

FIRST YEAR KGCE EXAMINATION
BASIC MATHEMATICS & SCIENCE
 MODEL QUESTION PAPER – ANSWER KEY
 COMMON TO ALL KGCE PROGRAMS

(Time : 3 hours)

(Maximum Marks: 60)

PART-A

(Maximum Marks: 20x1 Marks = 20 Marks)

- I. Answer the following questions by choosing the correct answer from the options given below. Each question carries 1 mark.

Q No	Question	Answer
1	The value of $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ is	b) $\frac{7}{8}$
2	The ratio of 60 cm to 1.2 m is	c) 1:2
3	If $x:8 :: 15:40$, then x is	a) 3
4	If $x=2$, $y=3$ and $z=5$, then the value of $(3x+2y-z)$ is equal to	b) 7
5	If $(x+1)^2 = 36$, then the value of x is given by	b) $x = 5$ and $x = -7$
6	Volume of a cube with side length 5cm is	c) 125 cm^2
7	The ratio of circumference to diameter of a circle is	c) π
8	If $\sin \theta = \frac{3}{5}$, then $\operatorname{cosec} \theta$ is	a) $\frac{5}{3}$
9	Value of $\cos 60^\circ \sin 30^\circ$ is	c) $\frac{1}{4}$
10	The degree measure of $\frac{\pi}{4}$ radian is	d) 45°
11	1 kilogram = _____ gram	c) 1000
12	The unit of distance is	a) metre
13	Mass per volume is called	d) Density
14	The unit of work is _____	a) Joule
15	Velocity is the rate of change of _____	c) Displacement
16	Kelvin is the unit of _____	c) Temperature
17	The instrument used to measure the temperature is	b) Thermometer

18	AC stands for _____	c) Alternating current
----	---------------------	------------------------

Q No	Question	Answer
19	The unit of current is _____	a) Ampere
20	The voltage across a conductor is 2V and a current of 1A flows through the conductor. What is the resistance of the conductor?	d) 2 ohm

PART-B

(Maximum Marks: 8x5 Marks = 40 Marks)

II. Answer *any eight* questions from the following. Each question carries marks.5 Marks.

Q No	Question
1	<p>Two numbers are in the ratio 3:4. If their sum is 77, find the numbers?</p> <p>Let the numbers be $3x$ and $4x$.</p> $\therefore 3x + 4x = 77$ <p>ie, $7x=77$</p> <p>ie, $x=11$</p> <p>So the numbers are 33 and 44.</p>
2	<p>The sum of side of a square and its half is 63. Find the side of the square.</p> <p>Let the side is x cm.</p> $x + \frac{x}{2} = 63$ <p>ie, $3\frac{x}{2} = 63$</p> <p>ie, $x=42$</p> <p>So the side = 42 cm.</p>
3	<p>The first, second and third terms of the proportion are 42, 54 and 24. Find the fourth term?</p> <p>Let the 4th number be x.</p> $\therefore \frac{42}{54} = \frac{24}{x}$ <p>ie, $x = 32$</p> <p>So, the 4th number is 32.</p>
4	<p>A circle has a radius of 23cm. Find its circumference and area?</p> <p>Circumference = $2\pi r = 46\pi$ cm</p> <p>Area = πr^2</p> $= 529 \pi \text{ cm}^2$

Q No	Question
5	<p>If $\tan B = \frac{1}{2}$, where B is an acute angle in a right triangle ABC. Find $\sin B$ and $\cos B$?</p> <p>Opposite side = 1 Adjacent side = 2 By Pythagoras theorem hypotenuse = $\sqrt{5}$ $\therefore \sin B = \frac{1}{\sqrt{5}}$ and $\cos B = \frac{2}{\sqrt{5}}$</p>
6	<p>Prove that: $\tan x + \cot x = \sec x \operatorname{cosec} x$?</p> $\begin{aligned} \tan x + \cot x &= \frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} \\ &= \frac{\sin^2 x + \cos^2 x}{\sin x \cos x} \\ &= \frac{1}{\sin x \cos x} \\ &= \frac{1}{\cos x} \cdot \frac{1}{\sin x} \\ &= \sec x \cdot \operatorname{cosec} x \end{aligned}$
7	<p>Write a note on systems of units?</p> <p>There are several unit systems in the scientific world. Some of them are, CGS system, MKS system, FPS system.</p> <p>CGS- centimetre, gram second MKS-metre, kilogram, second FPS- foot, pound ,second</p>
8	<p>Differentiate between Mass and weight?</p> <p>Mass is the amount of matter contained in a body. Its unit is Kg. Mass do not vary from place to place.</p> <p>Weight is the force experienced on a body due to gravity. Its unit is Newton. Weight vary from place to place</p>
9	<p>Differentiate between speed and velocity?</p> <p>Speed is the rate of change of distance.</p> <p>Speed = distance /time. Its unit is m/s</p> <p>Velocity is the rate of change of displacement</p> <p>Velocity = displacement /time. Its unit is m/s</p>
10	<p>Write any two differences between heat and temperature?</p> <p>Heat is a form of energy. Its unit is Joule or carorie</p>

Q No	Question
	Temperature is the amount of hotness in a body. Its unit are degree celcius, Kelvin etc.
11	<p>State and explain Ohm's law?</p> <p>At a constant temperature, current through a conductor is directly proportional to the potential difference across the conductor.</p> <p>$I \propto V$ or $V \propto I$ Or $V = RI$</p> <p>Where R is a constant called the resistance of a conductor</p>
12	<p>How can we determine resistance of a metal?</p> <p>Using ohms law set up we can determine the resistance of a conductor</p> <p>The voltage through a metal vary, using rheostat and the current is measured. In all cases V/I is a constant and is equal to the resistance (R) of a metal</p>