INDIAN SCHOOL MUSCAT

SECOND PRE-BOARD EXAMINATION

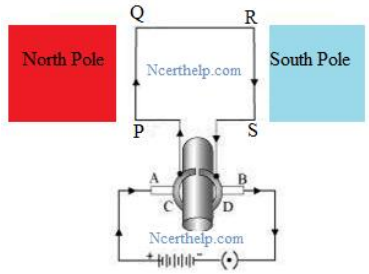
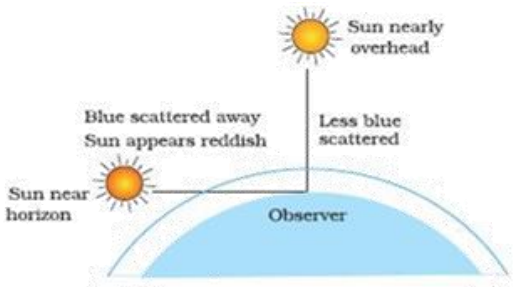
FEBRUARY 2020

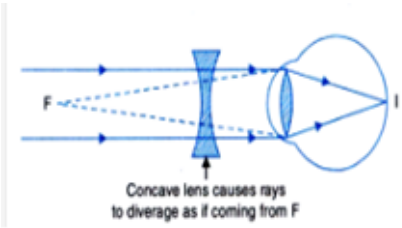
CLASS X

Marking Scheme – SCIENCE [THEORY]/PHYSICS

SET A

SECTION - A		
Q.NO.	ANSWER	MARKS
3(a)	Alternate energy sources	1
3(b)	Geothermal energy.	1
3(c)	Solar cell	1
3(d)	Solar panel.	1
5	(a) (OR) (c)	1
6	(C)	1
7	(c) -50 cm	1
14	(A)	1
SECTION - B		
22	Convex mirror: u = -20 cm R = +30cm, so , f = +15 cm v= ? Now 1/v + 1/u = 1/f 1/v = 1/f -1/u Hence, v = 60/7 cm Now magnification, m = -v/u = 3/7 or 0.42, Height of image = 2.1cm Thus image is virtual, errect and diminished.	3

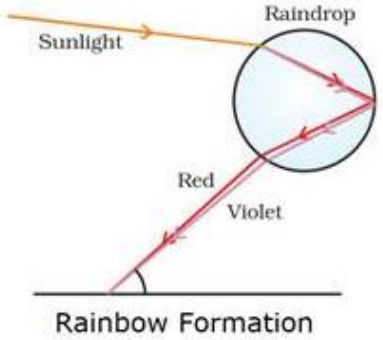
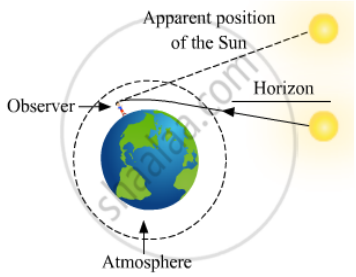
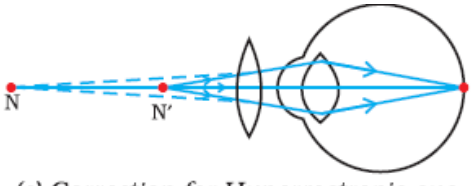
23	(a) $R = \frac{\rho l}{A}$ SI unit is ohm-m (b) $100 = \frac{\rho \times 5}{3 \times 10^{-7}}$ $\rho = 0.6 \times 10^{-5} \Omega m$	3
24	State the rule to determine the direction of a (i) Maxwell's Right Hand Thumb Rule: (ii) Fleming's Left Hand Rule (iii) Fleming's Right Hand Rule. (OR) (i) When coil P is moved towards Q, current will be induced in coil Q. This is because on moving P the magnetic field associated with Q increases and so a current is induced. The phenomenon is electromagnetic induction. (ii) If P is moved away from Q, the field associated with Q will decrease and a Current will be induced but in the opposite direction. (iii) Some of the methods of inducing current in the coil are (a) moving a magnet towards or away from the coil. (b) Moving a coil towards or away from a magnet.	3
	SECTION- C	
29	(i)  An electric motor is a device which converts electrical energy into mechanical energy. The principle behind the electric motor is based on Fleming's left hand rule. (ii) (a) increasing number of turns of solenoid (b) increasing strength of current.	5
30	(a) The cause of dispersion is the change in speed of light with wavelength. When white light enters the first surface of a Prism, light of different colours due to their different speeds in glasses gets deviated towards the base of the prism through different angles that is the Dispersion of white light into its constituent colours takes place at the first surface of prism. (b) Most bending colour violet and least bending colour is red. (c)  	5

