PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2019 (4 MAY SHIFT 2)

Physics

1. Identify the correct option.

A. The range of the gravitational force is large but not Infinite

B. The range of electromagnetic force is large but lesser than the range of gravitational force.

C. The range of weak nuclear force is smaller than the range of strong nuclear force, gravitation force and electromagnetic force.

D. The range of the weak as well as strong nuclear forces of the the order of 10^{-10} m

Answer: C

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2. A current carrying conductor obeys Ohm's law (V = RI). If the current passing through the conductor is $I = (5 \pm 0.2)$ A and voltage

developed is $V = (60 \pm 6)$ then find the percentage of error is resistance, R

A. 18

B. 6

C. 14

D. 2

Answer: C

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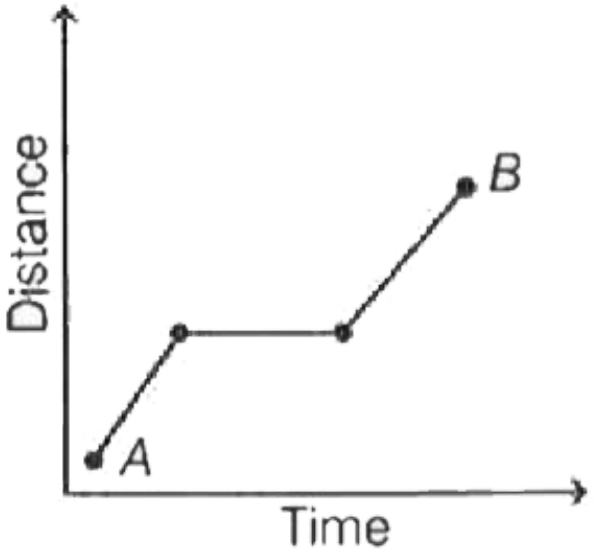
3. A particle covers a distance from A to B over a period of time, the distance versus time plot is the shown below. Then which of the following is true for the motion of the particle?



A. Both average speed and instantaneous speed are always zero

B. Average speed is always non-zero but instantaneous speed can be zero

C. Instantaneous speed is always non-zero but average speed can be zero.

D. Both average speed and instantaneous speed are always non-zero.

Answer: B

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4. An iron rod of length 1.5 m lying on a horizontal table is pulled up form one end along a vertical line so as to move it with a constant velocity 3m/s, while the other end of the rod slides along the floor. After how much time the speed of the end sliding on the floor equals to the speed of the end being pulled up

A. $\frac{1}{2\sqrt{2}}s$

B. $\frac{1}{\sqrt{2}}s$

C. $3\sqrt{2}$

D. $\frac{1}{4}s$

Answer:

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5. A boy standing on a moving truck throws a projectile such that he is able to catch it back after the truck has moved 100 m. If the truck is moving horizontally along a straight line with a constant speed 30 m/s, at what speed

(relative to the truck) must the projectile is thrown. (Assume, $g = 10m/s^2$)

A. $\frac{55}{3}m/s$

B. $43/2m/s$

C. $\frac{50}{3}m/s$

D. $\frac{23}{2}m/s$

Answer: C

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6. A body rotates about a stationary axis. If the angular deceleration is proportional to square root of angular speed, then the mean angular speed of the body, given ω_0 as the initial angular speed, is

A. $\frac{\omega_0}{\sqrt{2}}$

B. $\frac{\omega_0}{4}$

C. $\frac{\omega_0}{2}$

D. $\frac{\omega_0}{3}$

Answer: D

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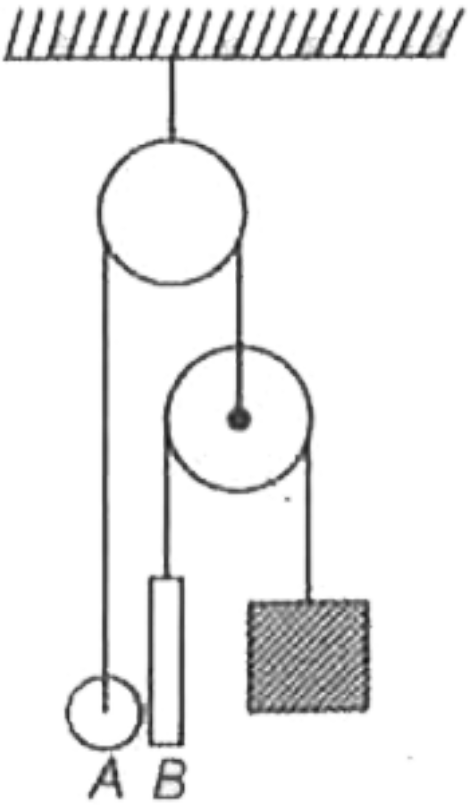
7. In the pulley system shown in the figure, the mass of A is half of that of rod B. The rod length is 500 cm. The mass of pulleys and the threads may be neglected The mass A is set at the same level as the lower end of the rod and then released After releasing the mass A, it would reach the top end of the rod B in time

