

Luminous flux and the efficacy of light sources

The table below gives the luminous efficiency of radiation averaged over 25nm wavebands together with the power of radiation emitted by a number of light sources. Lamp **A** is a 100w General Lighting Service (GLS) lamp, **B** is a 65w white fluorescent tube, **C** is a theoretical 12w equal energy light source where all the power consumed is emitted as radiation in the visible region.

Wavebands $\Delta\lambda = 25\text{nm}$	Lum. efficiency	Power Output in watt/25nm		
λ in nm	V_λ	Lamp A	Lamp B	Lamp C
400 - 424	0.003	0.06	0.31	1.0
425 - 449	0.021	0.10	0.39	1.0
450 - 474	0.071	0.14	0.54	1.0
475 - 499	0.202	0.20	0.51	1.0
500 - 524	0.588	0.26	0.52	1.0
525 - 549	0.917	0.34	1.05	1.0
550 - 574	0.973	0.42	2.45	1.0
575 - 599	0.781	0.50	2.36	1.0
600 - 624	0.474	0.58	1.71	1.0
625 - 649	0.207	0.66	1.11	1.0
650 - 674	0.058	0.76	0.42	1.0
675 - 700	0.012	0.84	0.25	1.0

For each lamp calculate (i) the percentage of lamp power which is radiated as light,
 (ii) the light output in lm ,
 (iii) the efficacy in lm/w.

Answers (i) 4.86%, 17.88%, 100% . (ii) 1218 lm, 4586 lm, 2942 lm . (iii) 12.2 lm/w, 70.6 lm/w, 245 lm/w.