NEW STANDARD ACADEMY

Test Type - 01

Do not open this Test Booklet until you are asked to do so.

04-08-2025

JEE(MAIN): 11th Undergoing Students

Read carefully the Instructions on the Back Cover of this Test Booklet.

Important Instructions :

1. Immediately fill in the form number on this page of the Test Booklet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. The candidates should not write their Form Number anywhere else (except in the specified space) on the Test Booklet/Answer Sheet.
3. The Test Booklet consists of 90 questions.
4. There are three parts in the question paper 1,2,3 consisting of Physics, Chemistry and Mathematics having 30 questions in each subject and each subject having Two sections. (i) Section-I contains 20 multiple choice questions with only one correct option. Marking scheme : +4 for correct answer, 0 if not attempted and –1 in all other cases. (ii) Section-II contains 10 Numerical Value Type questions. Attempt any 5 questions. First 5 attempted questions will be considered for marking. Marking scheme : +4 for correct answer, 0 if not attempted and –1 in all other cases.
5. Use Blue/Black Ball Point Pen only for writting particulars/marking responses on Side –1 and Side–2 of the Answer Sheet. Use of pencil is strictly prohibited.
6. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electronic device etc, except the Identity Card inside the examination hall/room.
7. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
8. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Room/ Hall. However, the candidate are allowed to take away this Test Booklet with them.

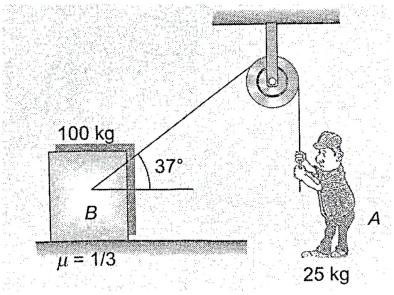
Name of the Candidate(In Capitals) _____

Date of Examintation _____

Candidate`s Signature:_____ Invigilator`s Signature: _____

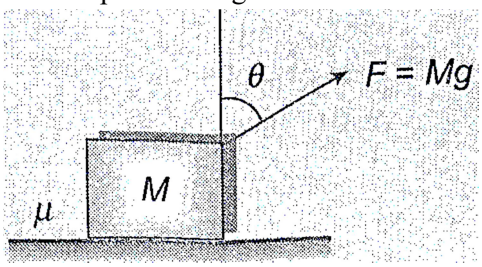
Section-A
Physics

1. Block B of mass 100 kg rests on a rough surface of friction coefficient μ = 1/3 .A rope is tied to block B as Shown in the figure .The maximum acceleration with which boy A of 25 kg can climbs on rope without making block move is



(a) $\frac{4g}{3}$ (b) $\frac{g}{3}$
(c) $\frac{g}{2}$ (d) $\frac{3g}{4}$

2. A block of mass M rests on a rough horizontal surface as shown. Coefficient of friction between the block and the surface is μ. A force F =Mg acting at angle θ with the vertical side of the block pulls it in which of the following cases the block can be pulled along the surface?

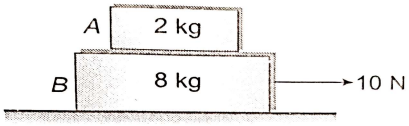


(a) $\tan\theta \geq \mu$ (b) $\tan(\theta/2) \geq \mu$
(c) $\cot\theta \geq \mu$ (d) $\cot(\theta/2) \geq \mu$

3. The coefficient of friction between two surfaces is 0.2. The angle of friction is
(a) $\text{Sin}^{-1}(0.2)$ (b) $\cos^{-1}(0.2)$
(c) $\tan^{-1}(0.1)$ (d) $\cot^{-1}(5)$

4. A block of mass 3 kg is placed on a rough horizontal surface (μ_s = 0.4) A force of 8.7 N is applied on the block. If g = 10m s^{-2} then the force of friction between the block and floor is
(a) 8.7 N (b) 12 N
(c) 10 N (d) zero

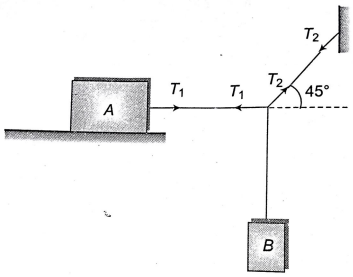
5. Block A of mass 2 kg is placed over a block B of mass 8 kg The combination is placed on a rough horizontal surface. If g = 10m s^{-2} coefficient of friction between B and floor = 0.5 , coefficient of friction between B and floor = 0.5. coefficient of friction between A and B = 0.4 and a horizontal force of 10 N is applied on 8 kg block, then the force of friction between A and B is