(Assume, $g = 10m/s^2$)



A. 2.0 s

B. 1.0 s

C. 3.0 s

D. 4.0 s

Answer: B

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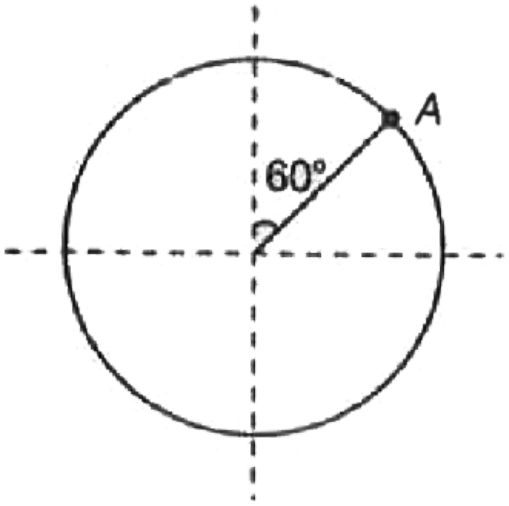
8. A light rigid wire of length 1 m is attached to a ball A of mass 500 g to one end. The other end of the wire is fixed, so that the wire can rotate freely in the vertical plane about its fixed and At the lowest point of the circular

motion, the ball is given a horizontal velocity 6 m/s. Determined the radial component of the acceleration of the ball, when this rigid wire makes an angle 60° with the upward vertical (Take $g = 10m/s^2$)



A. $10m/s^2$

B. $6m/s^2$

C. $18m/s^2$

D. $25m/s^2$

Answer: B

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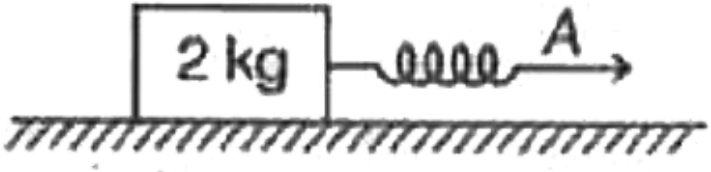
9. A block of mass 2 kg is connected to an ideal spring and is placed on a smooth horizontal surface. The spring is pulled to move the block and at an instant, the speed of end A of the spring and speed of the block were measured

to be 6 m/s and 3 m/s, respectively. At this moment the potential energy stored in the spring in increasing at a rate 15 J/s. Find the acceleration of the block at this instant.



A. $1.5m/s^2$

B. $3.0m/s^2$

C. $4.5m/s^2$

D. $2.5m/s^2$

Answer: A

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10. A uniform sphere of radius Rand mass m is placed on an inclined plane which makes an angle 45° to the horizontal. For which of the following value of coefficient of friction, the sphere rolls without slipping,

A. $\frac{3}{7}$

B. $\frac{1}{2}$

C. $\frac{5}{8}$

D. $\frac{1}{7}$

Answer: A::B::C

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11. A circular ring of mass 10 kg rolls along a horizontal floor. The center of mass of the ring has a speed 1.5 m/s. The work required to stop the ring is

A. 10 J

B. $-6J$

C. 14.5 J

D. $-22.5J$

Answer: D

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12. If the displacement of a body is given by $x = 3\cos\left[2\pi t + \frac{\pi}{4}\right]$ m, then the acceleration of the body at t=2s is

A. 0

B. $-6\sqrt{2}\pi^2 m/s^2$

C. $-10\pi^2 m/s^2$

D. $-12\sqrt{2}\pi^2 m/s^2$

Answer: B

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13. If the acceleration due to gravity g doubles and the radius of earth becomes half that of the present value, then the value of escape

velocity is (Assume, $g = 10m/s^2$ and radius of earth, R = 6400 km)

