> <p>(C) $\mu = \tan\theta$</p> <p>(D) $\mu = \frac{1}{\tan\theta}$</p> | <p>2. The efficiency of Carnot engine is 50% and temperature of sink is 500 K. If the temperature of source is kept constant and its efficiency is to be raised to 60%; then the required temperature of the sink will be :
(A) 600 K (B) 500 K
(C) 400 K (D) 100 K</p> <p>3. A uniform disc of mass M and radius R is mounted on an axle supported in frictionless bearing. a light cord is wrapped ar ound the rim of the disc and a steady downward pull T is exerted on the cord. The angular acceleration of the disc is -
(A) $\frac{T}{MR}$ (B) $\frac{MR^2}{T}$ (C) $\frac{2T}{MR}$ (D) $\frac{MR}{2T}$</p> |
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4. If the work done in blowing a bubble of volume V is W then the work done in blowing a soap bubble of volume $2V$ will be-
- (A) W (B) $2W$
(C) $\sqrt[3]{2} W$ (D) $\sqrt[3]{4} W$

5. A particle performing S.H.M. having amplitude 'a' possesses velocity $\frac{\sqrt{3}}{2}$ times the velocity at the mean position. The displacement of the particle shall be
- (A) $a/2$ (B) $\frac{a\sqrt{3}}{2}$
(C) $\frac{a}{\sqrt{2}}$ (D) $a\sqrt{2}$

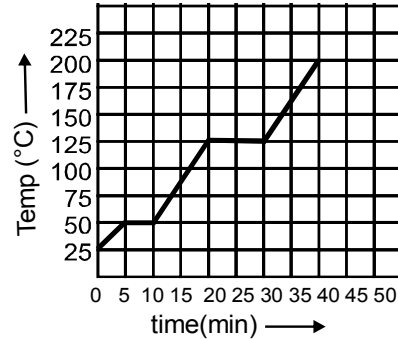
6. On a smooth inclined plane, a body of mass M is attached between two springs. The other ends of the springs are fixed to firm supports. If each spring has force constant K , the period of oscillation of the body (assuming the springs as massless) is



- (A) $2\pi\left(\frac{M}{2K}\right)^{1/2}$ (B) $2\pi\left(\frac{2M}{K}\right)^{1/2}$
(C) $2\pi\frac{Mg \sin \theta}{2K}$ (D) $2\pi\left(\frac{2Mg}{K}\right)^{1/2}$

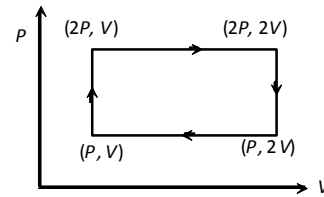
7. A source of sound is moving with constant velocity of 20 m/s emitting a note of frequency 1000 Hz. The ratio of frequencies observed by a stationary observer while the source is approaching him and after it crosses him will be
- (A) 9 : 8 (B) 8 : 9
(C) 1 : 1 (D) 9 : 10
(Speed of sound $v = 340$ m/s)

8. The graph shown in the figure represent change in the temperature of 5 kg of a substance as it absorbs heat at a constant rate of 42 kJ min^{-1} . The latent heat of vapourization of the substance is :



- (A) 630 kJ kg^{-1} (B) 126 kJ kg^{-1}
(C) 84 kJ kg^{-1} (D) 12.6 kJ kg^{-1}

9. Work done in the given P-V diagram in the cyclic process is

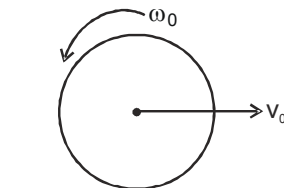


- (A) PV (B) $2PV$
(C) $PV/2$ (D) $3PV$

10. A uniform circular disc placed on a rough horizontal surface has initially a velocity v_0 and an angular velocity ω_0 as shown in the figure. The disc comes to rest after moving some distance in the direction of motion.

Then $\frac{v_0}{r\omega_0}$ is

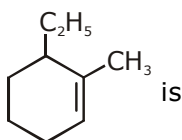
- (A) $\frac{1}{2}$
(B) 1
(C) $\frac{3}{2}$
(D) 2



CHEMISTRY

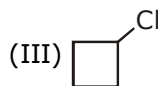
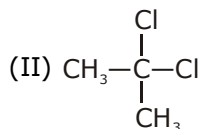
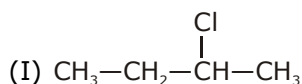
11. How many isomers are possible for the alkyl group C_4H_9- ?
 (A) Two (B) Three
 (C) Four (D) Five

12. The correct IUPAC name for the compound



- (A) 3-Ethyl-2-methylcyclohex-2-ene
 (B) 3-Ethyl-2-methylcyclohex-1-ene
 (C) 1-Ethyl-2-methylcyclohex-2-ene
 (D) 6-Ethyl-1-methylcyclohex-1-ene

