10 (a) Show that

$$\cos(A + B) + \cos(A - B) = 2\cos A\cos B$$

(2)

(b) Hence show that

$$\cos P + \cos Q = 2\cos\frac{P + Q}{2}\cos\frac{P - Q}{2}$$

(3)

(c) Solve, for $0 \leqslant \theta \leqslant \frac{\pi}{2}$, the equation

$$\cos 5\theta + \cos 7\theta = 0$$

Give each solution in terms of π

(4)

(d) Show that

$$\cos 8x + 2\cos 6x + \cos 4x = 4\cos 6x\cos^2 x$$

(3)

(e) Use calculus to find the exact value of

$$\int_0^{\frac{\pi}{3}} \cos 6x\cos^2 x\,\mathrm{d}x$$

(4)

Question 10 continued

Question 10 continued

Question 10 continued

Question 10 continued

(Total for Question 10 is 16 marks)

TOTAL FOR PAPER IS 100 MARKS