A. $12km/s$

B. $16\sqrt{2}km/s$

C. $8\sqrt{2}km/s$

D. $4\sqrt{2}km/s$

Answer: A

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14. A uniform rod of length L is rotated in a horizontal plane about a vertical axis through one of its ends. The angular speed of rotation is ω . Find increase in length of the rod, if ρ and Y are the density and Young's modulus of the rod respectively,

A. $\frac{\rho\omega^2 y}{4L^2}$

B. $\frac{4\rho\omega^2 L^3}{3Y}$

C. $\frac{\rho\omega^2 L^3}{3Y}$

D. $\frac{\rho\omega^2 L^3}{8Y}$

Answer: C

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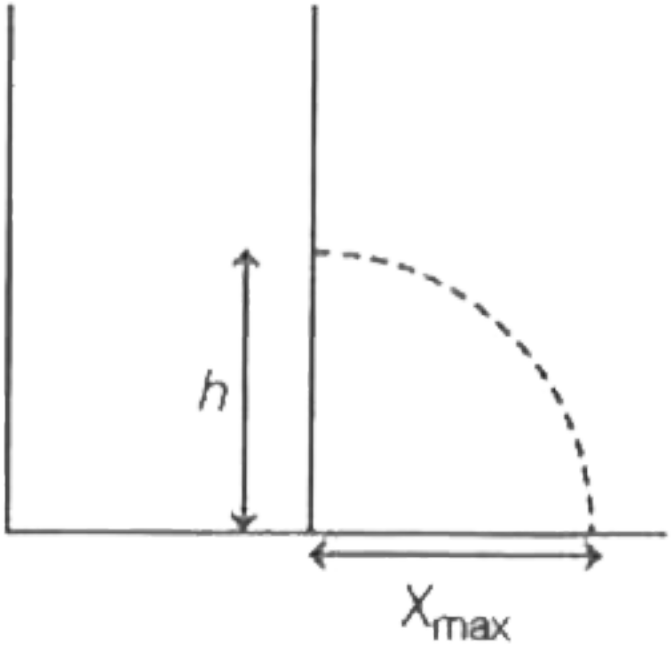
15. A cylindrical vessel of height 50 cm is filled with water and rests on a table. A small hole is made at the height h from the bottom of the vessel so that the water jet could hit the table surface at a maximum distance $x_{\max}$ from the vessel as shown in the figure. The value of

$x_{\max}$ will be (Neglect the viscosity of water.)



A. 15 cm

B. 35 cm

C. 50 cm

D. 40 cm

Answer: C

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16. A cubical block of wood, of length 10 cm, floats at the interface between oil of density $800kg/m^3$ and water. The lower surface of the block is 1.5 cm below the interface. If the depth of water is 10 cm below the interface and oil is upto 10 cm above the interface then the difference in pressure at the lower and the upper face of the wooden block is (Assume

density of water $\rho = 1000kg/m^3$) and acceleration of gravity , $g = 10m/s^2$)

A. 850 Pa

B. 780 Pa

C. 800 Pa

D. 830 Pa

Answer: D

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17. A vessel of volume V contains ideal gas having mass density ρ at temperature T and pressure p. After a portion of the gas is let out, the pressure in the vessel is decreased by Δp. The mass of the released gas is

A. $\rho V \Delta p / p$

B. $\frac{\Delta p}{p}$

C. $\frac{\rho}{p}$

D. $(\rho V)^2 \Delta p / p$

Answer: A

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18. A cup of coffee cools from 150° F to 144° F in I min in a room temperature at 72° F. How much time with the coffee take to cool from 110° F to 104° F in the same room?