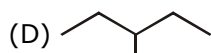
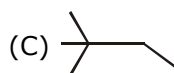
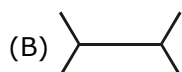
13. Consider the following structures -



Which is correct statements -

- (A) I & II are chain isomers
 (B) III & IV are chain isomers
 (C) II & IV are functional isomers
 (D) A and B Both

14. C_6H_{12} (P) has two types of alkenes that can be reduced to one type of C_6H_{14} (Q). Q is :

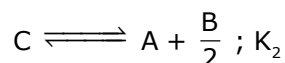


15. Correct order of size is :
 (A) $N^{3-} > O^{2-} > F^- > Na^+$
 (B) $N^{3-} < O^{2-} < F^- < Na^+$
 (C) $O^{2-} < N^{3-} < F^- < Na^+$
 (D) $O^{2-} > N^{3-} > F^- > Na^+$

16. Total no. of angle of 90° in SF_6 is/are
 (A) 8 (B) 4
 (C) 12 (D) 3

17. Oxidation state of Tl in TlI_3 is -
 (A) + 2 (B) +3
 (C) + 4 (D) +1

18. $2A + B \rightleftharpoons 2C ; K_1$

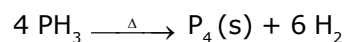


The correct relationship b/w k_1 & k_2 is -

(A) $k_1^2 = k_2$ (B) $k_1 = \frac{1}{k_2^2}$

(C) $k_2 = \frac{1}{k_1^2}$ (D) $k_1 k_2 = 1$

19. PH_3 on heating gives P_4 & H_2 . If 100 mL PH_3 at STP is heated, then the change in volume when the reaction is complete will be -



100	0
0	150

- (A) \uparrow by 50 mL
 (B) \downarrow by 50 mL
 (C) \uparrow by 100 mL
 (D) \uparrow by 150 mL

20. In which of the following, heat acts as a path function ?
 (A) isochoric process
 (B) isobaric process
 (C) isothermal process
 (D) AOTA

MATHEMATICS

- 21.** $\frac{1 - \cos \theta}{1 + \cos \theta} =$
 (A) $2 \cot^2 \frac{\theta}{2}$ (B) $\cot^2 \frac{\theta}{2}$
 (C) $2 \tan^2 \frac{\theta}{2}$ (D) $\tan^2 \frac{\theta}{2}$
- 22.** If α, β are roots of $(x - a)(x - b) + d = 0$ then roots of equation $(x - \alpha)(x - \beta) - d =$
 (A) $a, \frac{b}{2}$ (B) $\frac{a}{2}, b$
 (C) a, b (D) $\frac{a}{2}, \frac{b}{2}$
- 23.** How many 5 digits odd numbers can be formed
 (A) 40000 (B) 90000
 (C) 86000 (D) 45000
- 24.** If $x + y - k = 0$ touches the circle $x^2 + y^2 = 4$ the value of 'k' is
 (A) $2\sqrt{2}$ (B) $3\sqrt{2}$ (C) $4\sqrt{2}$ (D) none
- 25.** In ΔABC , $(\cos A + \cos B + \cos C) =$
 (A) $\frac{r}{R}$ (B) $1 + \frac{r}{R}$
 (C) rR (D) rR^2
- 26.** In the expansion of $(1 + 3x + 3x^2 + x^3)^{20}$, the term which have greatest binomial coefficient is
 (A) ${}^{60}C_{30}x^{30}$ (B) ${}^{60}C_{29}x^{29}$
 (C) ${}^{60}C_{30}$ (D) ${}^{60}C_{29}$
- 27.** One of the diameter of circle circumscribing the rectangle ABCD is $4y = x + 7$. If $A(-3,4)$ & $B(5,4)$ then find centre of circle.
 (A) (1,2) (B) (2,1)
 (C) (1,4) (D) (4,1)
- 28.** If $\sin x + \sin^2 x + \sin^3 x = 1$ then $\cos^6 x - 4\cos^4 x + 8\cos^2 x =$
 (A) 2 (B) 4 (C) 0 (D) 1
- 29.** If $a > 0, b > 0$ and $a^2 b = 32$ then $(a + b)_{\min} = ?$
 (A) 4 (B) 8 (C) 2 (D) 6
- 30.** In ΔABC if $\angle C = \frac{\pi}{2}$ and $\tan \frac{A}{2}$ & $\tan \frac{B}{2}$ are roots of the equation $ax^2 + bx + c = 0$ then the relation between a, b & c is.
 (A) $a + b + c = 0$ (B) $a + b - c = 0$
 (C) $a - b + c = 0$ (D) $b + c - a = 0$