	Sun is near the horizon and its rays cover a larger part of the atmosphere at sunrise and sunset. The intensity of the scattered light is inversely proportional to the wavelength of the colour. So, most of the blue light and components of shorter wavelength are scattered away by the particles of the atmosphere. The component of red light is least scattered because it has the longest wavelength and is visible to us. Hence, the sun looks red at the time of sunrise and sunset. (OR) (a) Myopia is the defect of the eye vision due to which a person can see the near by objects clearly but cannot see the far objects so distinctly. **Causes of myopia:** Myopia is caused due to (i) The elongation of the eyeball. (ii) Due to decrease in the focal length of the eye lens. (b)  (c) A person needs a lens of power -4.5D for correction of his vision. (i) Myopia (ii) f = 1/-4.5 = - 0.22m (iii) concave lens.	
	End of the Question Paper	

SET- B

SECTION - A		
Q.NO.	ANSWER	MARKS
3	**Answer question numbers 3(a) - 3(d) on the basis of your understanding of the following paragraph and the related studied concepts.**	
3(a)	Wind turbines.	1
3(b)	Unlike the wind the tides are predictable hence, power input is constant.	1
3(c)	Gas, coal and nuclear plants.	1

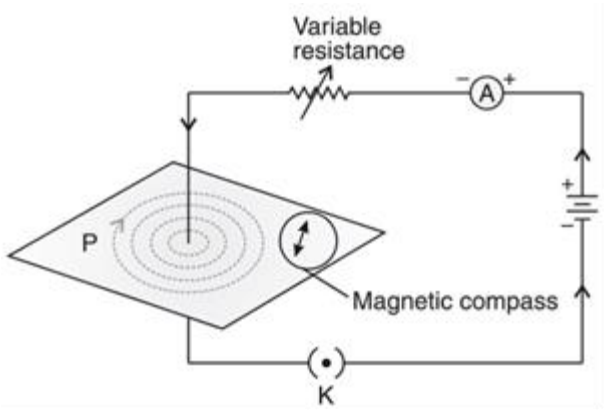
3(d)	Japan and New Zealand.	1
5	(C) (OR) (B)	1
6	(A)	1
7	(B)	1
	For question numbers 13 and 14, two statements are given- one labeled *Assertion* (A) and the other labeled *Reason* (R). Select the correct answer to these questions from the codes (i), (ii).(iii) and (iv) as given below i) **Both A and R are true and R is correct explanation of the assertion.** ii) **Both A and R are true but R is not the correct explanation of the assertion.** iii) **A is true but R is false.** iv) **A is false but R is true**	
14	(iii)	1
	SECTION - B	
22	1/30 - 1/20 = 1/v 1/v = - 1/60 (a) V = - 60 cm (b) virtual (c) image height = magnification × object height = 3 × 10 = 30cm	3
23	(a) P =1.8W (b) R = 5 Ohm (c) E = P x t = 7.2wh	3
24	(i) Direct current always flows in one direction but the alternating current reverses its direction Periodically. (ii) The major advantage that AC electricity has over DC electricity is that AC voltages can be readily transformed to higher or lower voltage levels, while it is difficult to do that with DC voltages. Since high voltages are more efficient for sending electricity great distances, AC electricity has an advantage over DC. (iii) 100 times. (OR) (i) Outside North pole to South pole and inside South pole to North Pole. (ii) If two magnetic field lines intersect, at point of intersection two directions to indicate but not possible. (iii) Frequency = 0	3
	SECTION- C	
29	(i) When magnet is pushed near a bar magnet then it induces current due to electromagnetic induction. (ii) When the bar magnet is withdrawn from inside the coil of the insulated copper wire again the current is induced in the coil but this time it is in reverse direction. (iii) When a bar magnet is held stationary inside the coil then no current is induced that's why galvanometer will show no deflection.	5

