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Classroom Test part 2: Navigating the night sky

Instructions:

1. You have 40 minutes in total to solve this part.
2. In this exercise, you are given three tables in the answer sheet. Table 2.1ab and Table 2.1c corresponds to part 2.1 below, titled "Messier Objects". Table 2.2 corresponds to part 2.2 below titled "Bright stars".
3. Mark your answers in these tables.
4. You can spend the available time as you wish between the two tables.
5. For both parts (2.1 and 2.2), if you provide more than the requested answers, only the first 10 answers in each column will be evaluated. You will however not be negatively marked for any wrong answers.

Part 2.1: Messier Objects

The table 2.1ab provides a list of the 110 Messier objects. The first row of the table is filled in as an example.

a) Write the letter code of the correct type for any 10 Messier objects in this table at the corresponding row of the "Type" column. **(5 points)**

Note: The types to choose from are: "Galaxy" (**GL**), "Nebula" (**NB**), "Globular Cluster" (**GC**), "Open Cluster" (**OC**) and "other" (**OT**). A few Messier objects do not belong to any of the first four categories, and as such, are categorised as "other".

b) Write the IAU code of the constellation of any 10 Messier objects in this table (not necessarily the same as the ones chosen in the previous question) at the corresponding row of the "Constellation" column. **(5 points)**

c) You will find below a list of 25 objects in Table 2.1c in the answer sheet, which are also found in the Messier list. For any 10 Messier objects from this list, write the correct Messier number in front of them. **(10 points)**

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Part 2.2: Bright Stars

The Table 2.2 provides a list of the 92 brightest stars (excluding the Sun) up to 2.50 mag. The table provides the proper name of the stars, their Bayer designation, their apparent visual magnitude (m_v), and their distance from the Sun (in light-years). The stars are given in alphabetical order.

d) Identify any 10 stars on the list that are either a binary or part of a multiple star system. To do so, put a tick mark ($\surd$) at the corresponding row of the "Binary or Multiple" column.

(5 points)

Note: For the case of binary or multiple star systems, the visual magnitude given is that of the entire system (combined magnitude), as observed by the naked eye.

e) Identify any 10 stars on the list that are variable stars (of any kind). To do so, put a tick mark ($\surd$) at the corresponding row of the "Variable" column.

(10 points)

Note: For the case of variable stars, the visual magnitude given is the approximate time averaged visual magnitude as observed by the naked eye.

f) Most stars are currently classified under the Morgan–Keenan (MK) system using the letters O, B, A, F, G, K, and M, a sequence from the hottest (O type) to the coolest (M type). For the sake of this exercise, we will refer to stars of spectral type G, K, or M as "cool" stars. Identify any 10 stars on the list that are "cool". To do so, put a tick mark ($\surd$) at the corresponding row of the "Cool" column. **(10 points)**

Note: For the case of binary or multiple star systems of the list, their members are either of the same type (e.g., all of them are "cool") or their brightest component is the main contributor to the observed colour. For example, in a binary system with both a "hot" and a "cool" star, the "cool" one is far brighter and makes gives the impression of a red or orange star when observed with the naked eye.

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Table 2.1ab

M#	Type	Const.		M#	Type	Const.		M#	Type	Const.
M1	**NB**	**TAU**		M38				M75		
M2				M39				M76		
M3				M40				M77		
M4				M41				M78		
M5				M42				M79		
M6				M43				M80		
M7				M44				M81		
M8				M45				M82		
M9				M46				M83		
M10				M47				M84		
M11				M48				M85		
M12				M49				M86		
M13				M50				M87		
M14				M51				M88		
M15				M52				M89		
M16				M53				M90		
M17				M54				M91		
M18				M55				M92		
M19				M56				M93		
M20				M57				M94		
M21				M58				M95		
M22				M59				M96		
M23				M60				M97		
M24				M61				M98		
M25				M62				M99		
M26				M63				M100		

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M27				M64				M101		
M28				M65				M102		
M29				M66				M103		
M30				M67				M104		
M31				M68				M105		
M32				M69				M106		
M33				M70				M107		
M34				M71				M108		
M35				M72				M109		
M36				M73				M110		
M37				M74						

Table 2.1c

Name	M#
Andromeda Galaxy	
Beehive Cluster	
Black Eye Galaxy	
Bode's Galaxy	
Butterfly Cluster	
Cat's Eye Galaxy	
Cigar Galaxy	
Crab Nebula	
Dumbbell Nebula	

Name	M#
Eagle Nebula	
Lagoon Nebula	
Le Gentil	
Omega Nebula	
Orion Nebula	
Owl Nebula	
Pinwheel Galaxy	
Pleiades	

Name	M#
Ptolemy Cluster	
Ring Nebula	
Sombrero Galaxy	
Spindle Galaxy	
Triangulum Galaxy	
Trifid Nebula	
Whirlpool Galaxy	
Wild Duck Cluster	