A. 1.55 min

B. 2.14 min

C. 2.89 min

D. 3.35 min

Answer: B

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19. An ideal gas at initial temperature T_0 and initial volume V_0 is expanded adiabatically to a volume $2V_0$ The gas is then expanded isothermally to a volume $5V_0$, and there after compressed adiabatically so that the temperature of the gas becomes again T_0 . If the final volume of the gas is αV_0 then the value of constant α is

A. 2.5

B. 1.5

C. 2

D. 3

Answer: A

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20. A thermally insulated vessel containing monatomic gas is moving with a speed of 30 m/s. If the vessel suddenly stops, the increase

in gas temperature is (Molar mass of gas = 83 g/mol and R = 8.3J/K mol)

A. 1K

B. 3K

C. 4K

D. 6K

Answer: B

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21. A string of length 100 cm has three resonant frequencies, 120 Hz, 200 Hz and 280 Hz. If a node is formed at the end of the string, the speed of the transverse wave on this string is:

A. 60 m/s

B. 80 m/s

C. 100 m/s

D. 120 m/s

Answer: B

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22. Two particles executing simple harmonic motion as described by $y_1 = 30\sin\left(2\pi t + \frac{\pi}{3}\right)$ and $y_2 = 10\left(\sin 2\pi t + \sqrt{3}\cos 2\pi t\right)$ have amplitudes A_1 and A_2 respectively. The ratio $A_1 : A_2$ is

A. $2:1$

B. $1:1$

C. $3:2$

D. $1 : \sqrt{3}$

Answer: C

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23. Two lenses A and B having focal lengths 2.0 cm and 5.0 cm, respectively are placed 14 cm apart. Lens A is placed to the left of lens B. An object is placed 3 cm to the left of lens A. The distance of the image from lens A will be

A. $\frac{40}{3} cm$

B. $\frac{82}{3}cm$

C. $\frac{112}{5}cm$

D. $\frac{92}{5}cm$

Answer: B

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24. The pass-axes of two polarisers were kept such that the incident unpolarised beam of intensity I_0 , gets completely blocked. Another polariser was introduced in between these

two polarisers with its pass-axis 60° with respect to the pass-axis of the first one. The output intensity would then become

A. 0

B. $\frac{3}{32}l_0$

C. $\frac{3}{16}l_0$

D. $\frac{3}{8}l_0$

Answer: B

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25. A negative charge is placed at the centre of the non-conducting sphere. The direction of electric field on any point at the surface of the sphere is

A. radially inward

B. radially outward

C. along the tangent to the surface

D. no electric field produced

Answer: A

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26. A spherical drop of liquid carrying charge, Q has potential V_0 at its surface. If two drops of same charge and radius combine to form of single spherical drop, then the potential at the surface of new drop is (Assume, V = 0 at infinity.)

A. $2^{\frac{1}{3}}V_0$

B. $4^{\frac{1}{3}}V_0$

C. $6^{\frac{1}{3}}V_0$

D. $2^{-\frac{1}{3}}V_0$

Answer: B

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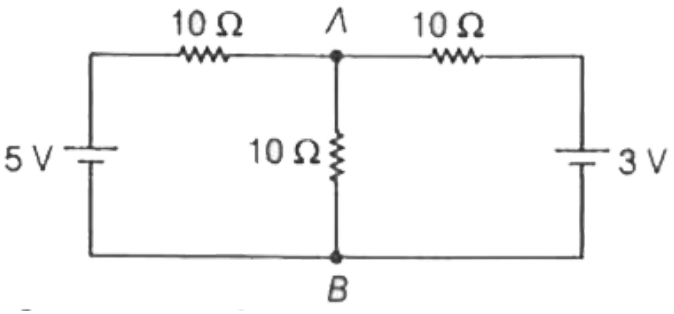
27. Calculate the voltage across AB terminals in the given circuit ,



A. $\frac{3}{8}V$

B. $\frac{8}{3}V$

C. $\frac{3}{2}V$

D. $\frac{2}{3}V$

Answer: B

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28. When subjected to a voltage of 10 V, the current through a resistor at a temperature of $40^{\circ}C$ is 0.1 A. The temperature coefficient of resistance of the material of the resistor is

$2 \times 10^{-4} {}^{\circ} C$. The temperature of the resistor in ${}^{\circ} C$ when the current drops to 0.098 A is

A. 142

B. 167

C. 181

D. 206

Answer: A

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29. A magnetic field of $5 \times 10^{-5} T$ is produced at a perpendicular distance of 0.2 m from a long straight wire carrying electric current. If the permeability of free space is 4×10^{-7} Tm/A The current passing through the wire in A is

A. 45

B. 40

C. 50

D. 30

Answer: C

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30. Along wire carries a current of 18 A kept along the axis of a long solenoid of radius 1 cm. The field due to the solenoid is 8.0×10^{-3} T. The magnitude of the resultant field at a point 0.6 mm from the solenoid axis is (Assume $\mu_0 = 4\pi x 10^{-7}$ Tm/A)

