所別：天文研究所碩士班 不分組(一般生)　科目：天文學　共 6 頁　第 1 頁
天文研究所碩士班 不分組(在職生)
本科考試可使用計算器，廠牌、功能不拘。　＊請在試卷答案卷（卡）內作答

Notes:

- Print clearly.
- Note clearly the meaning of each symbol you use.
- Show assumptions you made.
- Not only show the final results, but also explain the processes of your consideration.

1 Magnitude System

The magnitude system has been widely used in astronomy for many years. The description of the magnitude system is given by Pogson's formula.

$$m_A - m_B = -2.5 \log \frac{F_A}{F_B},$$

where m_A, m_B, F_A, F_B are magnitude of star A, magnitude of star B, brightness of star A, and brightness of star B, respectively.

1. 5 mag difference corresponds to the brightness ratio of 100. What is the base used for the logarithm in Pogson's formula? (1 points) Explain why. (4 points)
2. The apparent visual magnitude of α UMi (Polaris) is 1.97 mag, and the apparent visual magnitude of α Leo (Regulus) is 1.35 mag. Which star is brighter than the other? (1 point) Explain your result using Pogson's formula. (4 points)
3. The apparent visual magnitude of α Ori (Betelgeuse) is 0.58 mag and the apparent visual magnitude of 57 Ori is 5.92 mag. How much brighter (or fainter) is Betelgeuse than 57 Ori? (1 point) Show the processes of your calculations. (4 points)
4. The apparent visual magnitude of α Gem (Castor) is 1.58 mag. α CMa (Sirius) is 16.4 times brighter than Castor. What is the apparent visual magnitude of Sirius? (1 point) Show the processes of your calculations. (4 points)

2 Distance to Stars

The measurements of the distance to astronomical objects are not always easy. A method to measure the distance to stars is the annual parallax.

1. The distance determination of stars by annual parallax is based on the fact that the Earth has the orbital motion around the Sun. Describe the method to estimate the distance to stars by using the annual parallax. (10 points)
2. 1 parsec is the distance for which the annual parallax is 1 arcsec. How long is 1 parsec? Answer in meter. (Note: If you use the relation 1 parsec = 3.26 light-year, then you need to prove it before using it.) (2 points) Show the processes of your calculations. (8 points)
3. The annual parallax of α CMi (Procyon) is 0.286 arcsec. What is the distance to Procyon? Answer in parsec. (1 point) Show the processes of your calculations. (4 points)
4. The absolute magnitude is defined as the magnitude of the star if the star were 10 parsec away from us. For stars with known distance, we are able to calculate the absolute magnitude using following formula,

   $$M = m + 5 - 5 \log d,$$

   where M is absolute magnitude of the star, m is the apparent magnitude of the star, and d is the distance to the star in parsec. The apparent visual magnitude of Procyon is 0.37 mag. What is the absolute magnitude of Procyon? (1 point) Show the processes of your calculations. (4 points)
5. The apparent visual magnitude and the annual parallax of α Tau (Aldebaran) are 0.85 mag and 0.050 arcsec, respectively. Which star is radiating more energy per unit time? Procyon or Aldebaran? (1 point) Explain why. (4 points)

注意：背面有試題

3 Spectroscopy

Spectroscopy is a powerful method to study physical properties and chemical compositions of astronomical objects.

1. Describe a method to measure the temperature of an astronomical object using spectroscopy? (10 points)
2. What is Doppler effect? (3 points) Show an example of the situation that we recognize Doppler effect in our life. (2 points)
3. Doppler effect is used to detect extra-solar planets. Describe how we can find extra-solar planets using Doppler effect. (10 points)

4 Escape Velocity

The escape velocity is the minimum speed required to escape from an asronomical object. We now consider an astronomical object with a spherical shape of the mass M and the radius R.

1. What is the kinetic energy of a particle of the mass m travelling with the velocity of v? (5 points)
2. What is the gravitational potential energy of this particle when it is at the surface of the astronomical object we consider? (5 points)
3. Consider the situation that the sum of the kinetic energy and gravitational potential energy is zero and derive the escape velocity of this astronomical object. (5 points)
4. Calculate the escape velocity of the Earth. (1 point) Show the processes of your calculations. (4 points)

Constants

Speed of light	$c = 3.00 \times 10^{8}\,\mathrm{m\,s^{-1}}$
Gravitational constant	$G = 6.67 \times 10^{-11}\,\mathrm{m^{3}\,kg^{-1}\,s^{-2}}$
Planck constant	$h = 6.63 \times 10^{-34}\,\mathrm{J\,s}$
Boltzmann constant	$k = 1.38 \times 10^{-23}\,\mathrm{J\,K^{-1}}$
Electron volt	$1\,\mathrm{eV} = 1.60 \times 10^{-19}\,\mathrm{J}$
Stefan-Boltzmann constant	$\sigma = 5.67 \times 10^{-8}\,\mathrm{J\,m^{-2}\,s^{-1}\,K^{-4}}$
Radiation constant	$a = 7.56 \times 10^{-16}\,\mathrm{J\,m^{-3}\,K^{-4}}$
Avogadro constant	$N_A = 6.02 \times 10^{23}\,\mathrm{mol^{-1}}$
Atomic mass unit	$m_H = 1.66 \times 10^{-27}\,\mathrm{kg}$
electron mass	$m_e = 9.11 \times 10^{-31}\,\mathrm{kg}$
proton mass	$m_p = 1.6726 \times 10^{-27}\,\mathrm{kg}$
neutron mass	$m_n = 1.6749 \times 10^{-27}\,\mathrm{kg}$
ideal gas constant	$\mathcal{R} = 8.31 \times 10^{3}\,\mathrm{J\,kg^{-1}\,K^{-1}}$
Solar mass	$M_\odot = 1.99 \times 10^{30}\,\mathrm{kg}$
Solar radius	$R_\odot = 6.96 \times 10^{8}\,\mathrm{m}$
Solar luminosity	$L_\odot = 3.85 \times 10^{26}\,\mathrm{J\,s^{-1}}$
Earth mass	$M_\oplus = 5.98 \times 10^{24}\,\mathrm{kg}$
Earth radius	$R_\oplus = 6.38 \times 10^{6}\,\mathrm{m}$
Astronomical unit	$1\,\mathrm{AU} = 1.50 \times 10^{11}\,\mathrm{m}$
π	$\pi = 3.14$
cal and J	$1\,\mathrm{cal} = 4.2\,\mathrm{J}$