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Table 2.2

Rank	Proper name (IAU)	Bayer designation	m_v	Distance (ly)	Binary or Multiple	Variable	Cool
2	—	α Cen	-0.27	4.34			
75	—	α Lup	2.30	550			
76	—	ε Cen	2.30	380			
79	—	η Cen	2.35	310			
82	—	κ Sco	2.39	460			
89	—	γ Cas	2.47	610			
30	—	γ Vel	1.72	840			
9	Achernar	α Eri	0.46	139			
92	Acrab	β Sco	2.50	404			
13	Acrux	α Cru	0.76	320			
22	Adhara	ε CMa	1.50	430			
14	Aldebaran	α Tau	0.86	65			
57	Algieba	γ Leo	2.08	130			
61	Algol	β Per	2.12	93			
43	Alhena	γ Gem	1.92	100			
33	Alioth	ε UMa	1.77	83			
91	Aljanah	ε Cyg	2.48	72			
40	Alkaid	η UMa	1.86	100			
72	Almach	γ And	2.26	350			
31	Alnair	α Gru	1.74	100			
29	Alnilam	ε Ori	1.69	2,000			
32	Alnitak	ζ Ori	1.77	1,300			
48	Alphard	α Hya	2.00	180			
66	Alphecca	α CrB	2.23	75			
55	Alpheratz	α And	2.06	97			
45	Alsephina	δ Vel	1.96	80			
12	Altair	α Aql	0.76	17			
87	Aludra	η CMa	2.45	2,000			
81	Ankaa	α Phe	2.38	77			
15	Antares	α Sco	0.96	550			

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3	Arcturus	α Boo	-0.05	37			
64	Aspidiske	ι Car	2.21	690			
42	Atria	α TrA	1.91	390			
39	Avior	ε Car	1.86	600			
26	Bellatrix	γ Ori	1.64	250			
10	Betelgeuse	α Ori	0.50	550			
4	Canopus	α Car	0.00	310			
6	Capella	α Aur	0.08	43			
73	Caph	β Cas	2.28	54			
24	Castor	α Gem	1.62	51			
19	Deneb	α Cyg	1.25	2,600			
60	Denebola	β Leo	2.11	36			
50	Diphda	β Cet	2.02	96			
77	Dschubba	δ Sco	2.31	400			
34	Dubhe	α UMa	1.79	120			
27	Elnath	β Tau	1.65	130			
69	Eltanin	γ Dra	2.23	150			
83	Enif	ε Peg	2.40	670			
18	Fomalhaut	α PsA	1.16	25			
25	Gacrux	γ Cru	1.64	89			
11	Hadar	β Cen	0.61	390			
49	Hamal	α Ari	2.00	66			
74	Izar	ε Boo	2.29	202			
38	Kaus Australis	ε Sgr	1.85	140			
58	Kochab	β UMi	2.08	130			
78	Larawag	ε Sco	2.31	65			
90	Markab	α Peg	2.48	140			
88	Markeb	κ Vel	2.46	540			
41	Menkalinan	β Aur	1.90	80			
54	Menkent	θ Cen	2.06	59			
80	Merak	β UMa	2.37	79			
28	Miaplacidus	β Car	1.69	110			

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20	Mimosa	β Cru	1.25	280			
67	Mintaka	δ Ori	2.23	900			
53	Mirach	β And	2.05	200			
35	Mirfak	α Per	1.80	510			
46	Mirzam	β CMa	1.98	500			
51	Mizar	ζ UMa	2.04	83			
63	Muhlifain	γ Cen	2.17	130			
71	Naos	ζ Pup	2.25	1,080			
52	Nunki	σ Sgr	2.05	230			
44	Peacock	α Pav	1.94	180			
86	Phecda	γ UMa	2.44	84			
47	Polaris	α UMi	1.98	430			
17	Pollux	β Gem	1.14	34			
8	Procyon	α CMi	0.34	11			
56	Rasalhague	α Oph	2.07	47			
21	Regulus	α Leo	1.39	79			
7	Rigel	β Ori	0.13	860			
85	Sabik	η Oph	2.43	88			
68	Sadr	γ Cyg	2.23	1,500			
59	Saiph	κ Ori	2.09	720			
37	Sargas	θ Sco	1.84	330			
84	Scheat	β Peg	2.42	200			
70	Schedar	α Cas	2.24	230			
23	Shaula	λ Sco	1.62	570			
1	Sirius	α CMa	-1.46	8.6			
16	Spica	α Vir	0.97	250			
65	Suhail	λ Vel	2.21	570			
62	Tiaki	β Gru	2.15	170			
5	Vega	α Lyr	0.03	25			
36	Wezen	δ CMa	1.82	1,800			