(a) 100 N (b) 50 N
(c) 40 N (4) None of these

6. A body of mass 2 kg is placed on a horizontal surface having kinetic friction 0.4 and static friction 0.5. If the force applied on the body is 2.5 N, then the frictional force acting on the body will be [g = 10 ms^{-2}]
(a) 8 N (b) 10 N
(c) 20 N (d) 2.5 N

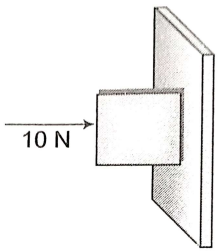
7. The block A in the figure weighs 100 N. The coefficient of static friction between the block and the table is 0.25. The weight of the block B is maximum for the system to be in equilibrium. The value of T_1 is



(a) 0.25 N (b) 25 N
(c) 100 N (d) 10.25 N

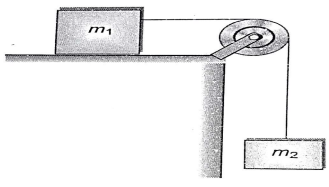
8. An iron chain lies on a rough horizontal table. It starts sliding when one-fourth of its length hangs over the edge of the table. The coefficient of static friction between the chain and the surface of the table is
(a) 1/2 (b) 1/3
(c) 1/4 (d) 1/5

9. A horizontal force of 10 N is necessary to just hold a block stationary against a wall. The coefficient of friction between the block and the wall is 0.2. The weight of the block is



(a) 2 N (b) 20 N
(c) 50 N (d) 100 N

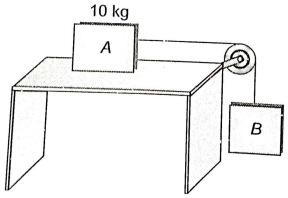
10. A block of mass m_1 kg is resting on a rough horizontal plane, coefficient of kinetic friction between block and surface is μ. If m_1 is connected to another mass m_2 with the help of string and pulley as shown in the diagram, then the common acceleration when released from rest will be



(a) $\frac{m_2 g}{m_1+m_2}$ (b) $\left[\frac{m_2-m_1}{m_1+\mu m_2}\right] g$

(c) $\frac{\mu m_2-m_1}{m_1+m_2}$g (d) $\left[\frac{m_2-\mu m_1}{m_1+m_2}\right] g$

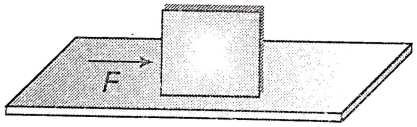
11. The coefficient of static friction, u, between block A of mass 2 kg and the table as shown in the figure is 0.2. What would be the maximum mass value of block B so that the two blocks do not move? The string and the pulley are assumed to be smooth and massless. (g = 10 m/s²)



(a) 2.0 kg (b) 4.0 kg

(c) 0.2 kg (4) 0.4 kg

12. A block of mass 2 kg is kept on the floor. The coefficient of static friction is 0.4. If a force F of 2.5 Newtons is applied on the block as shown in the figure, the frictional force between the block and the floor will be



(a) 2.5N (b) 5 N

(c) 7.84N (d) 10N

13. A body of 10 kg is acted by a force of 129.4 N if g = 9.8 m/sec². The acceleration of the block is 10 m/s². What is the coefficient of kinetic friction

(a) 0.03 (b) 0.01

(c) 0.30 (d) 0.25

14. The coefficient of friction between a body and the surface of an inclined plane at 45° is 0.5. If g = 9.8m / s ^{2} the acceleration of the body downwards in m / s ^{2} is

(a) 4.9 /$\sqrt{2}$ (b) 4.9$\sqrt{2}$

(c) 19.6$\sqrt{2}$ (d) 4.9

15. When a body slides down on inclined plane with coefficient of friction μ, then its acceleration will be

(1) g(sin θ - μcos θ) (b) g(sin θ + μsec θ)

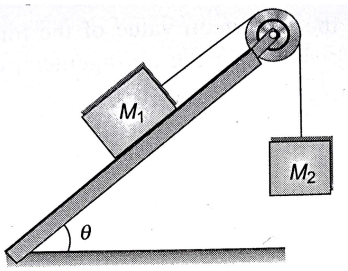
(c) g(μ sin θ - cos θ) (d) g(μsin θ - θcos θ)

16. A force of 98N is required to just start moving a body of mass 100 kg over ice. The coefficient of static friction is

(a) 0.6 (b)0.4

(c) 0.2 (d) 0.1

17. Two blocks of mass M_1 and M_2 are connected with a string which passes over a smooth pulley. The mass M_1 is placed on a rough incline plane as shown in the figure. The coefficient of friction between the block and the inclined plane is μ. What should be the minimum mass M_2 so that the block M_1 slides upwards?



