HW3_after Heat transfer conduction and convection

Due Sep 28 at 12:59pm **Points** 3 **Questions** 3 **Time Limit** None
Allowed Attempts 3

Take the Quiz Again (https://canvas.okstate.edu/courses/137119/quizzes/349079/take?user_id=220308)

Attempt History

	Attempt	Time	Score
KEPT	Attempt 2 (https://canvas.okstate.edu/courses/137119/quizzes/349079/history?version=2)	less than 1 minute	3 out of 3
LATEST	Attempt 2 (https://canvas.okstate.edu/courses/137119/quizzes/349079/history?version=2)	less than 1 minute	3 out of 3
	Attempt 1 (https://canvas.okstate.edu/courses/137119/quizzes/349079/history?version=1)	1,949 minutes	2 out of 3

Correct answers are hidden.

Score for this attempt: **3** out of 3
Submitted Sep 27 at 9:42pm
This attempt took less than 1 minute.

Question 1 1 / 1 pts

A fire in a room increases the interior wall surface temperature and maintains it at 800 ^{o}C. The outside ambient air temperature is 20 ^{o}C. If the wall is made of 200 mm brick, calculate the steady-state exterior wall surface

temperature[C]. Write down your answer rounded to the nearest ones without any units.

- Thermal conductivity of brick = 0.7 W/m-K
- Convective heat transfer coefficient = 15 W/m2-K

- (●) 168
- ( ) 142
- ( ) 240
- ( ) 254

Question 2 1 / 1 pts

Only one side of a 2 mm thick steel wall was suddenly exposed to 500 ^{o}C air stream. Calculate the surface temperature of the steel in Celsius at 12 sec with a time step of 4 sec. Write down your answer rounded to the nearest ones without units.

- Initial temperature = 20 ^{o}C
- Convective heat transfer coefficient on both sides = 10 W/m2-K
- Steel specific heat = 460 J/kg-K
- Steel density = 7500 kg/m3

- (●) 28

29

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Question 3 1 / 1 pts

Assuming thermally thick behavior, 40 kW/m^2 heat flux was applied to a 3 mm thick wood veneer for 15 sec. The initial ambient temperature was 300K and convective heat transfer coefficient was 20 W/m2-K. calculate the surface temperature of the wood veneer in Celsius. Write down your answer rounded to the nearest tens without units.

- Wood veneer properties:

Thermal conductivity of wood veneer = 0.15 W/m-K, density = 580 kg/m3, specific heat = 1750 J/kg-K, surface absorptivity = 0.85.

Below is the complementary error function table.

x	Hundredths digit of x									
	0	1	2	3	4	5	6	7	8	9
0.0	1.00000	0.98872	0.97744	0.96616	0.95489	0.94363	0.93238	0.92114	0.90992	0.89872
0.1	0.88754	0.87638	0.86524	0.85413	0.84305	0.83200	0.82099	0.81001	0.79906	0.78816
0.2	0.77730	0.76648	0.75570	0.74498	0.73430	0.72367	0.71310	0.70258	0.69212	0.68172
0.3	0.67137	0.66109	0.65087	0.64072	0.63064	0.62062	0.61067	0.60079	0.59099	0.58126
0.4	0.57161	0.56203	0.55253	0.54311	0.53377	0.52452	0.51534	0.50625	0.49725	0.48833
0.5	0.47950	0.47076	0.46210	0.45354	0.44506	0.43668	0.42838	0.42018	0.41208	0.40406
0.6	0.39614	0.38832	0.38059	0.37295	0.36541	0.35797	0.35062	0.34337	0.33622	0.32916
0.7	0.32220	0.31533	0.30857	0.30190	0.29532	0.28884	0.28246	0.27618	0.26999	0.26390
0.8	0.25790	0.25200	0.24619	0.24048	0.23486	0.22933	0.22390	0.21856	0.21331	0.20816
0.9	0.20309	0.19812	0.19323	0.18844	0.18373	0.17911	0.17458	0.17013	0.16577	0.16149
1.0	0.15730	0.15319	0.14916	0.14522	0.14135	0.13756	0.13386	0.13023	0.12667	0.12320
1.1	0.11979	0.11647	0.11321	0.11003	0.10692	0.10388	0.10090	0.09800	0.09516	0.09239
1.2	0.08969	0.08704	0.08447	0.08195	0.07949	0.07710	0.07476	0.07249	0.07027	0.06810
1.3	0.06599	0.06394	0.06193	0.05998	0.05809	0.05624	0.05444	0.05269	0.05098	0.04933
1.4	0.04771	0.04615	0.04462	0.04314	0.04170	0.04030	0.03895	0.03763	0.03635	0.03510
1.5	0.03389	0.03272	0.03159	0.03048	0.02941	0.02838	0.02737	0.02640	0.02545	0.02454
1.6	0.02365	0.02279	0.02196	0.02116	0.02038	0.01962	0.01890	0.01819	0.01751	0.01685
1.7	0.01621	0.01559	0.01500	0.01442	0.01387	0.01333	0.01281	0.01231	0.01183	0.01136
1.8	0.01091	0.01048	0.01006	0.00965	0.00926	0.00889	0.00853	0.00818	0.00784	0.00752
1.9	0.00721	0.00691	0.00662	0.00634	0.00608	0.00582	0.00557	0.00534	0.00511	0.00489
2.0	0.00468	0.00448	0.00428	0.00409	0.00391	0.00374	0.00358	0.00342	0.00327	0.00312
2.1	0.00298	0.00285	0.00272	0.00259	0.00247	0.00236	0.00225	0.00215	0.00205	0.00195
2.2	0.00186	0.00178	0.00169	0.00161	0.00154	0.00146	0.00139	0.00133	0.00126	0.00120
2.3	0.00114	0.00109	0.00103	0.00098	0.00094	0.00089	0.00085	0.00080	0.00076	0.00072
2.4	0.00069	0.00065	0.00062	0.00059	0.00056	0.00053	0.00050	0.00048	0.00045	0.00043
2.5	0.00041	0.00039	0.00037	0.00035	0.00033	0.00031	0.00029	0.00028	0.00026	0.00025
2.6	0.00024	0.00022	0.00021	0.00020	0.00019	0.00018	0.00017	0.00016	0.00015	0.00014
2.7	0.00013	0.00013	0.00012	0.00011	0.00011	0.00010	0.00009	0.00009	0.00008	0.00008
2.8	0.00008	0.00007	0.00007	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005	0.00004
2.9	0.00004	0.00004	0.00004	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00002
3.0	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001
3.1	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
3.2	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

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Quiz Score: **3** out of 3