注意：背面有試題

國立中央大學101學年度碩士班考試入學試題卷

所別：天文研究所碩士班 不分組(一般生)　科目：天文學　共 6 頁　第 3 頁
天文研究所碩士班 不分組(在職生)

本科考試可使用計算器，廠牌、功能不拘。

＊請在試卷答案卷（卡）內作答

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$\log_e(4.70) = 1.5476$	$\log_e(4.71) = 1.5497$	$\log_e(4.72) = 1.5518$	$\log_e(4.73) = 1.5539$	$\log_e(4.74) = 1.5560$
$\log_e(4.75) = 1.5581$	$\log_e(4.76) = 1.5602$	$\log_e(4.77) = 1.5623$	$\log_e(4.78) = 1.5644$	$\log_e(4.79) = 1.5665$
$\log_e(4.80) = 1.5686$	$\log_e(4.81) = 1.5707$	$\log_e(4.82) = 1.5728$	$\log_e(4.83) = 1.5748$	$\log_e(4.84) = 1.5769$
$\log_e(4.85) = 1.5790$	$\log_e(4.86) = 1.5810$	$\log_e(4.87) = 1.5831$	$\log_e(4.88) = 1.5851$	$\log_e(4.89) = 1.5872$
$\log_e(4.90) = 1.5892$	$\log_e(4.91) = 1.5913$	$\log_e(4.92) = 1.5933$	$\log_e(4.93) = 1.5953$	$\log_e(4.94) = 1.5974$
$\log_e(4.95) = 1.5994$	$\log_e(4.96) = 1.6014$	$\log_e(4.97) = 1.6034$	$\log_e(4.98) = 1.6054$	$\log_e(4.99) = 1.6074$
$\log_e(5.00) = 1.6094$	$\log_e(5.01) = 1.6114$	$\log_e(5.02) = 1.6134$	$\log_e(5.03) = 1.6154$	$\log_e(5.04) = 1.6174$
$\log_e(5.05) = 1.6194$	$\log_e(5.06) = 1.6214$	$\log_e(5.07) = 1.6233$	$\log_e(5.08) = 1.6253$	$\log_e(5.09) = 1.6273$
$\log_e(5.10) = 1.6292$	$\log_e(5.11) = 1.6312$	$\log_e(5.12) = 1.6332$	$\log_e(5.13) = 1.6351$	$\log_e(5.14) = 1.6371$
$\log_e(5.15) = 1.6390$	$\log_e(5.16) = 1.6409$	$\log_e(5.17) = 1.6429$	$\log_e(5.18) = 1.6448$	$\log_e(5.19) = 1.6467$
$\log_e(5.20) = 1.6487$	$\log_e(5.21) = 1.6506$	$\log_e(5.22) = 1.6525$	$\log_e(5.23) = 1.6544$	$\log_e(5.24) = 1.6563$
$\log_e(5.25) = 1.6582$	$\log_e(5.26) = 1.6601$	$\log_e(5.27) = 1.6620$	$\log_e(5.28) = 1.6639$	$\log_e(5.29) = 1.6658$
$\log_e(5.30) = 1.6677$	$\log_e(5.31) = 1.6696$	$\log_e(5.32) = 1.6715$	$\log_e(5.33) = 1.6734$	$\log_e(5.34) = 1.6752$
$\log_e(5.35) = 1.6771$	$\log_e(5.36) = 1.6790$	$\log_e(5.37) = 1.6808$	$\log_e(5.38) = 1.6827$	$\log_e(5.39) = 1.6845$
$\log_e(5.40) = 1.6864$	$\log_e(5.41) = 1.6882$	$\log_e(5.42) = 1.6901$	$\log_e(5.43) = 1.6919$	$\log_e(5.44) = 1.6938$
$\log_e(5.45) = 1.6956$	$\log_e(5.46) = 1.6974$	$\log_e(5.47) = 1.6993$	$\log_e(5.48) = 1.7011$	$\log_e(5.49) = 1.7029$

注意：背面有試題

國立中央大學101學年度碩士班考試入學試題卷

所別：天文研究所碩士班 不分組(一般生)　科目：天文學　共 6 頁 第 4 頁
天文研究所碩士班 不分組(在職生)

