

Max Marks: 60

Date: 02.10.2022

NEET 24 BATCH PHYSICS : DCT Topic: Laws of Motion + Friction

- 1. A force F applied to a body (A) of mass m_1 produces an acceleration of 4 m/s². If the same force F is applied to another body (B) of mass m_2 , then an acceleration of 10 m/s² is produced in the body. A and B are then tied together and the same force is applied to the combined body. What is the acceleration of the system?
 - (a) $\frac{10}{7}$ m/s² (b) $\frac{20}{7}$ m/s² (c) $\frac{5}{3}$ m/s² (d) $\frac{7}{20}$ m/s²
- A constant force acts on a body of mass 5 kg at rest for 10 s. If the body moves through a distance of 250 m, what is the magnitude of the force?
 - (a) 15 N (b) 25 N (c) 30 N (d) 40 N
- 3. A monkey of mass 20 kg is holding a vertical rope. The rope will not break when a mass of 25 kg is suspended from it but will break, if the mass exceeds 25 kg. What is the maximum acceleration with which the monkey can climb up along the rope? ($g = 10 \text{ m/s}^2$)
 - (a) 5 m/s^2 (b) 2.5 m/s^2 (c) 10 m/s^2 (d) 25 m/s^2
- 4. One end of massless rope, which passes over a massless and frictionless pulley P is tied to a hook C while the other end is free. Maximum tension that the rope can bear is 360 N. With what value of maximum safe acceleration (in m s⁻²) can a man of 60 kg climb on the rope?





- 5. A block of mass 'm' is kept on a smooth inclined plane of inclination θ . The whole system is given a horizontal acceleration 'a' so that the block remains stationary on the inclined plane. What is the force exerted by the inclined plane on the block?
 - (a) mg (b) mg $\cos \theta$ (c) mg $\sin \theta$ (d) $\frac{mg}{\cos \theta}$
- 6. Three blocks of masses m, 3m and 5m are connected by massless strings and pulled by a force F on a frictionless surface as shown in the figure below. The tension T_1 in the first string is 16 N.

$$F \leftarrow m \leftarrow 3m \leftarrow 5m$$

If the point of application of F is changed as given below T

 $\rightarrow 5m \rightarrow F$ 3m

The value of T'_1 and T'_2 shall be

- (a) 16 N, 10 N (b) 10 N, 16 N (c) 2 N, 8 N (d) 10 N, 6 N
- 7. A block of mass 10 kg is placed on a rough horizontal surface having coefficient of static friction $\mu = 0.5$. If a horizontal force of 100 N is applied to it, then the acceleration of the block will be (g = 10 m/s²) (a) 0.5 m/s² (b) 10 m/s² (c) 5 m/s² (d) 15 m/s²
- 8. A horizontal force of 20 N is applied to a block of 10 kg resting on a rough horizontal surface. How much additional force is required to just move the block, if the coefficient of static friction between the block and the surface is 0.4?
 - (a) 15.5 N (b) 10.3 N (c) 8.5 N (d) 19.2 N



9. A system consists of three masses m_1 , m_2 and m_3 connected by a string passing over a pulley P. The muss m_1 hangs freely and m_2 and m_3 are on a rough horizontal table (the coefficient of friction = μ). The pulley is frictionless and of negligible muss. The downward acceleration of mass m_1 is (Assume $m_1 = m_2 = m_3 = m$)



10. A trolley of mass M is attached to a block of mass m by a string passing over a frictionless pulley as shown in the figure. The coefficient of friction between the trolley and the surface of the table is μ . What is the acceleration of the trolley and the block when they are released?



