

Name of the Student: \_\_\_\_\_

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

**Q1.**

- (a) (i) main sequence correct **(1)**  
 Giants and Dwarfs correct **(1)**  
 OBAFGKM **(1)**
- (ii) X at G, 5 **(1)**  
 line up to Red Giant, down to White Dwarf **(1)**

max 4

- (b) (i) temperature and colour [or reference to correct spectral line] **(1)**

(ii)  $\frac{330}{3.26} = 100 \text{ (pc)}$  **(1)**

(iii)  $m - M = 5 \log \frac{d}{10}$  gives  $m - M = 5$  **(1)**

$M = -2.1$  **(1)**

(allow C.E. for value of  $d$  from (ii))

- (iv) Matar is brighter (but at same temperature) **(1)**

(since  $P = \sigma AT^4$ ), Matar must have larger  $A$ , therefore larger **(1)**

6

**[10]****Q2.**

(a) (i) (use of  $V_{\text{rms}} = \frac{V_0}{\sqrt{2}}$  gives)  $V_0 = 7.1\sqrt{2} = 10 \text{ V}$  **(1)**

(ii)  $T = 10 \text{ (ms)}$  **(1)**

(use of  $f = \frac{1}{T}$  gives)  $f = \frac{1}{10 \times 10^{-3}} = 100 \text{ Hz}$  **(1)**

3

- (b) control 1: time base **(1)** (or time period)

(use of  $T = \frac{1}{f}$  gives)  $T = \frac{1}{200} = 5 \times 10^{-3} \text{ (s)}$  **(1)**

setting = 2.5 ms (div<sup>-1</sup>) (1)

control 2: voltage sensitivity or Y-plate setting (or Y-gain) (1)

setting = 20 V (div<sup>-1</sup>) (1)

5

[8]