本科考試可使用計算器，廠牌、功能不拘。

＊請在試卷答案卷（卡）內作答

$\log_e(5.50) = 1.7047$	$\log_e(5.51) = 1.7066$	$\log_e(5.52) = 1.7084$	$\log_e(5.53) = 1.7102$	$\log_e(5.54) = 1.7120$
$\log_e(5.55) = 1.7138$	$\log_e(5.56) = 1.7156$	$\log_e(5.57) = 1.7174$	$\log_e(5.58) = 1.7192$	$\log_e(5.59) = 1.7210$
$\log_e(5.60) = 1.7228$	$\log_e(5.61) = 1.7246$	$\log_e(5.62) = 1.7263$	$\log_e(5.63) = 1.7281$	$\log_e(5.64) = 1.7299$
$\log_e(5.65) = 1.7317$	$\log_e(5.66) = 1.7334$	$\log_e(5.67) = 1.7352$	$\log_e(5.68) = 1.7370$	$\log_e(5.69) = 1.7387$
$\log_e(5.70) = 1.7405$	$\log_e(5.71) = 1.7422$	$\log_e(5.72) = 1.7440$	$\log_e(5.73) = 1.7457$	$\log_e(5.74) = 1.7475$
$\log_e(5.75) = 1.7492$	$\log_e(5.76) = 1.7509$	$\log_e(5.77) = 1.7527$	$\log_e(5.78) = 1.7544$	$\log_e(5.79) = 1.7561$
$\log_e(5.80) = 1.7579$	$\log_e(5.81) = 1.7596$	$\log_e(5.82) = 1.7613$	$\log_e(5.83) = 1.7630$	$\log_e(5.84) = 1.7647$
$\log_e(5.85) = 1.7664$	$\log_e(5.86) = 1.7681$	$\log_e(5.87) = 1.7699$	$\log_e(5.88) = 1.7716$	$\log_e(5.89) = 1.7733$
$\log_e(5.90) = 1.7750$	$\log_e(5.91) = 1.7766$	$\log_e(5.92) = 1.7783$	$\log_e(5.93) = 1.7800$	$\log_e(5.94) = 1.7817$
$\log_e(5.95) = 1.7834$	$\log_e(5.96) = 1.7851$	$\log_e(5.97) = 1.7867$	$\log_e(5.98) = 1.7884$	$\log_e(5.99) = 1.7901$
$\log_e(6.00) = 1.7918$	$\log_e(6.01) = 1.7934$	$\log_e(6.02) = 1.7951$	$\log_e(6.03) = 1.7967$	$\log_e(6.04) = 1.7984$
$\log_e(6.05) = 1.8001$	$\log_e(6.06) = 1.8017$	$\log_e(6.07) = 1.8034$	$\log_e(6.08) = 1.8050$	$\log_e(6.09) = 1.8066$
$\log_e(6.10) = 1.8083$	$\log_e(6.11) = 1.8099$	$\log_e(6.12) = 1.8116$	$\log_e(6.13) = 1.8132$	$\log_e(6.14) = 1.8148$
$\log_e(6.15) = 1.8165$	$\log_e(6.16) = 1.8181$	$\log_e(6.17) = 1.8197$	$\log_e(6.18) = 1.8213$	$\log_e(6.19) = 1.8229$
$\log_e(6.20) = 1.8245$	$\log_e(6.21) = 1.8262$	$\log_e(6.22) = 1.8278$	$\log_e(6.23) = 1.8294$	$\log_e(6.24) = 1.8310$
$\log_e(6.25) = 1.8326$	$\log_e(6.26) = 1.8342$	$\log_e(6.27) = 1.8358$	$\log_e(6.28) = 1.8374$	$\log_e(6.29) = 1.8390$
$\log_e(6.30) = 1.8405$	$\log_e(6.31) = 1.8421$	$\log_e(6.32) = 1.8437$	$\log_e(6.33) = 1.8453$	$\log_e(6.34) = 1.8469$
$\log_e(6.35) = 1.8485$	$\log_e(6.36) = 1.8500$	$\log_e(6.37) = 1.8516$	$\log_e(6.38) = 1.8532$	$\log_e(6.39) = 1.8547$
$\log_e(6.40) = 1.8563$	$\log_e(6.41) = 1.8579$	$\log_e(6.42) = 1.8594$	$\log_e(6.43) = 1.8610$	$\log_e(6.44) = 1.8625$
$\log_e(6.45) = 1.8641$	$\log_e(6.46) = 1.8656$	$\log_e(6.47) = 1.8672$	$\log_e(6.48) = 1.8687$	$\log_e(6.49) = 1.8703$
$\log_e(6.50) = 1.8718$	$\log_e(6.51) = 1.8733$	$\log_e(6.52) = 1.8749$	$\log_e(6.53) = 1.8764$	$\log_e(6.54) = 1.8779$
$\log_e(6.55) = 1.8795$	$\log_e(6.56) = 1.8810$	$\log_e(6.57) = 1.8825$	$\log_e(6.58) = 1.8840$	$\log_e(6.59) = 1.8856$
$\log_e(6.60) = 1.8871$	$\log_e(6.61) = 1.8886$	$\log_e(6.62) = 1.8901$	$\log_e(6.63) = 1.8916$	$\log_e(6.64) = 1.8931$
$\log_e(6.65) = 1.8946$	$\log_e(6.66) = 1.8961$	$\log_e(6.67) = 1.8976$	$\log_e(6.68) = 1.8991$	$\log_e(6.69) = 1.9006$
$\log_e(6.70) = 1.9021$	$\log_e(6.71) = 1.9036$	$\log_e(6.72) = 1.9051$	$\log_e(6.73) = 1.9066$	$\log_e(6.74) = 1.9081$
$\log_e(6.75) = 1.9095$	$\log_e(6.76) = 1.9110$	$\log_e(6.77) = 1.9125$	$\log_e(6.78) = 1.9140$	$\log_e(6.79) = 1.9155$
$\log_e(6.80) = 1.9169$	$\log_e(6.81) = 1.9184$	$\log_e(6.82) = 1.9199$	$\log_e(6.83) = 1.9213$	$\log_e(6.84) = 1.9228$
$\log_e(6.85) = 1.9242$	$\log_e(6.86) = 1.9257$	$\log_e(6.87) = 1.9272$	$\log_e(6.88) = 1.9286$	$\log_e(6.89) = 1.9301$
$\log_e(6.90) = 1.9315$	$\log_e(6.91) = 1.9330$	$\log_e(6.92) = 1.9344$	$\log_e(6.93) = 1.9359$	$\log_e(6.94) = 1.9373$
$\log_e(6.95) = 1.9387$	$\log_e(6.96) = 1.9402$	$\log_e(6.97) = 1.9416$	$\log_e(6.98) = 1.9430$	$\log_e(6.99) = 1.9445$