- A railway engine (mass 10⁴ kg) is moving with a speed of 72 km/h. The force which should be applied to bring it to rest over a distance of 20 m is
 - (a) 7200 N (b) 10000 N (c) 3600 N (d) 100000 N



- 12. A body, under the action of a force $\vec{F} = 6\hat{i} 8\hat{j} + 10\hat{k}$ acquires an acceleration of 1 m/s². The muss of this body must be
 - (a) $2\sqrt{10}$ kg (b) 10 kg (c) 20 kg (d) $10\sqrt{2}$ kg
- 13. A helicopter, in a rescue operation, wants to lift a 70 kg man floating in sea, with the help of a rope which can bear a maximum tension of 90 kg wt. With what maximum acceleration, the helicopter should rise, so that the rope will not break?
 - (a) 1.4 m/s^2 (b) 2.8 m/s^2 (c) 4 m/s^2 (d) 6 m/s^2

14. A boy stands on a weighing machine inside a lift. When the lift is going down with acceleration g/4, the machine shows a reading 30 kg. When the lift goes upwards with acceleration g/4, the reading would be
(a) 18 kg
(b) 37.5 kg
(c) 50 kg
(d) 67.5 kg

15. Two masses M_1 and M_2 are accelerated uniformly on a frictionless surface ns shown in the figure. The ratio of the tensions $\frac{T_1}{T}$ is





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NEET 24 BATCH BIOLOGY: DCT Topic: Root and Stem.

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16.	Thick roots arising in Ficus to support heavy branches are called										
	(a)	Stilt roots	(b)	Prop roots	(c)	Assimilatory roots	(d)	Floating roots			
17.	In A	morphophallus and Cro	ocus ve	egetative reproduction	occur	s by means of					
	(a)	Offset	(b)	Rhizome	(c)	Corm	(d)	Both (1) and (2)			
18.	Stem	tendrils occur in									
	(a)	Cucumber	(b)	Watermelon	(c)	Pumpkin	(d)	All of these			
19.	Thorn is a stem structure because it										
	(a)	Develops from stipul		(b)	Arises from leaf directly						
	(c)	Develops from axillary bud				Is structure of defence					
20.	A.	A. Cells of root meristematic zone has dense cytoplasm.									
	B.	Chrysanthemum, Pineapple and Jasminum are examples of sucker.									
	C.	A fleshy bud is called bulbil.									
	D.	Root cap is absent in	hydro	phytes.							
	(a)	All are correct			(b)	All are correct, except B					
	(c)	A & B are correct			(d)	B & C are correct					
21.	Redu	Reduced, discoid and underground stem is found in									
	(a)	Ginger	(b)	Turmeric	(c)	Potato	(d)	Onion			
22.	Find	odd one w.r.t. plants h	aving	green succulent stem.							
	(a)	Opuntia	(b)	Euphorbia	(c)	Citrus	(d)	Both (1) and (2)			
23.	All given modifications belong to adventitious roots, except										
	(a)	Reproductive root of Asparagus				Storage roots of sweet potato					
	(c)	Conical roots of carrot				Prop roots of banyan tree					
24.	Which of the following function is not performed by underground stem?										
	(a)	Reproduction	(b)	Assimilation	(c)	Perennation	(d)	Storage			
25.	Bud associated with the underground stem of potato is										
	(a)	Axillary	(b)	Apical	(c)	Adventitious	(d)	Intermodal			
26.	Whic	Which of the following is not a part of root system?									
	(a)	Root cap	(b)	Node	(c)	Root hair	(d)	Meristematic zone			



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- 27. Which of the following is an incorrect statement?
 - (a) Roots are positively geotropic
 - (c) Roots are negatively phototropic
- 28. The radicle elongates and forms _____
 - (a) Primary root (b) Secondary root
- 29. Monocotyledon plants generally contain _____.
 - (a) Tap root system (b) Naked seeds
- 30. Which of the following is not a storage root?
 - (a) Tap root of carrot
 - (c) Adventitious root of sweet potato
- (b) Roots are always positively phototropic
 (d) Both (1) and (2)
 (c) Rootlets (d) Tertiary root
 (c) Fibrous root system (d) Archegonia
 (b) Tap root of turnip
 - (d) Roots of banyan tree

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1.	(b)	2.	(b)	3.	(b)	4.	(b)	5.	(d)
6.	(c)	7.	(c)	8.	(d)	9.	(c)	10.	(c)
11.	(d)	12.	(d)	13.	(b)	14.	(c)	15.	(d)

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16.	(b)	17.	(c)	18.	(d)	19.	(c)	20.	(b)
21.	(d)	22.	(c)	23.	(c)	24.	(b)	25.	(a)
26.	(b)	27.	(b)	28.	(a)	29.	(c)	30.	(d)