

When you arrive at your observing station, **DO NOT** disturb the telescope before attempting the first question (OT1).

(OT1) The telescope is already set to a deep sky object. Identify the object and tick the correct box in the Summary Answersheet. 10

Note: You can use any technique to identify the object. However, if you disturb the telescope, you will **NOT** be helped to bring it back to the original position.

(OT2)

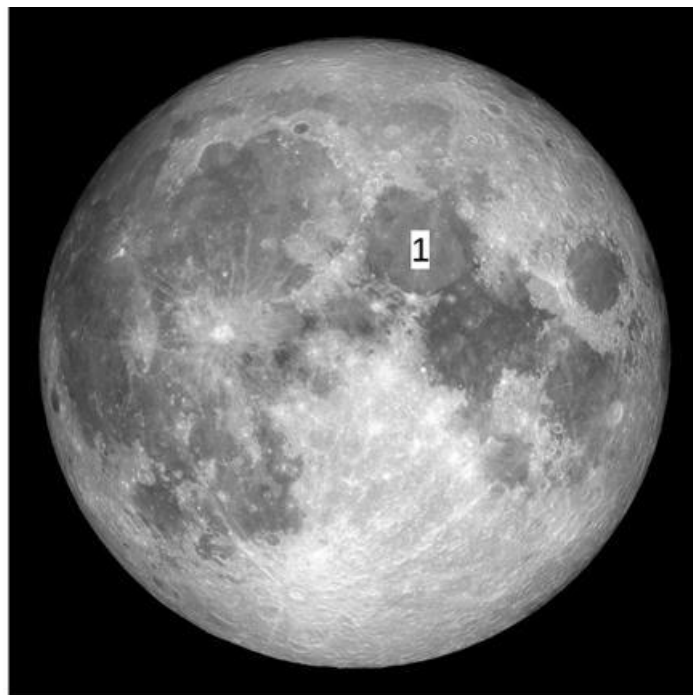
(OT2.1) Point the telescope to M45. Show the object to the examiner. 5

Note: 1. After 5 minutes, 1 mark will be deducted for a delay of every minute (or part thereof) in pointing the telescope.

2. You have a single chance to be evaluated. If your pointing is incorrect the examiner will change the pointing to M45 for the next part of the question.

(OT2.2) Your Summary Answersheet shows telescopic field of M45. In the image, seven (7) brightest stars of the cluster are replaced by ‘+’ sign. Compare the image with the field you see in the telescope and number the ‘+’ marks from 1 to 7 in the order of decreasing brightness (brightest is 1 and faintest is 7) of the corresponding stars. 15

(OT3) The examiner will give you a moon filter, an eyepiece with a cross-wire and a stopwatch. Point the telescope towards the Moon. Attach the filter to the telescope. On the surface of the Moon, you will see several “seas” (maria) which are nearly circular in shape. Estimate the diameter of Mare Serenitatis, D_{MSr} , labelled as “1” in the figure below, as a fraction of the lunar diameter, D_{Moon} , by measuring the telescope drift times, t_{Moon} and t_{MSr} , for the Moon and the mare, respectively. 20



- (OP1) Eight well known historical supernovae will appear in the projected sky one at a time (not necessarily in chronological order). You have to identify the appropriate map (Map 1 / Map 2) where a particular supernova belongs and mark it in the corresponding map with '+' sign and write codes 'S1' to 'S8' besides it. **40**
- Each supernova code will be projected on dome for 10 seconds, followed by appearance of supernova for 60 seconds and then 20 seconds for you to mark the answers.
- (OP1.1) For S1, S2, S3, S4 and S5, the projected sky corresponds to the sky as seen from Rio de Janeiro on the midnight of 21st May.
- (OP1.2) For S6, S7 and S8, the projected sky corresponds to the sky as seen from Beijing on the midnight of 20th November. There will be a gap of two minute after S5 for change over and adaptation to new sky.
- (OP2) We are now projecting sky of another planet. The sky will be slowly rotated for 5 minutes . Identify the visible celestial pole of this planet and mark it with a '+' sign and label it as 'P' on the appropriate map (Map 1 / Map 2). **10**

(OM1) Mark any 5 (five) of the following stars on the map by putting a circle (O) around the appropriate star and writing its code next to it. If you mark more than 5 stars, only the first 5 in serial order will be considered. 20

Code	Name	Bayer Name	Code	Name	Bayer Name
S1	Caph	β Cas	S5	Sheliak	β Lyr
S2	Asellus Australis	δ Cnc	S6	Albireo	β Cyg
S3	AcruX	α Cru	S7	Rasalhague	α Oph
S4	Alphard	α Hya	S8	Kaus Australis	ϵ Sgr

(OM2) Mark location of any 3 (three) of the following galaxies on the map by putting a '+' sign at appropriate place in the map and writing its code next to it. If you mark more than 3 galaxies, only the first 3 in serial order will be considered. 15

Code	Name	M number	Code	Name	M number
G1	Triangulum Galaxy	M 33	G4	Virgo A	M 87
G2	Whirlpool Galaxy	M 51	G5	Sombrero Galaxy	M 104
G3	Southern Pinwheel Galaxy	M 83			

(OM3) Draw ecliptic on the map and label it as 'E'. 5

(OM4) Show position of Autumnal Equinox (descending node of the ecliptic) on the map by a '+' sign and label it as 'A'. 5

(OM5) Draw local meridian for Bhubaneswar on Winter Solstice day (22nd December) at local midnight and label it as 'M'. 5