MARKING SCHEME

GATUNDU EVALUATION 2019 EXAMINATION PHYSICS PAPER 232/2

232/2

PHYSICS

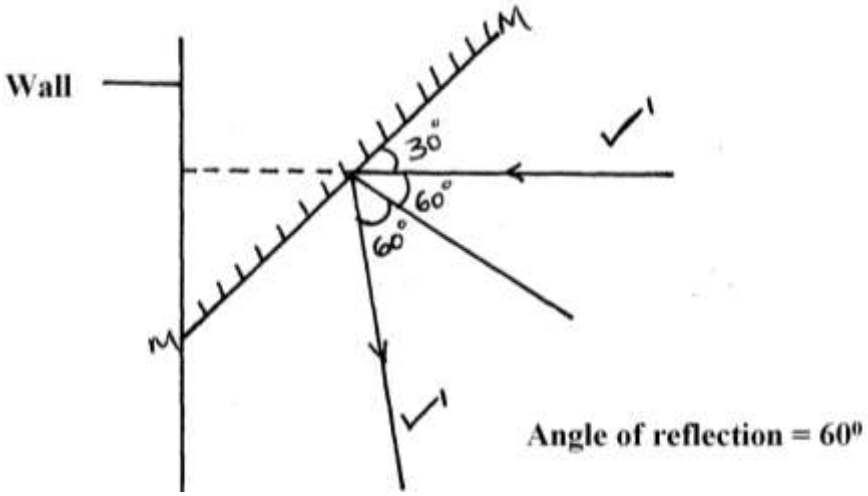
PAPER 2

JULY / AUGUST, 2019

2 HOURS

SECTION A (25MARKS)

1. a)

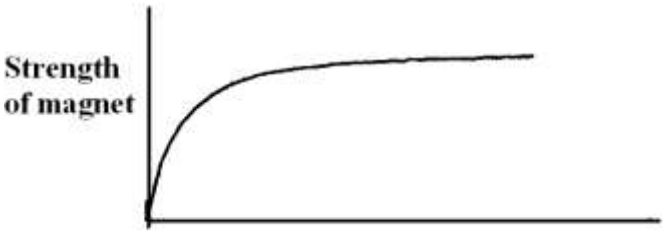


b) When moon covers the sun it obstructs both the light and heat since both move with same velocity. ✔

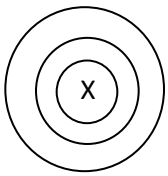
2. A is **positively** charge while B is **negatively** charged

3. **Circuit A, internal resistance in circuit** A is less than in circuit B and **same current flow through bulbs in A** while current divide in B through the bulbs.
4. (i) South

   (ii)



5.



Pattern
Direction

6. Arsenic shares 4 of its 5 electrons with germanium and the extra electron is free for conduction.
7. r =beta particle, c=206 d= 82
8. a) - Galvanometer shows defection 1
   Reason; When UV radiation energy falls on a metal surface, some electrons absorb this energy and are dislodged from the surface. 1 deflection shows current flow.
   b) - Galvanometer shows no deflection 1mk
9. Daily consumption = $4 \times \frac{40}{1000} + 6 \times \frac{100}{1000} \times 5$

   = (0.16 + 0.6) x5 = 3.8 KW ✔

   Monthly consumption = 3.8 x30

   = 114KW or units ✔

   Monthly bill = 150 + 114 x 5.5

   = 150 + 627 = sh. 777 ✔
10. Infrared ✔ – Source of heat, used for photography ✔
11. a) Frequency remains CONSTANT ✔*1*
    b) V = λf

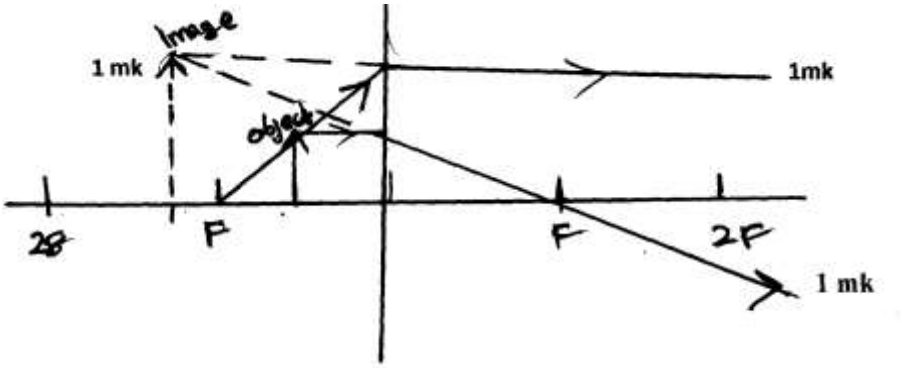
24cm/s = f × 8cm ✔*1*

f = 3Hz ✔*1*

12. **Wider field of view, upright** disadvantage is that the image is smaller

SECTION B (55 MARKS)

13.