$\log_e(7.00) = 1.9459$	$\log_e(7.01) = 1.9473$	$\log_e(7.02) = 1.9488$	$\log_e(7.03) = 1.9502$	$\log_e(7.04) = 1.9516$
$\log_e(7.05) = 1.9530$	$\log_e(7.06) = 1.9544$	$\log_e(7.07) = 1.9559$	$\log_e(7.08) = 1.9573$	$\log_e(7.09) = 1.9587$
$\log_e(7.10) = 1.9601$	$\log_e(7.11) = 1.9615$	$\log_e(7.12) = 1.9629$	$\log_e(7.13) = 1.9643$	$\log_e(7.14) = 1.9657$
$\log_e(7.15) = 1.9671$	$\log_e(7.16) = 1.9685$	$\log_e(7.17) = 1.9699$	$\log_e(7.18) = 1.9713$	$\log_e(7.19) = 1.9727$
$\log_e(7.20) = 1.9741$	$\log_e(7.21) = 1.9755$	$\log_e(7.22) = 1.9769$	$\log_e(7.23) = 1.9782$	$\log_e(7.24) = 1.9796$
$\log_e(7.25) = 1.9810$	$\log_e(7.26) = 1.9824$	$\log_e(7.27) = 1.9838$	$\log_e(7.28) = 1.9851$	$\log_e(7.29) = 1.9865$
$\log_e(7.30) = 1.9879$	$\log_e(7.31) = 1.9892$	$\log_e(7.32) = 1.9906$	$\log_e(7.33) = 1.9920$	$\log_e(7.34) = 1.9933$
$\log_e(7.35) = 1.9947$	$\log_e(7.36) = 1.9961$	$\log_e(7.37) = 1.9974$	$\log_e(7.38) = 1.9988$	$\log_e(7.39) = 2.0001$
$\log_e(7.40) = 2.0015$	$\log_e(7.41) = 2.0028$	$\log_e(7.42) = 2.0042$	$\log_e(7.43) = 2.0055$	$\log_e(7.44) = 2.0069$
$\log_e(7.45) = 2.0082$	$\log_e(7.46) = 2.0096$	$\log_e(7.47) = 2.0109$	$\log_e(7.48) = 2.0122$	$\log_e(7.49) = 2.0136$
$\log_e(7.50) = 2.0149$	$\log_e(7.51) = 2.0162$	$\log_e(7.52) = 2.0176$	$\log_e(7.53) = 2.0189$	$\log_e(7.54) = 2.0202$
$\log_e(7.55) = 2.0215$	$\log_e(7.56) = 2.0229$	$\log_e(7.57) = 2.0242$	$\log_e(7.58) = 2.0255$	$\log_e(7.59) = 2.0268$
$\log_e(7.60) = 2.0281$	$\log_e(7.61) = 2.0295$	$\log_e(7.62) = 2.0308$	$\log_e(7.63) = 2.0321$	$\log_e(7.64) = 2.0334$
$\log_e(7.65) = 2.0347$	$\log_e(7.66) = 2.0360$	$\log_e(7.67) = 2.0373$	$\log_e(7.68) = 2.0386$	$\log_e(7.69) = 2.0399$
$\log_e(7.70) = 2.0412$	$\log_e(7.71) = 2.0425$	$\log_e(7.72) = 2.0438$	$\log_e(7.73) = 2.0451$	$\log_e(7.74) = 2.0464$
$\log_e(7.75) = 2.0477$	$\log_e(7.76) = 2.0490$	$\log_e(7.77) = 2.0503$	$\log_e(7.78) = 2.0516$	$\log_e(7.79) = 2.0528$
$\log_e(7.80) = 2.0541$	$\log_e(7.81) = 2.0554$	$\log_e(7.82) = 2.0567$	$\log_e(7.83) = 2.0580$	$\log_e(7.84) = 2.0592$
$\log_e(7.85) = 2.0605$	$\log_e(7.86) = 2.0618$	$\log_e(7.87) = 2.0631$	$\log_e(7.88) = 2.0643$	$\log_e(7.89) = 2.0656$
$\log_e(7.90) = 2.0669$	$\log_e(7.91) = 2.0681$	$\log_e(7.92) = 2.0694$	$\log_e(7.93) = 2.0707$	$\log_e(7.94) = 2.0719$
$\log_e(7.95) = 2.0732$	$\log_e(7.96) = 2.0744$	$\log_e(7.97) = 2.0757$	$\log_e(7.98) = 2.0769$	$\log_e(7.99) = 2.0782$
$\log_e(8.00) = 2.0794$	$\log_e(8.01) = 2.0807$	$\log_e(8.02) = 2.0819$	$\log_e(8.03) = 2.0832$	$\log_e(8.04) = 2.0844$
$\log_e(8.05) = 2.0857$	$\log_e(8.06) = 2.0869$	$\log_e(8.07) = 2.0882$	$\log_e(8.08) = 2.0894$	$\log_e(8.09) = 2.0906$
$\log_e(8.10) = 2.0919$	$\log_e(8.11) = 2.0931$	$\log_e(8.12) = 2.0943$	$\log_e(8.13) = 2.0956$	$\log_e(8.14) = 2.0968$
$\log_e(8.15) = 2.0980$	$\log_e(8.16) = 2.0992$	$\log_e(8.17) = 2.1005$	$\log_e(8.18) = 2.1017$	$\log_e(8.19) = 2.1029$
$\log_e(8.20) = 2.1041$	$\log_e(8.21) = 2.1054$	$\log_e(8.22) = 2.1066$	$\log_e(8.23) = 2.1078$	$\log_e(8.24) = 2.1090$
$\log_e(8.25) = 2.1102$	$\log_e(8.26) = 2.1114$	$\log_e(8.27) = 2.1126$	$\log_e(8.28) = 2.1138$	$\log_e(8.29) = 2.1150$
$\log_e(8.30) = 2.1163$	$\log_e(8.31) = 2.1175$	$\log_e(8.32) = 2.1187$	$\log_e(8.33) = 2.1199$	$\log_e(8.34) = 2.1211$
$\log_e(8.35) = 2.1223$	$\log_e(8.36) = 2.1235$	$\log_e(8.37) = 2.1247$	$\log_e(8.38) = 2.1258$	$\log_e(8.39) = 2.1270$
$\log_e(8.40) = 2.1282$	$\log_e(8.41) = 2.1294$	$\log_e(8.42) = 2.1306$	$\log_e(8.43) = 2.1318$	$\log_e(8.44) = 2.1330$
$\log_e(8.45) = 2.1342$	$\log_e(8.46) = 2.1353$	$\log_e(8.47) = 2.1365$	$\log_e(8.48) = 2.1377$	$\log_e(8.49) = 2.1389$