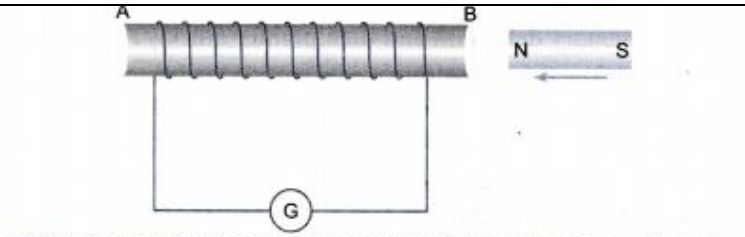
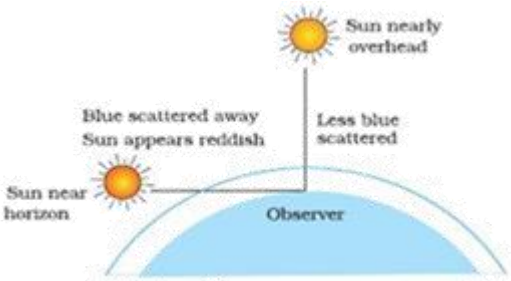
30	(a) Planets do not twinkle like stars because the distance between the planets and the earth is not far when compared to the distance between the stars and the earth. As the distance is less, the refraction of light won't be much for planets. Thus, planets do not twinkle. (b) A rainbow is a meteorological phenomenon that is caused by reflection, refraction and dispersion of light in water droplets resulting in a spectrum of light appearing in the sky. The diagram is given below:  Rainbow Formation (c) The Sun appears about two minutes before the actual sunrise and this phenomenon is known as advance sunrise. The Sun remains visible about two minutes after the actual sunset and this phenomenon is known as delayed sunset. The advance sunrise and delayed sunset happen due to atmospheric refraction. Sunrise means rising of the Sun above the horizon and sunset means setting of Sun below the horizon. The diagram given below shows the actual position (A) and the apparent position (B) of the Sun relative to the horizon.  (OR) (i) This is known hypermetropia. Hypermetropia is also known as far sightedness. The causes are : 1. This defect arises because of the focal length of the eye lens to long. 2. the eyeball has become too small. (ii) This can be corrected by using a convex lens of appropriate power. (iii)  *(c) Correction for Hypermetropic eye*	5

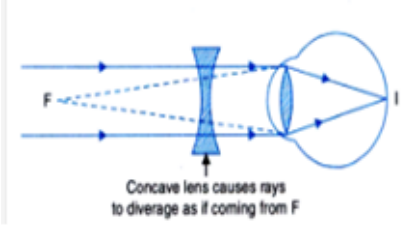
	End of the Question Paper	

SET – C

SECTION - A		
Q.NO.	ANSWER	MARKS
3	**Answer question numbers 3(a) - 3(d) on the basis of your understanding of the following paragraph and the related studied concepts.** PHY	
3(a)	Wind turbines.	1
3(b)	Unlike the wind the tides are predictable hence, power input is constant.	1
3(c)	Gas, coal and nuclear plants.	1
3(d)	Japan and New Zealand.	1
5	(C) (OR) (A) (or) any answer	1
6	(A)	1
7	(A)	1
	For question numbers 13 and 14, two statements are given- one labeled *Assertion* (A) and the other labeled *Reason* (R). Select the correct answer to these questions from the codes (i), (ii).(iii) and (iv) as given below i) **Both A and R are true and R is correct explanation of the assertion.** ii) **Both A and R are true but R is not the correct explanation of the assertion.** iii) **A is true but R is false.** iv) **A is false but R is true**	
14	((IV)	1
SECTION - B		

