PHYSICS

BOOKS - NAVBODH PHYSICS (HINGLISH)

VERY SHORT ANSWER QUESTIONS

Circular Motion

1. Why is uniform circular motion called a periodic motion?

2. A wheel is rotating with uniform angular velocity $\vec{\omega}$. What is the nature of the graph between tangential speed at different points of the wheel and their radial distances from the axis?

3. What is the ratio of the angular speed of the hour hand of a clock to that of the Earth due to its spin (rotational motion)?

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4. Which is greater : the angular speed of the earth's rotation or that of the hour hand of a clock?

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5. What is the angle between linear acceleration and angular acceleration of a particle in nonuniform circular motion?

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6. When a particle perform UCM, what does the quantity ωv represent?

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7. ANGULAR ACCELERATION

8. State any two quantities that are uniform in UCM.

9. State any two quantities that are nonuniform in UCM.

10. The equations of motion of a particle of mass m in circular motion with constant angular speed ω are $x = r\cos\omega t$ and $y = r\sin\omega t$. Write the expression for the force in the particle.

11. Why is centrifugal force called a pseudo force?

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12. Why is the work done by a centripetal force equal to zero?

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13. What is centrifuge? What are its used?

14. Why does a motorcyclist moving along a level curve at high speed have more than a cyclist moving along the same curve at low speed?

15. A small body of mass m is tried to a string and revolved in a vertical circle of radius r. If

the tension in the string at the highest point

is mg, what is its speed there?

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16. The linear speed of a particle revolved in a vertical circle of radius r is $\sqrt{7gr}$ at the lowest point. What is the linear speed half way to the top?

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1. The dimension of universal gravitational constant are

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2. What is a satellite?

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3. In setallite launching, under what conditions is the path of the satellite (i) a parabola (ii) a hyperbola?

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4. In setallite launching, what can you say about the total energy of the satellite when its path is (i) circular (ii) a parabola?

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5. In satellite launching, what will be the path of the satellite if the total energy of the projected satellite is positive?

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6. State the dimensions of gravitational potential.

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7. State the expression for the effective gravitational acceleration due to the rotational of the Earth at a latitude λ on the Earth's surface.

8. If r the distance from the centre of the earth, then what is the nature of the graph of gravitational acceleration versus r for point below the earth's surface?

9. If the Earth were a hollow sphere, what would be the weight of a body below its surface?

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10. What is a geostationary statellite? What are the basic requirements for such a satellite?

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11. A geostationary satellite

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Rotational Motion

1. What is a rigid body?

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2. Is moment of inertia of a body a constant quantity?

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3. About what axis would a uniform cube have its minimum moment of inertia?

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4. A nollow sphere and a solid sphere having same mass and same radii are rolled down a rough incline plane.

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5. Two uniform circular discs having the same mass and the same thickness but different radii are made from different materials. The disc with the smaller rotational inertia is

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6. Which physical quantities are represented by the product of moment of inertia and (i) angular velocity (ii) angular acceleration?

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7. Find the moment of inertia of a uniform cylinder about an axis through its centre of mass and perpendicular to its base. Mass of the cylinder is M and radius is R.

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8. State the expression for the moment of inertia of a solid cylinder of uniform cross section about an axis through its centre and perpendicular to its length.

9. Show that the square of the radius of gyration of a hollow cylinder is twice that a

solid cylinder having the same radius for rotation about the respective cylinder axis.

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10. Find the ratio of the radii of gyration of a circular disc and a circular ring of the same radii about a tangential axis in their planes.

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11. If the Earth suddenly shrinks so as reduce its volume, mass remaining unchanged, what will be the effect on the duration of the day ?

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12. Write SI unit of angular momentum:

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Oscillations

1. What is Oscillatory motion?

2. A sinple harmonic motion is represented by $\dfrac{d^2 x}{dt^2} + kx = 0$, where k is a constant of the motion. Find its time period.

3. How does the frequency of an SHM vary with the force constant k?

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4. Spring constant is a dimensional contant. Justify.

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5. State the dimensions and SI unit of force constant k.

6. What is the reference circle for a particle performing linear SHM?

7. What is the initial phase of a particle, in SHM, starting from an extreme position?

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8. The phase difference between the displacement and acceleration of a particle execuliting simple harmonic motion is

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9. State the expression for the total energy of SHM in term of acceleration.

10. What are damped oscillations ?

11. State the differential equation of motion for an oscillator of mass m in the presence of

a damping force directly proportional to the velocity.

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1. What is a plastic body ?

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2. What is a linear elastic or Hookean material ?

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3. What are limiting values of poisson's ratio ?

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4. Briefly explain

(i) The main purpose of vulcanisation of

rubber.

(ii) What are elastomers ? Explain

5. Flexibility in plants is due to

6. What will be the stress required to double the length of a wire of Young's modulus Y?

7. What types of deforming forced are present in (a) the cables of a suspension bridge (b) an arch of an arch bridge?

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8. The buckling of a beam is found to be more if

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9. What is an I-beam?

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Surface Tension

1. What is meant by a surface film ?

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2. State the dimensions of (i) surface tansion (ii) surface energy.