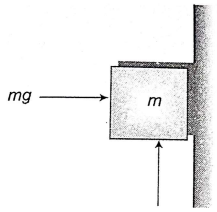
(a) $M_2 = M_1(\sin\theta + \mu\cos\theta)$

(b) $M_2 = M_1(\sin\theta - \mu\cos\theta)$

(c) $M_2 = M_1/(\sin\theta + \mu\cos\theta)$

(d) $M_2 = M_1/(\sin\theta - \mu\cos\theta)$

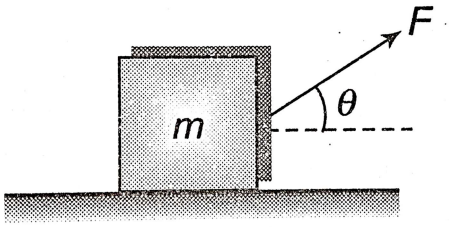
18. A block pressed against the vertical wall is in equilibrium .The minimum coefficient of friction is



(a) 0.2 (b) 0.5

(c) 0.4 (d) none of these

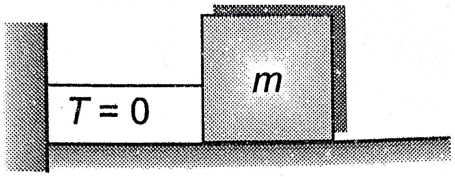
19. A block of mass m is places on rough horizontal surface. The minimum force F required to pull it



(a) $\frac{mg}{2}$ (b) $\frac{mg}{2}\cos\theta$

(c) $\frac{mg}{\sqrt{5}}$ (d) none of these

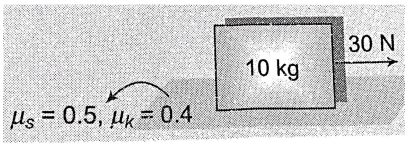
20. A block of mass m is stationary on a horizontal surface. It is connected with a string which has no tension. The coefficient of friction between the block and surface is μ. Then, the frictional force between the block and surface is:



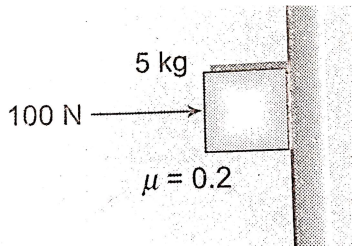
(a) μmg (b) mg/μ

(c) zero (d) none of these

21. Find out the acceleration of the black as shown in the figure.



22. Determine the magnitude of frictional force in case



23. A block of mass m_1 is placed on a rough horizontal table Another mass mass m_2 hung from the strong connected by pulley is just sufficient to start the motion of mass m_1. Find the coefficient of friction between table and block.
24. A uniform chain of length of length *l* part is hanging over the edge table without sliding . Find the value of *l′*.
25. A block of mass $\frac{\sqrt{2}}{10}$ kg is kept on an inclined plane of inclination of 45°. The coefficient of static friction between block and inclined plane is $\mu_s = \frac{1}{\sqrt{3}}$. Find the minimum force applied on block ,up the inclined plane to support it.

