KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

PRECIOUS BLOOD HIGH SCHOOL
232/1
PHYSICS
PAPER 2
MARKING SCHEME

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PRECIOUS BLOOD SCHOOL KCSE TRIAL AND PRACTICE EXAM 2016

Paper 2

MARKING SCHEME

SECTION A

Two plane mirrors are inclined at an angle of 120° to each other such that their reflecting surfaces face each other. An object pin stands midway between the mirrors

Draw a ray diagram to show all the images

DIAGRAM

2. *State two conditions necessary for the occurrence of an annular* eclipse (2mks)

i) Moon too small to hide the sun completely

ii) Ring of sunlight shows round the edge of the moon

3. The figure below shows two parallel rays incident on a concave mirror .F is the focal point of the mirror

DIAGRAM

Sketch on the same diagram the path of the rays after striking the mirror (2mks)

4, State the class of waves to which sound belongs

- Longitudinal waves

5. *Calculate the value of the critical angle C shown in the figure below*

$n_1 \sin C = n_2 \sin 90^0$

$\sin C = n_2/n_1 \sin 90^0$

$C = 60^0$

6. In the diagram below two electroscopes A and B carry the same type of charges as shown . The two are then connected with a copper wire as shown

DIAGRAM

State and explain the observations

The divergence of A drops slightly while B rises slightly. Both A and B will have equal divergence as they share charges equally

6 The image below shows a real image formed d by a convex lens

DIAGRAM

On the same grid ,construct a ray diagram to locate the position of the object

7. *State a property of electromagnetic wave on which the operation of a radar system is based*

- The waves can be reflected

8. *The figure below shows an attempt to supply each of the three lamps L_1 L_2 L_3*

DIAGRAM

<u>Explain why this is a poor connection</u>

- When one switch is open (S_I).Bulbs ½ and L_3will not light

ii) Redraw an adjacent diagram to show the best positioning for the stitches

9. State one use of x-ray in medicine and one use in industry

- X-ray photography to reveal fractures/killing cancerous cells
- Industries to detect flaws in metals

10 draw the magnetic field lines due to the configurations shown below

DIAGRAM

11) Sketch the current –voltage characteristic of a junction diode with a forward bias

DIAGRAM

12 . *The graph below represents valves of – corresponding valves of wavelength For waves transmitted in a certain medium*

DIAGRAM

From the graph determine the speed of the waves

G = 0.08- $\frac{0.03}{3-1}$

$=\frac{0.05}{2}$ =0.025

C= fð

$\frac{1}{f} = \frac{1}{0}$

$t = \frac{\partial}{c}$

$\frac{1}{c} = 0.025$

$\underline{c = 40m/s}$

13. *state one cause of powerloss in long distance transmission wires and how these lose can be minimized*
- High resistance in the cables – use the thick conductors
- High current I in the cables – stepping up voltage before transmission (*1mk)*

SECTION B (55 MARKS)

Answer all the questions in the spaces provided

14 *study the circuit shown below*

DIAGRAM

State and explain what happens to the identical lamps X and Y in the circuit shown when

i) -Switch S_2 only is close
- Bulbs X and Y light dimly
- They are connected in series & resistant adds up

i) Switches S_1 and S_2 are closed
- Bulb X lights brightly while Y does not
- - bulb Y is short circuited

b*)* *The graph below shows how potential difference across a battery varies with the current supplied . Graph B shows the current in a filament lamp varies with the potential difference across it.*

GRAPH

i) Use the graph A to determine e.mf of the battery

9.0 V

ii) The internal resistant of the battery given V = -ir+E

G = 3-8/8-0.5= -0.6667

-r = 0.6667 S_2

R= 0.6667 Ω_2

i) Calculate the resistant of the filament lamp when the current it is 1.5V

$$\frac{5.0-0.3}{2.45-0.55} = \frac{4.7}{1.9} \Rightarrow 2.474\Omega \pm 0.1$$

15. *a) The folloear reaction is part of radioactive series*

$$^{210}_{A} \xrightarrow{\beta} {}^{210}_{B} \xrightarrow{r} {}^{210}_{C} \longrightarrow {}^{206}_{D}$$

i *) name the radiation represented by r and* s

r- beta

s- alpha

ii) Determine the number represented by x and y

x…Beta……

y……Alpha…….

iii) Determine the number represented by x and y

x…83…….

y…82……

ii) *The figure below shows the features of a diffusion cloud used for* detecting radiation from *radioactive sources*

DIAGRAM

i.) *State the property of alcohol that makes it suitable for use in the chamber*