22	u = -15 cm, f = -10 cm and h = 1 cm From the mirror formula, we get $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ $\rightarrow \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$ $\Rightarrow \frac{1}{v} = \frac{1}{-10} - \frac{1}{-15}$ $\Rightarrow v = -30$ cm The image is formed at a distance 30 cm on the left side c $m = \frac{h'}{h} = -\frac{v}{u}$ $h' = -1 \times \frac{-30}{-15} = -2$ cm The image size is 2 cm and it is real and inverted.	3
23	(i) $R_1 = 4R$ (ii) No change in resistivity. (b) Resistivity = 6×10^{-6} ohm - m	3
24	State the rule to determine the direction of a (i) Maxwell's Right Hand Thumb Rule: (ii) Fleming's Left Hand Rule (iii) Fleming's Right Hand Rule. (OR) (a)  (b) Right hand thumb rule: If a current carrying conductor is imagined to be held in right hand such that thumb points in direction of current, then curled fingers of hand indicate the direction of magnetic field. If current flows in upward direction then direction will be anticlockwise. (c) Decreases	3
29	SECTION- C Take a coil of wire AB having a large number of turns.	5

	 Moving a magnet towards a coil sets up a current in the coil circuit, as indicated by deflection in the galvanometer needle. Connect the ends of the coil to a galvanometer. Take a strong bar magnet and move its north pole towards the end B of the coil. There is a momentary deflection in the needle of the galvanometer, say to the right. This indicates the presence of a current in the coil AB. The deflection becomes zero the moment the motion of the magnet stops. Now withdraw the north pole of the magnet away from the coil. Now the galvanometer is deflected toward the left, showing that the current is now set up in the direction opposite to the first. Place the magnet stationary at a point near to the coil, keeping its rforth pole towards the end B of the coil. We see that the galvanometer needle deflects toward the right when the coil is moved towards the north pole of the magnet. Similarly, the needle moves toward left when the coil is moved away. When the coil is kept stationary with respect to the magnet, the deflection of the galvanometer drops to zero. To find the direction of electric current Fleming's right hand rule is applied. According to it, if we stretch the forefinger, middle finger and thumb of our right hand mutually perpendicular in such a way that thumb points along the direction of motion of conductor, forefinger along the direction of magnetic field; then the middle finger points along the direction of induced current. When current in P is changed, the field associated with Q will vary causing an induced current in Q. If both the coils are moved in the same direction with same speed, there will not be any change in the field associated with Q. Hence no current will be induced in Q. Fleming's Right hand rule. (ii) Increasing number of turns and increasing electric current.	
30	(a) The cause of dispersion is the change in speed of light with wavelength. When white light enters the first surface of a Prism, light of different colours due to their different speeds in glasses gets deviated towards the base of the prism through different angles that is the Dispersion of white light into its constituent colours takes place at the first surface of prism. (b) Most bending colour violet and least bending colour is red. (c)  Sun is near the horizon and its rays cover a larger part of the atmosphere at sunrise and sunset. The intensity of the scattered light is inversely proportional to the wavelength of the colour. So, most of the blue light and components of shorter wavelength are scattered away by the particles of the atmosphere. The component of red light is least scattered because it has the longest wavelength and is visible to us. Hence, the sun looks red at the time of sunrise and sunset. (OR (a) Myopia is the defect of the eye vision due to which a person can see the near by objects clearly but cannot see the far objects so distinctly.	5

	Causes of myopia: Myopia is caused due to (i) The elongation of the eyeball. (ii) Due to decrease in the focal length of the eye lens. (b)  (c) A person needs a lens of power -4.5D for correction of his vision. (i) Myopia (ii) f = 1/-4.5 = - 0.22m (iii) concave lens.	
	End of the Question Paper	