CHEMISTRY

26. Which compound has all ionic, covalent and coordinate bond?
    (a) NH_4Cl (b) $K4[Fe(CN)_6]$
    (c) $FeCl_3\ 6H_2O$ (d) All
27. Which hybrid orbitals have highest angle?
    (a) sp (b) sp^2
    (c) sp^2 (d) sp^3d
28. Electron pair donor in ammonia boron trifluoride addition compound is
    (a) N (b) H
    (c) F (d) B
29. Hybridisation on the carbon atoms in organic compound $CH_2 = CH - CH = CH_2$ is:
    (a) sp^2 hybridisation on all carbon atoms
    (b) sp^2 hybridisation on two carbon atoms and sp^3 on another two carbon atoms
    (c) sp hybridisation on all the carbon atoms
    (d) sp^3 hybridisation on 2 carbon atoms and sp on another 2 carbon atoms
30. Number of sigma and pi bonds in the organic compound CH ≡C-C ≡ CH :
    (a) $5\sigma, 4\pi$ (b) $6\sigma, 2\pi$
    (b) $2\ \sigma, 4\ \pi$ (d) $7\ \sigma\ ,2\ \pi$
31. Correct decreasing order of atomic radius of cations is:
    (a) $Li^+ > Na^+ > Mg^{2+} > Be^{2+}$
    (b) $B^{2+} > Mg^{2+} > Li^+ > Na^+$
    (c) $Na^+ > Li^+ > Mg^{2+} > Be^{2+}$
    (d) $Mg^{2+} > Be^{2+} > Li^+ > Na^+$
32. Element of 3rd period and 13th group is
    (a) C (b)B
    (c) Co (d) Al
33. Elements having outer three orbits in completely filled are called:
    (a) inner transition elements
    (b) Lanthanides
    (c) actinides
    (d) All are correct
34. Which element does not have covalent radius?
    (a) N (b) He
    (c) O (d) P
35. Which element has highest ionisation enthalpy?
    (a) Na (b) P
    (c) Cl (d) Ar
36. Out of the following which compound will have electrovalent bonding ?
    (a) Ammonia (b) Water
    (c) Calcium chloride (d) Chloromethane
37. Amongst LiCl ,RbCl, $BeCl_2$ and $MgCl_2$ the compounds with the greatest and the least ionic character, respectively are
    (a)LiCl and RbCl (b) RbCl and $BeCl_2$
    (c) RbCl and $MgCl_2$ (d) $MgCl_2$ and $BeCl_2$
38. The most likely arrangement of atoms in S_2Cl_2 is
    (a) S-S-Cl-Cl (b) S-Cl-S-Cl
    (c) S-Cl-Cl-S (d) Cl-S-S-Cl
39. Which of the following molecule does not show tetrahedral shape?
    (a) CCl_4 (b) $SiCl_4$
    (c) SF_4 (d) CF_4
40. The percentage s- character of the hybrid orbitals in methane ethene and ethyne are respectively
    (a) 25,33,50 (b) 25, 50, 75
    (c) 50,75,100 (d) 10,20,40
41. In allene (C_3H_4), Type (s) of hybridization of carbon atoms is (are) :
    (a) sp and sp^3 (b) only sp^2
    (c) sp and sp^2 (d) sp^2 and sp^3
42. Which of the following has maximum number of lone pairs on central atom?
    (a) ClO_3^- (b) XeF_4
    (c) SF_4 (d) I_3^-
43. The species having pyramidal shape is
    (a) SO_3 (b)BrF_3
    (c) Sio_3^{2-} (d) OSF_2
44. Which has the least bond angle?
    (a) NH_3 (b) BeF_2
    (c) H_2O (d) CH_4
45. C-C bond lengh is minimum in
    (a) C_2H_6 (b) C_2H_4
    (c) C_2H_2 (d) Benzene

READ THE STATEMENTS CAREFULLY TO MARK THE CORRECT OPTION OUT OF THE OPTIONS GIVEN BELOW

(a) If both statements are true and Reason is the correct explanation of Assertion.

(b) If both statements are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If Assertion is false but Reason is true.

46. Assertion (A) bipyramidel. : PCl_5 molecule is trigonal
    Reason (R) : Hybridisation on P atom is sp^3d.
47. Assertion (A): P- Cl bond lengths in PCI5, is not equal.
    Reason (R): P- Cl bonds are of equatorial and axial type.
48. Assertion (A): SF_6, molecule is octahedral.
    Reason (R): All S-F bonds are of equal length.
49. Assertion (A): Greater the negative charge on the atom of an element, smaller is the ionic radius.
    Reason (R): Effective nuclear charge is decreased.
50. Assertion (A): f-block elements have been placed in separate rows below the periodic table.
    Reason (R): There is no proper place for f-block elements inside the periodic table.