(a) Virtual, magnified and on the same side as object . Any two

(b) (i) Reciprocal of the focal length power of the lens

(ii) 1/f = gradient => f = 1/gradient

f= 13cm

iii v =u= 27cm

(c) $\frac{1}{V}+\frac{1}{U}=\frac{1}{f}$ $f=-20$ $U=+10$

$$\frac{1}{V}=\frac{-1}{f}-\frac{1}{U}$$ ✓1

$$=\frac{-1}{20}-\frac{1}{10}=\frac{(-1-2)}{20}$$

$$= \frac{-3}{20}$$

V = 6.67cm [1]

14. (a) $${}_w\eta_g = {}_w\eta_a \times {}_a\eta_g$$

$$= \frac{3}{4} \times \frac{3}{2}$$

$$= \frac{9}{8}$$

= 1.13

(b) (i) $$\eta = \frac{Sin\ i}{Sin\ r}$$

$$1.6 = \frac{Sin\ 35.6^o}{Sin\ r}$$

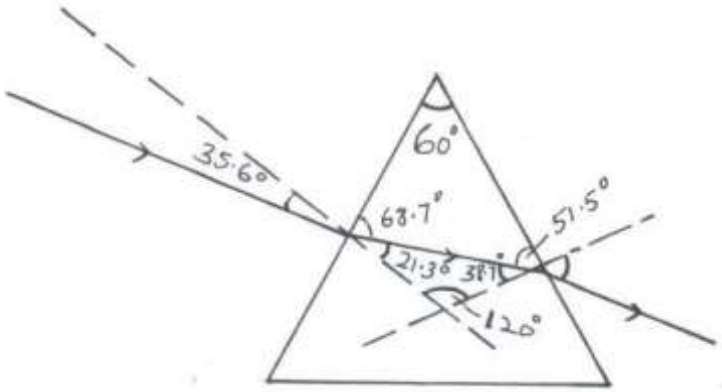
r = 21.3º

(ii) Angle of incidence = 38.7º (show working)

$$Sin\ C = \frac{1}{\eta} = \frac{1}{1.6}$$

= 38.7º

(iii)



(iv) - The critical angle must be exceeded. [1]

- Light must be travelling from a dense medium to a less dense medium. [1]

(c)

$V = \frac{2S}{t}$ $S = \frac{Vt}{2}$ $= \frac{340 \times 2}{2}$ ✓ = 340m ✓

15. a) Capacitors are used in

- rectification smoothing circuits
- tuning circuits
- camera flash
- reduction of sparking in induction coil contact

any one 1

b) i) $\frac{2 \times 8}{2 + 8} = \frac{16}{10} = 1.6\mu F$

$1.6 + 3.2 = 4.8\mu F$ ✔

$C_T = \frac{5 \times 4.8}{5 + 4.8}$ ✔ $= \frac{24}{9.8} = 2.45 \times 10^{-6}F$ ✔

ii) $Q = CV$

$= 2.45 \times 10^{-6} \times 12 = 2.94 \times 10^{-5}C$ ✔

charge on $3.2\mu F = {}^{2}/_{3} \times 2.94 \times 10^{-5}$

$= 1.96 \times 10^{-5}C$ ✔

iii) p.d on 5mF $= \frac{Q}{C} = \frac{2.94 \times 10^{-5}}{5 \times 10^{-6}} = 5.88$volts ✔

iv) energy $= \frac{1}{2}CV^2$ ✔

$= ½ \times 2 \times 10^{-6} \times 6.12^2$

$= 3.75 \times 10^{-5}$J ✔

(c) (i) Capacitance will also increase

(ii) capacitance will decrease.

16. a) Lenz's Law states that the direction of induced current is such that it opposes the charge producing it.

b) i) When switch S is closed, the magnetic field strength increases (magnetic flux) from zero to maximum $^{1/2}$ This changing magnetic flux (field) induces an e.m.f in the secondary coil 1When the switch is opened, the magnetic field strength decreases (magnetic flux) from maximum to zero $^{1/2}$ This produces an induced current in the secondary coil

ii) Having more turns on the coil connected to the cell

c) i) - Hysterisis
- Eddy currents
- Resistance of wire
- Loss of magnetic flux linkage

ii) Power Primary $\times \frac{90}{100}$ = VsIs 1

$240 \times IP \times \frac{90}{100} = 80 \times 9$

$IP = \frac{80 \times 9}{240} \times \frac{100}{90}$ 1 = 3.33A 1

d) (i) Emf of the battery equal to v intercept 9.2V

(ii) internal resistance = gradient of the graph .

$r = 2.5\ 3\Omega$

17. a) Most of the Kinetic Energy of the electrons is converted into Heat Energy

b) High density

c) $E = QV = hf$ $\frac{1}{2}$

$1.6 \times 10^{19} \times 1{,}200 = 6.63 \times 10^{34} \times f$ $\frac{1}{2}$

$f = 2.9 \times 10^{18}$ Hz

d) Hard X-Rays – They have high penetrating power.

e) i) 4x5x2 = 40 V

ii) T = 8x10

= $8x10^{-2}$ s

iii) f = $\frac{1}{T}$

= $\frac{1}{8x10^{-2}}$ = 12.5 Hz