

# Mark Scheme Interference Past Paper Questions

## Jan 2002 to Jan 2009

1(a) graph to show:

maxima of successively smaller intensity ✓

subsidiary maxima/minima equally spaced ✓

(at least two each side of central axis)

width of subsidiary sections half width of central section ✓

symmetrical pattern each side of central axis ✓

**Q1 Jan 2002**

(4)

(b)(i) broader maxima or pattern ✓ [or fringes wider apart]  
dimmer pattern ✓

(ii) maxima are closer ✓ [or narrower fringes]  
green and dark regions ✓

max (3)

(7)

2(a) slits act as coherent sources ✓

waves/light diffract at slits ✓

waves overlap/superpose/meet/cross ✓

bright patches : constructive/waves in phase/reinforce ✓

dark patches : destructive/waves out of phase/cancel ✓

**Q2 Jan 2003**

max(3)

(b)(i) spacing  $w = \frac{76 \pm 1(\text{mm})}{26} = 3.0 \text{ or } 2.9 \text{ mm} \checkmark$  ( $2.92 \pm 0.04 \text{ mm}$ )

15 or more fringes used ✓

(b)(ii) (use of  $\lambda = \frac{wS}{D}$  gives)  $\lambda = \frac{2.92 \times 10^{-3} \times 0.90 \times 10^{-3}}{4.2} \checkmark$   
 $= 6.26 \times 10^{-7} \checkmark$

(allow C.E. for sensible value of  $w$  from (i))

(4)

(7)

Question 2				
(a)	(i)	bright and dark bands (or fringes) ✓ equally spaced ✓ of similar intensity to each other (or suitable comment about decrease of intensity outwards from centre) ✓	<b>Q2 Jun 2008</b>  <b>max 4</b>	
	(ii)	central band wider than others ✓ intensity decreases greatly away from centre of pattern ✓		
(b)	(i)	fringe width $w = \frac{58}{20} = 2.9 \text{ mm}$ ✓	<b>5</b>	
	(ii)	$\lambda = \frac{ws}{D}$ gives $\frac{w}{D} = \frac{w'}{D'}$ (since $\lambda$ and $s$ are constant) ✓  $\frac{2.9}{D} = \frac{3.7}{D+0.80}$ gives $D = 2.9 \text{ m}$ ✓		
	(iii)	$\lambda = \frac{2.9 \times 10^{-3} \times 0.60 \times 10^{-3}}{2.9}$ ✓ = $6.0 \times 10^{-7} \text{ m}$ (600 nm) ✓		
			<b>Total</b>	<b>9</b>

Question 2			
(a)		same wavelength or frequency ✓ (same phase or) constant phase difference ✓	<b>Q2 Jun 2005</b>  <b>2</b>
(b)	(i)	narrow slit gives wide diffraction ✓ (to ensure that) both $S_1$ and $S_2$ are illuminated ✓	<b>Max 4</b>
	(ii)	slit S acts as a point source ✓ $S_1$ and $S_2$ are illuminated from same source giving monochromatic/same $\lambda$ ✓ paths to $S_1$ and $S_2$ are of constant length giving constant phase difference ✓ [or $SS_1 = SS_2$ so waves are in phase]	
(c)		graph to show: maxima of similar intensity to central maximum ✓ [or some decrease in intensity outwards from centre] all fringes same width as central fringe ✓	<b>2</b>

**Section A: Objective test keys****Q5 Jan 2002**

1-D; 2-C; 3-B; 4-C; 5-B; 6-D; 7-B; 8-A; 9-D; 10-C; 11-B; 12-B; 13-A; 14-D; 15-B.

**Section A****Q5 Jun 2002****Key to Objective Test Questions**

1-B; 2-B; 3-D; 4- C; 5-A; 6-C; 7-B; 8-B; 9-D; 10-A; 11-C; 12-C; 13-D; 14-A; 15-C.

**Key to Objective Test Questions****Q6 Jun 2003**

1-A; 2-B; 3-A; 4-B; 5-A; 6-B; 7-A; 8-A; 9-D; 10-C; 11-C; 12-D; 13-A; 14-C; 15-D.

**Unit 4: Section A****Q4 Jan 2004****Key to Objective Test Questions**

1-C; 2-A; 3-D; 4-D; 5-B; 6-A; 7-C; 8-D; 9-C; 10-C; 11-A; 12-C; 13-C; 14-B; 15-B.

**Section A****Q5 Jan 2006**

*This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.*

	Keys to Objective Test Questions															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	C	C	B	C	A	D	B	B	A	D	C	A	D	B	D	

**Unit 4: PA04 Section A**  
**Waves, Fields and Nuclear Energy**
**Q5 Jan 2005****Key to Objective Test Questions**

1-B; 2-A; 3-D; 4-A; 5-C; 6-C; 7-D; 8-D; 9-C; 10-D; 11-C; 12-B; 13-B; 14-A; 15-C.

**PA04 Section A: Waves, Fields and Nuclear Energy****Q5 Jun 2006**

	<b>Keys to Objective Test Questions</b>															
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
	B	C	A	C	A	D	B	C	D	D	B	C	D	B	B	

**Section A****Q5 Jan 2008****Q6 Jan 2008**

*This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.*

	<b>Keys to Objective Test Questions</b>															
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
	D	B	C	B	A	C	B	C	D	C	A	C	D	B	A	

**Section A****Q5 Jun 2007****Q6 Jun 2007**

*This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.*

	<b>Keys to Objective Test Questions</b>															
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
	C	B	A	C	A	B	D	C	B	C	D	B	D	C	A	