MATHS

51. If $a_1, a_2, a_3, \ldots$ is an arithmetic progression with common difference 1 and $a_1+a_2+a_3+a_{98}= 137$ then find the value of $a_2+a_4+a_6+\ldots+a_{98}$.
    (a) 93 (b) 39
    (c) 89 (d) 45
52. If the pth term of an A.P is q and qth term is p, then its rth term will be
    (a) p-q+r (b) p+q-r
    (c) p+r-q (d) p-q-r
53. If the sum of the first 10 terms of an A.P is 4 times the sum of its first 5 terms, then the ratio of the first term to the common difference is
    (a) 2:1 (b) 1:2
    (c) 2:3 (d) 3:2
54. If the 5th term of a G.P. is $\frac{1}{3}$and 9th term is $\frac{16}{243}$, then the 4th term will be
    (a) $\frac{3}{4}$ (b) $\frac{1}{2}$
    (c) $\frac{1}{3}$ (d) $\frac{2}{5}$
55. If a,b,c are distinct and are in G.P with common ratio r such that a, 2b,3c form an A.P ., then r equals
    (a) 1 (b) 1/3
    (c) -1/3 (d) -1
56. If $S_n = nP + \frac{1}{2}n(n-1)Q$, *where* S_n denotes the sum of the first n term of an A.P., then the common difference is
    (a) P+Q (b) 2P+3Q
    (c) 2Q (d) Q
57. If $3x^2-2ax+(a^2+2b^2+2c^2) = 2(ab+bc)$ then a,b and c are in
    (a) A.P (b) G.P
    (c) H.P (d) none of these
58. If the side a,b, and c of a triangle ABC are in A.P. then $\frac{b}{c}$ belongs to
    (a) $\left(0,\frac{2}{3}\right)$ (b) (1,2)
    (c) $\left(\frac{2}{3},2\right)$ (d)$\left(\frac{2}{3},\frac{7}{3}\right)$
59. If 11 A.M .s are inserted between 28 and 10 , then number of integral A.M.s is
    (a) 5 (b) 6
    (c) 7 (d) 8
60. If x,|x+1| and | x-1| are first three terms of an A.P ., then the sum of its first 20 terms is
    (a) 360 or 180 (b) 350 or 180
    (c) 150 or 100 (d) none of these
61. Concentric circles of radii 1,2,3 …,100 cm are drawn .The interior of the smallest circle is coloured red and the angular regions and coloured alternately green and red ,so that no two adjacent regions are of the same colour . The total area of the green regions in sq. cm is equal to
    (a) 1000π (b) $5050\,\pi$
    (c) $4950\,\pi$ (d) $5151\,\pi$
62. If the pth qth and rth terms of A.P . are in G.P ., then common ratio of G.P.is
    (a) pr/q^2 (b) r/p
    (c) $\frac{q+r}{p+q}$ (d) $\frac{q-r}{p-q}$
63. In an increasing sequence of 4 positive integers, The first 3 terms are in A.P ., the last three terms are in G.P and the first and fourth term differ by 30. The sum of all four terms is
    (a) 120 (b) 129
    (c) 130 (d) 150
64. Let $a_1,a_2,a_3\ldots$.and $b_1,b_2,b_3,\ldots$ Be two grometric progressions with $a_1= 2\sqrt{3}$ and $b_1 = \frac{52}{9}\sqrt{3}$. If $3a_{99}b_{99} = 104$ then $\sum_{i=0}^{101} a_i b_i$ is
    (a) 1024 (b) 2456
    (c) 3536 (d) none of these
65. Find the 18th and 25th terms of the sequence defined by

$$T_n = \begin{cases} n(n+2), \textit{if } n \textit{ is even natural number} \\ \dfrac{4n}{n^2+1}, \textit{if } n \textit{ is odd natural number.} \end{cases}$$

(a) 360,$\frac{50}{313}$ (b) 360,$\frac{59}{313}$

(c) 306,$\frac{50}{313}$ (d) 306,$\frac{59}{313}$

66. A person was drawing a monthly salary of ₹25000 in 11 th year of service and a salary of ₹29000 in the 19th year . Given that pension is half the salary at retirement time , find his monthly pension if he had put in 25 years of service before retirement .Assume that annual increment is constant.

(a) ₹15000 (b) ₹ 25000

(c) ₹16000 (d) ₹ 32000

67. The sum of first 15 terms of an A.P is 105 and the sum of next 15 terms is 780 . Find the first 3 terms.

(a) -14,-11,-8 (b) 14,-11,9

(c) 14,11,7 (d) 15,11,7

68. The sum of three consecutive number in an A.P is 24 and the sum of their squares is 194. Find the numbers.

(a) 7, 8, 9 (b) 8, 9, 10

(c) 4, 5,6 (d) 1, 4, 7

69. If a,b are the roots of x^2-3x+p= 0 and c, d are the roots of x^2-12x-q = 0 where a,b,c,d form a G.P,. tan (q+p):(q-p) = 17:15.

(a) 17:25. (b) 27:15.

(c) 17:15. (d) 47:15.

70. Three number are in A.P. and their sum is 15 . If 1,4 and 19 are added to these number s respectively , the resulting numbers are in G.P find the numbers.

(a) (7,5,3), (26,4,-16) (b)(1,5,9), (26,8,-16)

(c) 4,5,6 (d) (2,5,8),(26,5,-16)

71. If a , b, and c are in A.P., then $\frac{(a-c)^2}{(b^2-ac)} =$

72. Seventh term of an A.P is 40 ,then the sum of its first 13 terms will be

73. Find the 7th term from the end of the sequence -5,-2,1,4,.., 85.

74. The first and the last terms of an A.P are 1 and 11 . If the sum of the terms is 36 then find the number of terms.

75. There are n arithmetic means between 3 and 17 . The ratio of the first mean to the last mean is 1:3. Find *n.*