A. $6 \times 10^{-3} T$

B. $6 \times 10^{-4} T$

C. $2\sqrt{7} \times 10^{-3} T$

D. $10 \times 10^{-3} T$

Answer: D

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31. A small bar magnet experiences a torque of 0.016 Nm when placed with its axis at 30° with an external field of 0.04 T. If the bar magnet is replaced by a solenoid of cross-sectional area

of $1cm^2$ and 1000 turns but having the same magnetic moment as that of bar magnet, then the current flowing through the solenoid is

A. 2A

B. 4A

C. 6A

D. 8A

Answer: D

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32. A rod of length 80 cm rotates about its mid point with a frequency of 10 rev/s. The potential difference in volts) between two ends of the rod due to a magnetic field, B=0.5 T directed perpendicular to the rod is

A. π

B. 1.6π

C. 2π

D. 0.8π

Answer: D

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33. LCR circuit, the resonance frequency of circuit increases two times of the initial circuit by changing C and C' and R from $100\Omega \text{ to } 400\Omega$ while the inductance was kept the same. The ratio C/C', is

A. 2

B. 8

C. 16

D. 4

Answer: D

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34. In a travelling plane electromagnetic wave, the maximum magnetic field is 1.26×10^{-4} T. The intensity of the wave is (Assume, $\mu_0 = 126 \times 10^{-6} H/m$)

A. $1.56 \times 10^6 \frac{W}{m^2}$

B. $1.89 \times 10^6 \frac{W}{m^2}$

C. $8.92 \times 10^6 \frac{W}{m^2}$

D. $4.62 \times 10^6 \frac{W}{m^2}$

Answer: B

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35. A cobalt (Co) plate is placed at a distance of 1 m from a point source of power 1 W. Assume a circular area of the plate of radius, r= 1 A is exposed to the radiation and ejects photo electrons. The light energy is considered to be spread uniformly and the

work function of cobalt is 5 eV. The minimum time the target should be exposed to the light source to eject a photoelectron (Assuming no reflection losses) is

A. 320 s

B. 450 s

C. 860 s

D. 100 s

Answer: A

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36. A hydrogen sample is prepared in a particular excited state A of quantum number, $n_A = 3$. The ground state energy of hydrogen atom is - |E| . The photons of energy $\frac{|E|}{12}$ are absorbed in the sample which results in the excitation of some electrons to excited state B of quantum number n_B whose value is

A. 6

B. 4

C. 5

D. 7

Answer: A

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37. The half life of neutron is 693 seconds. What fraction of neutrons will decay when a beam of neutrons, having kinetic energy of 0.084 eV, travells a distance of 1 km? (mass of neutron 1.68×10^{-27} kg, and In 2=0.693)

A. 60×10^{-5}

B. 15×10^{-5}

C. 25×10^{-5}

D. 50×10^{-5}

Answer:

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38. For a given truth table A, B and C are input and Y is the output , then the funtional form

of the circuit is

A	B	C	Y
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

A. $\overline{A}$

B. $\overline{B}$

C. $\overline{A} + BC$

D. $A + B + C$

Answer: B

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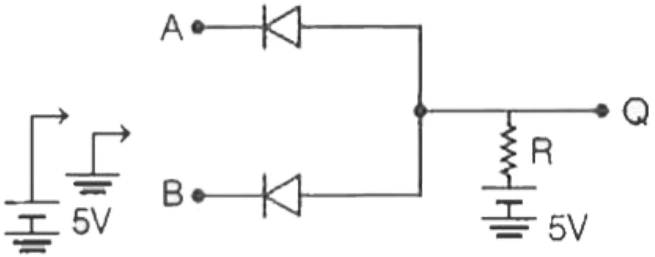
39. Two diodes are connected in the following fashion. Provision is made to connect either +5 V or ground (0 V) to the points A to B. The output Q will act as



A. OR gate

B. AND gate

C. XOR gate

D. NAND gate

Answer: B

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40. Carrier waves are used for communicating signals over long distance, because

A. carrier waves can be generated very easily

B. low frequencies can not be easily modulated by the carrier Waves

C. low frequencies can be transmitted over long distances

D. carrier waves generated at higher frequencies can be transmitted over long distances

Answer: D

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