$\log_e(8.50) = 2.1401$	$\log_e(8.51) = 2.1412$	$\log_e(8.52) = 2.1424$	$\log_e(8.53) = 2.1436$	$\log_e(8.54) = 2.1448$
$\log_e(8.55) = 2.1459$	$\log_e(8.56) = 2.1471$	$\log_e(8.57) = 2.1483$	$\log_e(8.58) = 2.1494$	$\log_e(8.59) = 2.1506$
$\log_e(8.60) = 2.1518$	$\log_e(8.61) = 2.1529$	$\log_e(8.62) = 2.1541$	$\log_e(8.63) = 2.1552$	$\log_e(8.64) = 2.1564$
$\log_e(8.65) = 2.1576$	$\log_e(8.66) = 2.1587$	$\log_e(8.67) = 2.1599$	$\log_e(8.68) = 2.1610$	$\log_e(8.69) = 2.1622$
$\log_e(8.70) = 2.1633$	$\log_e(8.71) = 2.1645$	$\log_e(8.72) = 2.1656$	$\log_e(8.73) = 2.1668$	$\log_e(8.74) = 2.1679$
$\log_e(8.75) = 2.1691$	$\log_e(8.76) = 2.1702$	$\log_e(8.77) = 2.1713$	$\log_e(8.78) = 2.1725$	$\log_e(8.79) = 2.1736$
$\log_e(8.80) = 2.1748$	$\log_e(8.81) = 2.1759$	$\log_e(8.82) = 2.1770$	$\log_e(8.83) = 2.1782$	$\log_e(8.84) = 2.1793$
$\log_e(8.85) = 2.1804$	$\log_e(8.86) = 2.1815$	$\log_e(8.87) = 2.1827$	$\log_e(8.88) = 2.1838$	$\log_e(8.89) = 2.1849$
$\log_e(8.90) = 2.1861$	$\log_e(8.91) = 2.1872$	$\log_e(8.92) = 2.1883$	$\log_e(8.93) = 2.1894$	$\log_e(8.94) = 2.1905$
$\log_e(8.95) = 2.1917$	$\log_e(8.96) = 2.1928$	$\log_e(8.97) = 2.1939$	$\log_e(8.98) = 2.1950$	$\log_e(8.99) = 2.1961$
$\log_e(9.00) = 2.1972$	$\log_e(9.01) = 2.1983$	$\log_e(9.02) = 2.1994$	$\log_e(9.03) = 2.2006$	$\log_e(9.04) = 2.2017$
$\log_e(9.05) = 2.2028$	$\log_e(9.06) = 2.2039$	$\log_e(9.07) = 2.2050$	$\log_e(9.08) = 2.2061$	$\log_e(9.09) = 2.2072$
$\log_e(9.10) = 2.2083$	$\log_e(9.11) = 2.2094$	$\log_e(9.12) = 2.2105$	$\log_e(9.13) = 2.2116$	$\log_e(9.14) = 2.2127$
$\log_e(9.15) = 2.2138$	$\log_e(9.16) = 2.2148$	$\log_e(9.17) = 2.2159$	$\log_e(9.18) = 2.2170$	$\log_e(9.19) = 2.2181$
$\log_e(9.20) = 2.2192$	$\log_e(9.21) = 2.2203$	$\log_e(9.22) = 2.2214$	$\log_e(9.23) = 2.2225$	$\log_e(9.24) = 2.2235$
$\log_e(9.25) = 2.2246$	$\log_e(9.26) = 2.2257$	$\log_e(9.27) = 2.2268$	$\log_e(9.28) = 2.2279$	$\log_e(9.29) = 2.2289$
$\log_e(9.30) = 2.2300$	$\log_e(9.31) = 2.2311$	$\log_e(9.32) = 2.2322$	$\log_e(9.33) = 2.2332$	$\log_e(9.34) = 2.2343$
$\log_e(9.35) = 2.2354$	$\log_e(9.36) = 2.2364$	$\log_e(9.37) = 2.2375$	$\log_e(9.38) = 2.2386$	$\log_e(9.39) = 2.2396$
$\log_e(9.40) = 2.2407$	$\log_e(9.41) = 2.2418$	$\log_e(9.42) = 2.2428$	$\log_e(9.43) = 2.2439$	$\log_e(9.44) = 2.2450$
$\log_e(9.45) = 2.2460$	$\log_e(9.46) = 2.2471$	$\log_e(9.47) = 2.2481$	$\log_e(9.48) = 2.2492$	$\log_e(9.49) = 2.2502$
$\log_e(9.50) = 2.2513$	$\log_e(9.51) = 2.2523$	$\log_e(9.52) = 2.2534$	$\log_e(9.53) = 2.2544$	$\log_e(9.54) = 2.2555$
$\log_e(9.55) = 2.2565$	$\log_e(9.56) = 2.2576$	$\log_e(9.57) = 2.2586$	$\log_e(9.58) = 2.2597$	$\log_e(9.59) = 2.2607$
$\log_e(9.60) = 2.2618$	$\log_e(9.61) = 2.2628$	$\log_e(9.62) = 2.2638$	$\log_e(9.63) = 2.2649$	$\log_e(9.64) = 2.2659$
$\log_e(9.65) = 2.2670$	$\log_e(9.66) = 2.2680$	$\log_e(9.67) = 2.2690$	$\log_e(9.68) = 2.2701$	$\log_e(9.69) = 2.2711$
$\log_e(9.70) = 2.2721$	$\log_e(9.71) = 2.2732$	$\log_e(9.72) = 2.2742$	$\log_e(9.73) = 2.2752$	$\log_e(9.74) = 2.2762$
$\log_e(9.75) = 2.2773$	$\log_e(9.76) = 2.2783$	$\log_e(9.77) = 2.2793$	$\log_e(9.78) = 2.2803$	$\log_e(9.79) = 2.2814$
$\log_e(9.80) = 2.2824$	$\log_e(9.81) = 2.2834$	$\log_e(9.82) = 2.2844$	$\log_e(9.83) = 2.2854$	$\log_e(9.84) = 2.2865$
$\log_e(9.85) = 2.2875$	$\log_e(9.86) = 2.2885$	$\log_e(9.87) = 2.2895$	$\log_e(9.88) = 2.2905$	$\log_e(9.89) = 2.2915$
$\log_e(9.90) = 2.2925$	$\log_e(9.91) = 2.2935$	$\log_e(9.92) = 2.2946$	$\log_e(9.93) = 2.2956$	$\log_e(9.94) = 2.2966$
$\log_e(9.95) = 2.2976$	$\log_e(9.96) = 2.2986$	$\log_e(9.97) = 2.2996$	$\log_e(9.98) = 2.3006$	$\log_e(9.99) = 2.3016$