– volatile

ii.) *what is the purpose of the solid* co_2

-lowers the temperature in the chamber until is super saturated

iii) *explain how the radiation from the radio active source detected in the chamber*

- radiation ionizes air inside the chamber
- alcohol droplets form on the air ions produced by the radiation forming white tracks

iv*)* *state one advantage of the cloud chamber over a charged gold leaf electroscope when used as detectors of radiation*

- the type of radiation can be detected g,i.e can not identify the nature of radiation

b *) the graph below shows how the activity of a sample of the radioisotope technetium which is used extensively in medicine ,varies with time*

DIAGRAM

i) *use the graph to determine the half-life* $T_{1/2}$ *of technetium*

6 hours

ii) *Hence calculate the decay constant for technetium given that* $T½= 0.6931/\lambda$

where λ *is the decay of the constant*

iii) Determine the number of technetium atoms remaining in the sample after 24 hrs

$N= No(½)^{24}$

$= 8x10^7 (½)^{24} = 47.68$ *(1mk)*

16. *the figure below shows the feature of an X-ray tube*

DIAGRAM

a) *i)* *what is the purpose of the oil going in and out of the anode*

-it is used to cool the anode by conducting heat away

ii)state with reason the property of tungsten that makes it suitable as a target

- high melting point *(1mk)*

b) *an x-ray tube operates with a potential difference of 100kv and filament current is 20mA. Calculate*

I the power transferred to the target of X-ray tube

(P = I X v

= 20X 10-3 X 100,000 = 2000W (*2 MKS)*

ii) *the number of electrons hitting the target per second (2mks)*

I= nxe

N= I/e $\rightarrow 20x10^3/1.6x10^{-19} = 1,25\ x10^{17}$

iii))the maximum kinetic energy of the emitted electrons

E maximum = hc/1min = $9.2512x\ 10^{19}$J *(2 mks)*

iv))write down the value of the stopping potential

= 5.782- 2.26

= 3.522 ev

17. *State lenzs law of electromagnetic induction*

- the direction of induced e.m.f is such that the induced current which it causes to flow produces magnetic effect that opposes the change producing it

B *) in the figure below, the bar magnet moved out of the coil*

DIAGRAM

i)If the current, I is induced in the coil in the direction shown ,what is the polarity x of the magnet

-North *(1mk)*

ii) explain briefly the source of electrical energy in the circuit

- the magnet fuse cuts he coil inducing an e.m.f in the coil hence electrical energy

c) *A hydro-electric power station produces 500kv and the power is transmitted through cables of resistance 200Ω to a* step down transformer in a sub-station .assuming that both transformers are 100% *efficient calculate*

i) *The current produced by the generator*

P= IV

=500,000 = I x 10,000

I= 50 A

ii) *The current that flows through transmission cables*

Vs/vp = Ip/Is

= 50/Is

Is= 3.33A *(2mks)*

iii) *The voltage drop across the transmission cables*

V= IR

=3.333 x200

=666.6Ω

iv) *The power loss during transmission*

$P = I^2R$

= 2222.17wats

18. a) *state two factors that determine the capacitance of parallel place capacitor*

-area of plates

-nature of dielectric

-distance between the plates

b*) A 5μ capacitor is charged to a potential of 200v and isolated . it is then connected to a 10μF capacitor*

i) find the resultant potential difference across combination

$Q = Q_1 + Q_2$	$1x10^{-3}$ v $1x10^{-3} = 15 x10^{-6}$ $Q = 5x10^{-6}$ x200 $1x10^{-3}/5x10^{-6}$ = *6667v* *(3MKS)*

ii) energy stored in the capacitors after connection

$E = ½ \times 15 \times 10^{-6} \times 200^2 = 0.1$ joules *(2mks)*

ii0)total energy in the capacitors after connection

$E = ½ \times 15 \times 10^{-6} \times 66.67^2$

= 0.00333367 joules *(2mks)*

d) *Give one application of capacitors*

– smoothening rectified circuits

- Reduction of sparking in induction coils in tuning
- Circuits /delay /camera flash

DIAGRAM

Using the graph and the equation v/f = M+1 determine :

i) *The object position when the image position is 45cm*

M= v/u

3.5= 45/u u = 45/3.5

= 12.857cm

ii) The focal lengthy of the lens

V= mf +f at m=0

V= f

= 10 cm

iii) *The power of the lens*

P = 1/0.1

=10 diameters

b) *the following figure below shows an eye defect*

DIAGRAM

name the defect and illustrate on the same diagram how the effect could be corrected

- Long sightedness
- Hypermetropia *(2mks)*