BIOLOGY

- 21.** Connecting link between light phase and dark phase of photosynthesis.
 (A) Only ATP (B) Only NADH_2
 (C) Only NADPH_2 (D) Both (A) and (C)
- 22.** Phytohormones responsible for cell division in callus are _____ and _____.
 (A) ABA and cytokinin
 (B) Gibberellin and ethylene
 (C) Auxin and cytokinin
 (D) Ethylene and cytokinin
- 23.** Disjunction is
 (A) Chromosome separation during mitosis
 (B) Chromosome separation during prophase I
 (C) Chromosome separation during metaphase I
 (D) Chromosome separation during anaphase I
- 24.** Casparian strips are found on radial and inner walls of
 (A) Root endodermis
 (B) Stem endodermis
 (C) Pericycle
 (D) Outer cortex
- 25.** Which one of the following statements is **correct**?
 (A) A sterile pistil is called a staminode
 (B) A proteinaceous aleurone layer is present in maize grain
 (C) The seed in grasses is not endospermic
 (D) Mango is a parthenocarpic fruit
- 26.** The typical Lubb–Dup sounds heard in the heart beat of a healthy person are due to
 (A) Closing of the tricuspid and semilunar valves
 (B) Blood flow through the aorta
 (C) Closing of the tricuspid and bicuspid value
 (D) Closing of the semilunar valves

- 27.** Amount of air that remains always trapped in respiratory passage is called
 (A) Dead space (B) Dead volume
 (C) Both (A) and (B) (D) Used air volume
- 28.** Which of the following is not a function of kidneys
 (A) Regulation of blood pressure
 (B) Secretion of antibiotics
 (C) Regulation of acidity of fluids
 (D) Removal of urea
- 29.** Which of the following are amphibians ?



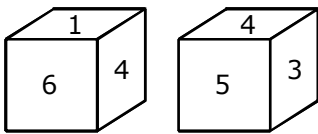
- (A) A and C (B) B and D
 (C) A and D (D) C and D

- 30.** Cardiac muscles are different from skeletal muscles as they are –
 (A) smooth
 (B) striated and involuntary
 (C) non-striated
 (D) voluntary

MENTAL ABILITY

31. The priest told the devotee, "The temple bell is rung at regular intervals of 45 minutes. The last bell was rung five minutes ago. The next bell is due to be rung at 7.45 am." At what time did the priest give this information to the devotee?
 (A) 7.40 am (B) 7.05 am
 (C) 7.00 am (D) 6.55 am

32. Two positions of a dice are shown here. Find the number on face opposite to the face having number 3.

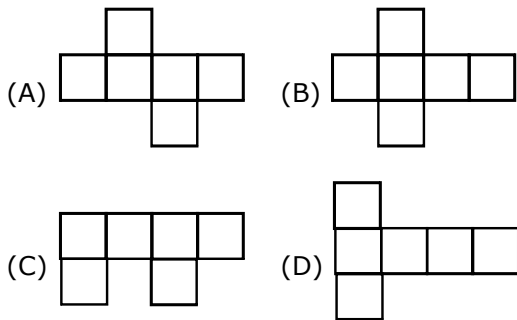


- (A) 2 (B) 6
 (C) 5 (D) 1

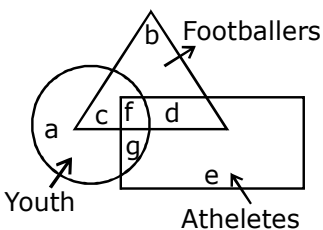
33. Select the correct mirror image of the given combination of number and alphabets.
 TARAIN1014A

- (A) A410ARTAIN1 (B) A4101NIARAT
 (C) A410ARTAIN1 (D) TARAIN1014A

34. Which of the following could not be folded into a cube?

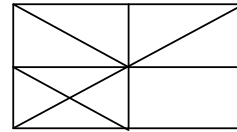


35. In the figure, the circle represents youth, the triangle represents footballers and the rectangle represents athletes. Which letter (s) represents (s) athletes among youths who are not footballers?



- (A) g (B) g and c
 (C) f (D) f and d

36. In the following figure, the number of triangles are -



- (A) 8 (B) 12
 (C) 15 (D) 16

37. Take the given statement(s) as true and decide which of the conclusion logically follows from the statements.

Statement: All Actors are Musicians. No Musician is a Singer. Some Singers Are Dancers. Some Dancers are Musicians.

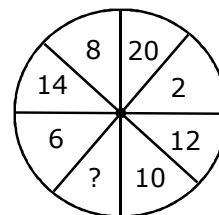
Conclusions:

- I: Some Actors are singers
 II: Some Dancers are Actors
 III: No Actor is a singer
 (A) Only conclusion I follows
 (B) Only conclusion III follows
 (C) Exactly one of conclusion I, III follows
 (D) Only conclusion II follows

38. B is to North-East of A, C is to West of B and North-West of A and D is to the south of C in line with BA. In which direction of A is D located ?

- (A) North (B) East
 (C) South-West (D) North-East

39. Which number replaces that question mark '?' in the given figure?



- (A) 4 (B) 16
 (C) 18 (D) 22

40. Find the missing value '?' in the following series :

13, 34, 74, ?, 290

- (A) 168 (B) 170
 (C) 172 (D) 174