注意：背面有試題

所別：天文研究所碩士班 不分組(一般生)　科目：天文學　共 6 頁 第 5 頁
天文研究所碩士班 不分組(在職生)

本科考試可使用計算器，廠牌、功能不拘。

＊請在試卷答案卷（卡）內作答

$\log_{10}(1.00) = 0.0000$	$\log_{10}(1.01) = 0.0043$	$\log_{10}(1.02) = 0.0086$	$\log_{10}(1.03) = 0.0128$	$\log_{10}(1.04) = 0.0170$
$\log_{10}(1.05) = 0.0212$	$\log_{10}(1.06) = 0.0253$	$\log_{10}(1.07) = 0.0294$	$\log_{10}(1.08) = 0.0334$	$\log_{10}(1.09) = 0.0374$
$\log_{10}(1.10) = 0.0414$	$\log_{10}(1.11) = 0.0453$	$\log_{10}(1.12) = 0.0492$	$\log_{10}(1.13) = 0.0531$	$\log_{10}(1.14) = 0.0569$
$\log_{10}(1.15) = 0.0607$	$\log_{10}(1.16) = 0.0645$	$\log_{10}(1.17) = 0.0682$	$\log_{10}(1.18) = 0.0719$	$\log_{10}(1.19) = 0.0755$
$\log_{10}(1.20) = 0.0792$	$\log_{10}(1.21) = 0.0828$	$\log_{10}(1.22) = 0.0864$	$\log_{10}(1.23) = 0.0899$	$\log_{10}(1.24) = 0.0934$
$\log_{10}(1.25) = 0.0969$	$\log_{10}(1.26) = 0.1004$	$\log_{10}(1.27) = 0.1038$	$\log_{10}(1.28) = 0.1072$	$\log_{10}(1.29) = 0.1106$
$\log_{10}(1.30) = 0.1139$	$\log_{10}(1.31) = 0.1173$	$\log_{10}(1.32) = 0.1206$	$\log_{10}(1.33) = 0.1239$	$\log_{10}(1.34) = 0.1271$
$\log_{10}(1.35) = 0.1303$	$\log_{10}(1.36) = 0.1335$	$\log_{10}(1.37) = 0.1367$	$\log_{10}(1.38) = 0.1399$	$\log_{10}(1.39) = 0.1430$
$\log_{10}(1.40) = 0.1461$	$\log_{10}(1.41) = 0.1492$	$\log_{10}(1.42) = 0.1523$	$\log_{10}(1.43) = 0.1553$	$\log_{10}(1.44) = 0.1584$
$\log_{10}(1.45) = 0.1614$	$\log_{10}(1.46) = 0.1644$	$\log_{10}(1.47) = 0.1673$	$\log_{10}(1.48) = 0.1703$	$\log_{10}(1.49) = 0.1732$
$\log_{10}(1.50) = 0.1761$	$\log_{10}(1.51) = 0.1790$	$\log_{10}(1.52) = 0.1818$	$\log_{10}(1.53) = 0.1847$	$\log_{10}(1.54) = 0.1875$
$\log_{10}(1.55) = 0.1903$	$\log_{10}(1.56) = 0.1931$	$\log_{10}(1.57) = 0.1959$	$\log_{10}(1.58) = 0.1987$	$\log_{10}(1.59) = 0.2014$
$\log_{10}(1.60) = 0.2041$	$\log_{10}(1.61) = 0.2068$	$\log_{10}(1.62) = 0.2095$	$\log_{10}(1.63) = 0.2122$	$\log_{10}(1.64) = 0.2148$
$\log_{10}(1.65) = 0.2175$	$\log_{10}(1.66) = 0.2201$	$\log_{10}(1.67) = 0.2227$	$\log_{10}(1.68) = 0.2253$	$\log_{10}(1.69) = 0.2279$
$\log_{10}(1.70) = 0.2304$	$\log_{10}(1.71) = 0.2330$	$\log_{10}(1.72) = 0.2355$	$\log_{10}(1.73) = 0.2380$	$\log_{10}(1.74) = 0.2405$
$\log_{10}(1.75) = 0.2430$	$\log_{10}(1.76) = 0.2455$	$\log_{10}(1.77) = 0.2480$	$\log_{10}(1.78) = 0.2504$	$\log_{10}(1.79) = 0.2529$
$\log_{10}(1.80) = 0.2553$	$\log_{10}(1.81) = 0.2577$	$\log_{10}(1.82) = 0.2601$	$\log_{10}(1.83) = 0.2625$	$\log_{10}(1.84) = 0.2648$
$\log_{10}(1.85) = 0.2672$	$\log_{10}(1.86) = 0.2695$	$\log_{10}(1.87) = 0.2718$	$\log_{10}(1.88) = 0.2742$	$\log_{10}(1.89) = 0.2765$
$\log_{10}(1.90) = 0.2788$	$\log_{10}(1.91) = 0.2810$	$\log_{10}(1.92) = 0.2833$	$\log_{10}(1.93) = 0.2856$	$\log_{10}(1.94) = 0.2878$
$\log_{10}(1.95) = 0.2900$	$\log_{10}(1.96) = 0.2923$	$\log_{10}(1.97) = 0.2945$	$\log_{10}(1.98) = 0.2967$	$\log_{10}(1.99) = 0.2989$
$\log_{10}(2.00) = 0.3010$	$\log_{10}(2.01) = 0.3032$	$\log_{10}(2.02) = 0.3054$	$\log_{10}(2.03) = 0.3075$	$\log_{10}(2.04) = 0.3096$