3. Write the expression for the angle of contact in terms of interfacial tensions.

4. In terms of interfacial tensions, when is the angle of contact acute ?

5. A small air bubble of radius r in water is at depth h below the water surface. If P_0 is the atmospheric pressure, ρ is the density of water and T is the surface tension of water, what is the pressure inside the bubble?

6. The surface tension of molten cadmium with increase of temperature generally

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Wave Motion

1. State the properties of the medium through which mechanical waves can be propagated.

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2. Express the equation of a simple harmonic progressive wave in terms of (i) wavelength and period of wave (ii) wavelength and wave speed.

3. A simple harmonic progressive wave is given by $y = A\sin(\omega t - kx)$. What is (i) the particle velocity at a point x and time t (ii) the wave speed ?

4. What happens to a particle velocity when a transverse wave is reflected from a rarer medium and a denser medium ?

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5. What happens to a particle velocity when a sound wave is reflected from a rarer medium and a denser medium ?

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6. What are beats ?

7. What is meant by period of beats?

8. What is the relation between the apparent frequency and true frequency of sound when

the source and observer move towards each

other along the same line ?

9. A source of sound is located in a medium in

which speed of sound is V and an observer is

located in a medium in which speed of sound

is 2V. Both the source and observer are

moving directly towards each other at velocity

$\dfrac{V}{5}$. The source has a frequency of f_0.

(a) Find the wavelength of wave in the medium

in which the observer is located.

(b) Find the frequency received by the observer.

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Stationary Waves

1. In a sound wave, a displacement mode is a pressure antitode. Explain.

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2. State the factors on which the fundamental frequency of air column in a pipe depends.

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3. What are overtones? What is the meaning of first overtone ?

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4. What is the first overtone in terms of harmonics present in a vibrating air column of a pipe (a) open a both ends (b) closed at one end ?

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5. The pitch of an organ pipe is highest when the pipe is filled with

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6. A tuning fork is in resonance with a closed pipe. But the same tuning fork cannot be in resonance with an open pipe of the same length. Why ?

7. State the formulae for the frequency N of a tuning fork in Melde's experiment (i) in perpendicular position and (ii) in paraller position, if L is the vibrating length of the

string having linear density m and under tension T.

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8. How sounds of different frequencies are produced by opening or closing the different holes of a flute ?

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Kinetic Theory Of Gases Radiation

1. What is the Boltzmann constant?

2. Mean free path of a gas molecule is

3. Two different pure gases have the same tempereture. Do their molecules have the same rms speeds?

4. State the types of degrees of freedom of non-rigid diatomic molecules.

5. What is meant by thermal equilibrium?

6. Give two examples of an irreversible process.

7. In one refrigeration cycle, the energy absorbed as heat by the refrigerant from the cold reservoir is Q_c and the energy discharged as heat to the hot reservoir is Q_h. What is the coefficient of performance of the refrigeration?

8. State the factors which the emissive power of a body depends on.

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9. State the SI unit and dimensions of emissive power.

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10. What is greenhouse effect ?

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11. Name any two greenhouse gases.

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Wave Theory Of Light

1. What is meant by polarised light ?

2. Draw diagrams to show polarised and unpolarised light are represented in a ray diagram.

Interference And Diffraction

1. IF Young's experiment is performed using two separate identical sources of light instead of using two slits and one light source then the

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2. What is Fresnel diffraction?

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3. What is Fraunhofer diffraction ?

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4. What should be the order of the size of an obstacle or aperture to produce diffraction of light?

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5. State Abbe's condition for the least distance between two objects so that they are just resolved [when they are viewed through a microscope].

6. How can the resolving power of a telescope be increased ?

1. A spherical Gaussian surface encloses, and is concentric with, a charged spherical conductor. If the TNEI over the Gaussian surface is negative, what can you say about the electric field $\overrightarrow{E}$ at a point on the surface?

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2. For a charged cylindrical conductor of cross - sectional radius R, what is the relation

between the surface charge density and linear charge density?

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3. What is dielectric?

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4. State the dimensions and SI unit of electric polarisation.

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5. What is electric susceptibility ?

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6. State the dimensions and SI unit of electric susceptibility.

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7. State the focator on which the capacitance of a parallel plate capacitor depends.

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8. What happens to the energy stored in a capacitor if after disconnecting the battery, the plates of a charged capacitor are moved farther

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9. What happens to the energy stored in a capacitor if after disconnecting the battery, the plates of a charged capacitor are moved farther

