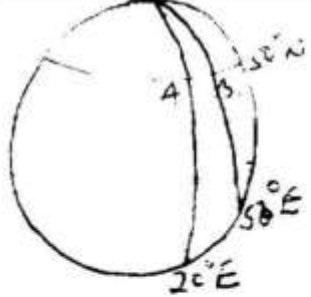


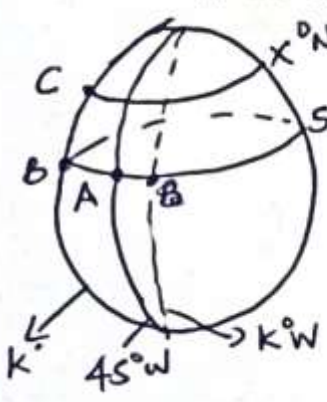
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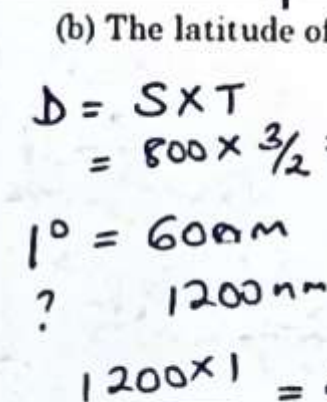
- 1 Find the distance between two points A(50°N , 20°E) and (50°N , 50°E) in:
- i) Kilometers (2 Marks)
 - ii) Nautical miles (Take $R = 6400\text{km}$ and $\pi = 3.142$) (2 Marks)
- 2
- The positions of two towns A and B are (50°N , 45°W) and (50°N , $K^{\circ}\text{W}$) respectively. It takes a plane 5 hours to travel from A to B at an average speed of 800knots. The same plane takes $1\frac{1}{2}$ hours to travel from B to another town C at the same average speed. Given that C is to the north of B, calculate to the nearest degree,

 - (a) The value of K (4marks)
 - (b) The latitude of C (3marks)
 - (c) If the plane started from A at 9.00am and flew to C through B, find the local time at C when the plane arrived there. (3marks)
- 3 A ship left point P(10°S , 40°E) and sailed due East for 90 hours at an average speed of 24 knots to a point R.(Take 1 nautical mile (nm) to be 1.853 km and radius of the earth to be 6370 km)
- (a) Calculate the distance between P and R in:
 - (i) nm;
 - (ii) km.
 - (b) Determine the position of point R.
 - (c) Find the local time, to the nearest minute, at point R when the time at P is 11:00a.m.

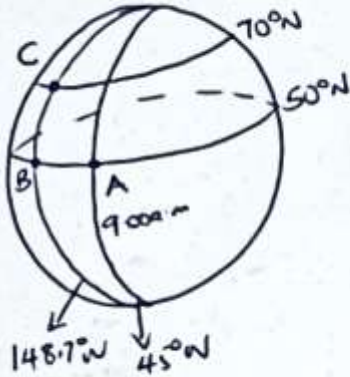
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1	 <p>i) <u>Dist in km</u> = $\frac{30}{360} \times 2 \times 3.142 \times 6400 \times \cos 50^\circ$ = 2154.28km</p> <p>ii) <u>Dist in nm</u> = $\frac{2154.28}{1.83}$ = $\cong 1,177.2\text{nm}$</p>	M1 A1 M1 A1	Accept calculation
	04		

2	<p style="text-align: center;">(a) The value of K</p>  <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> $D = S \times T$ $= 800 \times 5$ $= 4000\text{nm}$ $1^\circ = 60 \cos 50^\circ$ $? \quad 4000$ $\frac{4000 \times 1}{60 \cos 50}$ </div> <div style="width: 30%;"> $= 103.7^\circ$ $K - 45 = 103.7$ $K = 103.7 + 45$ $= \underline{\underline{148.7^\circ W}} \quad (4)$ </div> </div>	(4marks)	
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	<p style="text-align: center;">(b) The latitude of C</p>  <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> $D = S \times T$ $= 800 \times \frac{3}{2} = 1200\text{nm}$ $1^\circ = 60\text{nm}$ $? \quad 1200\text{nm}$ $\frac{1200 \times 1}{60} = 20^\circ$ </div> <div style="width: 30%;"> $X - 50 = 20$ $X = \underline{\underline{70^\circ W}} \quad (3)$ </div> </div>	(3marks)	
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(c) If the plane started from A at 9.00am and flew to C through B, find the local time at C when the plane arrived there. (3marks)



Distance A-B-C
 $= 4000 \text{ nm} + 1200$
 $= \underline{5200 \text{ nm}}$
 $T = \frac{D}{S}$
 $= \frac{5200}{800}$
 $= 6\frac{1}{2} \text{ hrs}$

$\theta = 103.7^\circ$
 $1^\circ = 4 \text{ min}$
 $103.7 = 103.7 \times 4 = \frac{414.8}{60}$
 $= 6 \text{ hrs } 55 \text{ min}$
 $9:00$
 $- 6:55$
 $\underline{02:05 \text{ a.m.}}$
 $+ 6:30$
 $\underline{8:35 \text{ a.m. at C}}$

10

3

(a)(i) Distance in nm $= 24 \times 90$ $= 2160 \text{ nm}$	BI	
(a)(ii) Distance Km $= 2160 \times 1.853$ $= 4002.48 \text{ km}$	BI	CAD
(b) Position of R $10^\circ = 60 \cos 10^\circ \text{ nm} = 2160$ $\theta = \angle PO_1R$ $\theta = \frac{2160}{60 \cos 10^\circ}$ $= 36.56^\circ$ in km (36.55). (36.54)	BI MI MI	$60 \cos 10^\circ$ seen. for expression θ subject formula.
Position of R = $(10^\circ \text{S}, (40 + 36.56)^\circ \text{E})$ $= (10^\circ \text{S}, 76.56^\circ \text{E}) \Rightarrow (10^\circ \text{S}, 76.55^\circ \text{E})$	MI AI	$6370 \cos 10^\circ$ Bi
(c) Local time at R Longitude difference between P and R = 36.56 $\text{Time difference} = \frac{36.5 \times 4}{60}$ $= 2 \text{ hrs } 26 \text{ mins}$	MI AI	Time diff in hrs.
Local time at R $= 1100 \text{ h} + 2 \text{ h } 26 \text{ min}$ $= 1326 \text{ h}$ or $= 1.26 \text{ pm}$	MI AI	(Units must be specified). If wrong value of θ is used, A.