$\log_{10}(2.05) = 0.3118$	$\log_{10}(2.06) = 0.3139$	$\log_{10}(2.07) = 0.3160$	$\log_{10}(2.08) = 0.3181$	$\log_{10}(2.09) = 0.3201$
$\log_{10}(2.10) = 0.3222$	$\log_{10}(2.11) = 0.3243$	$\log_{10}(2.12) = 0.3263$	$\log_{10}(2.13) = 0.3284$	$\log_{10}(2.14) = 0.3304$
$\log_{10}(2.15) = 0.3324$	$\log_{10}(2.16) = 0.3345$	$\log_{10}(2.17) = 0.3365$	$\log_{10}(2.18) = 0.3385$	$\log_{10}(2.19) = 0.3404$
$\log_{10}(2.20) = 0.3424$	$\log_{10}(2.21) = 0.3444$	$\log_{10}(2.22) = 0.3464$	$\log_{10}(2.23) = 0.3483$	$\log_{10}(2.24) = 0.3502$
$\log_{10}(2.25) = 0.3522$	$\log_{10}(2.26) = 0.3541$	$\log_{10}(2.27) = 0.3560$	$\log_{10}(2.28) = 0.3579$	$\log_{10}(2.29) = 0.3598$
$\log_{10}(2.30) = 0.3617$	$\log_{10}(2.31) = 0.3636$	$\log_{10}(2.32) = 0.3655$	$\log_{10}(2.33) = 0.3674$	$\log_{10}(2.34) = 0.3692$
$\log_{10}(2.35) = 0.3711$	$\log_{10}(2.36) = 0.3729$	$\log_{10}(2.37) = 0.3747$	$\log_{10}(2.38) = 0.3766$	$\log_{10}(2.39) = 0.3784$
$\log_{10}(2.40) = 0.3802$	$\log_{10}(2.41) = 0.3820$	$\log_{10}(2.42) = 0.3838$	$\log_{10}(2.43) = 0.3856$	$\log_{10}(2.44) = 0.3874$
$\log_{10}(2.45) = 0.3892$	$\log_{10}(2.46) = 0.3909$	$\log_{10}(2.47) = 0.3927$	$\log_{10}(2.48) = 0.3945$	$\log_{10}(2.49) = 0.3962$
$\log_{10}(2.50) = 0.3979$	$\log_{10}(2.51) = 0.3997$	$\log_{10}(2.52) = 0.4014$	$\log_{10}(2.53) = 0.4031$	$\log_{10}(2.54) = 0.4048$
$\log_{10}(2.55) = 0.4065$	$\log_{10}(2.56) = 0.4082$	$\log_{10}(2.57) = 0.4099$	$\log_{10}(2.58) = 0.4116$	$\log_{10}(2.59) = 0.4133$
$\log_{10}(2.60) = 0.4150$	$\log_{10}(2.61) = 0.4166$	$\log_{10}(2.62) = 0.4183$	$\log_{10}(2.63) = 0.4200$	$\log_{10}(2.64) = 0.4216$
$\log_{10}(2.65) = 0.4232$	$\log_{10}(2.66) = 0.4249$	$\log_{10}(2.67) = 0.4265$	$\log_{10}(2.68) = 0.4281$	$\log_{10}(2.69) = 0.4298$
$\log_{10}(2.70) = 0.4314$	$\log_{10}(2.71) = 0.4330$	$\log_{10}(2.72) = 0.4346$	$\log_{10}(2.73) = 0.4362$	$\log_{10}(2.74) = 0.4378$
$\log_{10}(2.75) = 0.4393$	$\log_{10}(2.76) = 0.4409$	$\log_{10}(2.77) = 0.4425$	$\log_{10}(2.78) = 0.4440$	$\log_{10}(2.79) = 0.4456$
$\log_{10}(2.80) = 0.4472$	$\log_{10}(2.81) = 0.4487$	$\log_{10}(2.82) = 0.4502$	$\log_{10}(2.83) = 0.4518$	$\log_{10}(2.84) = 0.4533$
$\log_{10}(2.85) = 0.4548$	$\log_{10}(2.86) = 0.4564$	$\log_{10}(2.87) = 0.4579$	$\log_{10}(2.88) = 0.4594$	$\log_{10}(2.89) = 0.4609$
$\log_{10}(2.90) = 0.4624$	$\log_{10}(2.91) = 0.4639$	$\log_{10}(2.92) = 0.4654$	$\log_{10}(2.93) = 0.4669$	$\log_{10}(2.94) = 0.4683$
$\log_{10}(2.95) = 0.4698$	$\log_{10}(2.96) = 0.4713$	$\log_{10}(2.97) = 0.4728$	$\log_{10}(2.98) = 0.4742$	$\log_{10}(2.99) = 0.4757$
$\log_{10}(3.00) = 0.4771$	$\log_{10}(3.01) = 0.4786$	$\log_{10}(3.02) = 0.4800$	$\log_{10}(3.03) = 0.4814$	$\log_{10}(3.04) = 0.4829$
$\log_{10}(3.05) = 0.4843$	$\log_{10}(3.06) = 0.4857$	$\log_{10}(3.07) = 0.4871$	$\log_{10}(3.08) = 0.4886$	$\log_{10}(3.09) = 0.4900$
$\log_{10}(3.10) = 0.4914$	$\log_{10}(3.11) = 0.4928$	$\log_{10}(3.12) = 0.4942$	$\log_{10}(3.13) = 0.4955$	$\log_{10}(3.14) = 0.4969$