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Current Electricity

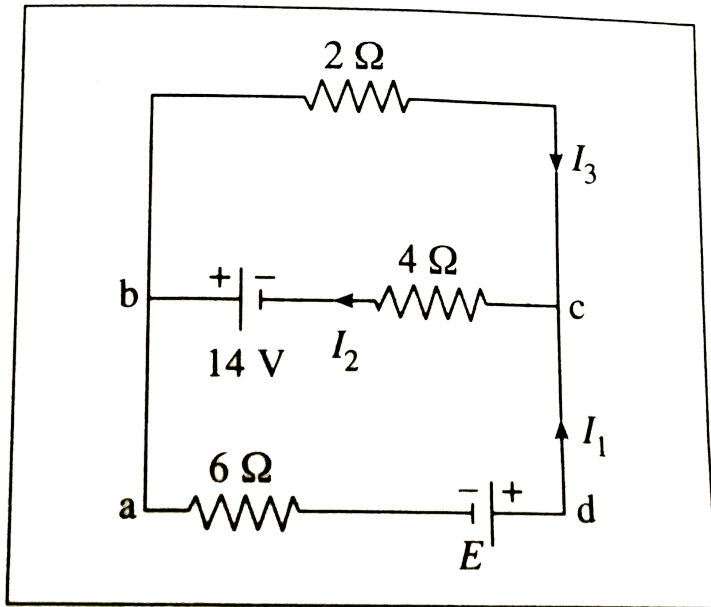**1.** What is a junction in a circuit ?

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2. What are the basis of Kirchhoff's current law and voltage law ?

3. In the given circuit, apply Kirchhoff's voltage law to loop abcda, and write the

corresponding equation.

4. Explain : In Wheatstone's metre bridge experiment, the null point is obtained in the

middle one-third of the wire.

5. What is a potentiometer ?

6. Volymeter can not be used to measure emf to a cell potentiometer can be used to measure emf of a cell because

1. What is a radial magnetic field? How has it been achieved in moving coil galvanometer?

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2. Explain the main functions of electric and magnetic fields in a cyclotron.

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3. What are the factor on which the cyclotron frequency depends ?

4. What are the factors on which the maximum kinetic energy acquired by a charged particles in the cyclotron depends?

1. State the formula and dimensions of magnetization.

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2. When a small magnetising field H is applied to a magnetic material the intensity of magnetisation (I) is proportional to:

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3. Write the relation between relative permeability and susceptibility.

4. What is the relative permeability of a medium ?

5. What happens if a rod of diameter material is placed in a nonuniform magnetic field ?

6. What happens if a rod of diamagnetic material suspended in a unifrom magnetic field?

Electromagnetic Induction

1. State the SI unit and dimensions of magnetic flux.

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2. When is the magnetic flux through an area element (i) maximum (ii) zero ?

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3. What is the basis of Lenz's law of electromagnetic induction.

4. State Fleming's left-hand rule.

5. How id the primary coil in a step-down transfomer different from that in a step-up

transformer?

6. For a coil rotating in a uniform magnetic field, in which position of the coil is the emf induced in the maximum? What is the magnetic flux through the coil in this position?

7. State the modified Ampere's circuital law.

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8. Explain impedance of an ac circuit.

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9. What is meant by wattles current ?

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10. State the condition for resonance in a parallel resonance circuit.

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Electrons And Photons

1. What is the effect of the intensity of incident radiation on the photoelectric current, for a given emitter material and p.d across the photoelectric cell ?

2. What, if any, is the effect of the (i) intensity (ii) frequency of incident radiation on the stopping potential in photoelectric emission?

3. In photoelectric effect, what does the stopping potential depend upon?

4. Is the kinetic energy of all photoelectrons from a given metal the same?

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5. What does the maximum kinetic energy (or the maximum speed) of a photoelectron depend on ?

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6. How is the stopping potential in volt related to the maximum kinetic energy of photoelectrons in electron volt?

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Atoms Molecules And Nuclei

1. State any two limitations of Bohr's atomic model.

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2. What is the significance of binding energy per nucleon?

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3. What is α-decay? What is the consequence of an α-decay on a radioactive element ?

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4. What is β-decay? What is the consequence of an β-decay on a radioactive element ?

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5. What is the interpretation of Bohr's stationary orbit's in terms of the Broglie wavelength of the electron in that orbit ?

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6. State the expression for the radius of the nth Bohr orbit in a hydrogen atom. Hence state the expression for the de Broglie wavelength associated with the electron in this orbit.

7. State the importance (significance) of Davisson and Garmer experiment.

8. Obtain the dimensions of Planck's constant.

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Semiconductors

1. INTRINSIC SEMICONDUCTORS

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2. What is doping?

3. What is an extrinsic semiconductor? Discuss the working of the various types of extrinsic semiconductors with help of their energy band diagram.

4. What is the order of density of free electrons in an intrinsic semiconductor ?

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5. Forbidden energy gap for an insulator is :–

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6. Give one example of each type of dopants.

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7. What is a rectifier?

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8. Name two device in which photodiodes are used.

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9. What is a light - emitting diode?

10. Colour of light emitted by LED depends

upon

11. Define the dynamic output resistance of a

transistor amplifier in common - emitter

configuration.

12. What is positive feedback in a transistor oscillator ?

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Communication Systems

1. What is a transmitter ?

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2. What are the components of a transmitter ?

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3. What is a receiver ?

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4. What are the components of a receiver?

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5. What is amplitude modulation ?

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6. In frequency modulation

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7. What is phase modulation ?

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8. Why is it necessary to amplify a signal before transmission ?

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9. What is the bandwidth of human speech (voice) signals ?

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10. What is modulation index ?

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11. Name the two layers of ionosphere important for communication.

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