$\log_{10}(3.15) = 0.4983$	$\log_{10}(3.16) = 0.4997$	$\log_{10}(3.17) = 0.5011$	$\log_{10}(3.18) = 0.5024$	$\log_{10}(3.19) = 0.5038$
$\log_{10}(3.20) = 0.5051$	$\log_{10}(3.21) = 0.5065$	$\log_{10}(3.22) = 0.5079$	$\log_{10}(3.23) = 0.5092$	$\log_{10}(3.24) = 0.5105$
$\log_{10}(3.25) = 0.5119$	$\log_{10}(3.26) = 0.5132$	$\log_{10}(3.27) = 0.5145$	$\log_{10}(3.28) = 0.5159$	$\log_{10}(3.29) = 0.5172$
$\log_{10}(3.30) = 0.5185$	$\log_{10}(3.31) = 0.5198$	$\log_{10}(3.32) = 0.5211$	$\log_{10}(3.33) = 0.5224$	$\log_{10}(3.34) = 0.5237$
$\log_{10}(3.35) = 0.5250$	$\log_{10}(3.36) = 0.5263$	$\log_{10}(3.37) = 0.5276$	$\log_{10}(3.38) = 0.5289$	$\log_{10}(3.39) = 0.5302$
$\log_{10}(3.40) = 0.5315$	$\log_{10}(3.41) = 0.5328$	$\log_{10}(3.42) = 0.5340$	$\log_{10}(3.43) = 0.5353$	$\log_{10}(3.44) = 0.5366$
$\log_{10}(3.45) = 0.5378$	$\log_{10}(3.46) = 0.5391$	$\log_{10}(3.47) = 0.5403$	$\log_{10}(3.48) = 0.5416$	$\log_{10}(3.49) = 0.5428$
$\log_{10}(3.50) = 0.5441$	$\log_{10}(3.51) = 0.5453$	$\log_{10}(3.52) = 0.5465$	$\log_{10}(3.53) = 0.5478$	$\log_{10}(3.54) = 0.5490$
$\log_{10}(3.55) = 0.5502$	$\log_{10}(3.56) = 0.5514$	$\log_{10}(3.57) = 0.5527$	$\log_{10}(3.58) = 0.5539$	$\log_{10}(3.59) = 0.5551$
$\log_{10}(3.60) = 0.5563$	$\log_{10}(3.61) = 0.5575$	$\log_{10}(3.62) = 0.5587$	$\log_{10}(3.63) = 0.5599$	$\log_{10}(3.64) = 0.5611$
$\log_{10}(3.65) = 0.5623$	$\log_{10}(3.66) = 0.5635$	$\log_{10}(3.67) = 0.5647$	$\log_{10}(3.68) = 0.5658$	$\log_{10}(3.69) = 0.5670$
$\log_{10}(3.70) = 0.5682$	$\log_{10}(3.71) = 0.5694$	$\log_{10}(3.72) = 0.5705$	$\log_{10}(3.73) = 0.5717$	$\log_{10}(3.74) = 0.5729$
$\log_{10}(3.75) = 0.5740$	$\log_{10}(3.76) = 0.5752$	$\log_{10}(3.77) = 0.5763$	$\log_{10}(3.78) = 0.5775$	$\log_{10}(3.79) = 0.5786$
$\log_{10}(3.80) = 0.5798$	$\log_{10}(3.81) = 0.5809$	$\log_{10}(3.82) = 0.5821$	$\log_{10}(3.83) = 0.5832$	$\log_{10}(3.84) = 0.5843$
$\log_{10}(3.85) = 0.5855$	$\log_{10}(3.86) = 0.5866$	$\log_{10}(3.87) = 0.5877$	$\log_{10}(3.88) = 0.5888$	$\log_{10}(3.89) = 0.5899$
$\log_{10}(3.90) = 0.5911$	$\log_{10}(3.91) = 0.5922$	$\log_{10}(3.92) = 0.5933$	$\log_{10}(3.93) = 0.5944$	$\log_{10}(3.94) = 0.5955$
$\log_{10}(3.95) = 0.5966$	$\log_{10}(3.96) = 0.5977$	$\log_{10}(3.97) = 0.5988$	$\log_{10}(3.98) = 0.5999$	$\log_{10}(3.99) = 0.6010$
$\log_{10}(4.00) = 0.6021$	$\log_{10}(4.01) = 0.6031$	$\log_{10}(4.02) = 0.6042$	$\log_{10}(4.03) = 0.6053$	$\log_{10}(4.04) = 0.6064$
$\log_{10}(4.05) = 0.6075$	$\log_{10}(4.06) = 0.6085$	$\log_{10}(4.07) = 0.6096$	$\log_{10}(4.08) = 0.6107$	$\log_{10}(4.09) = 0.6117$
$\log_{10}(4.10) = 0.6128$	$\log_{10}(4.11) = 0.6138$	$\log_{10}(4.12) = 0.6149$	$\log_{10}(4.13) = 0.6160$	$\log_{10}(4.14) = 0.6170$
$\log_{10}(4.15) = 0.6180$	$\log_{10}(4.16) = 0.6191$	$\log_{10}(4.17) = 0.6201$	$\log_{10}(4.18) = 0.6212$	$\log_{10}(4.19) = 0.6222$
$\log_{10}(4.20) = 0.6232$	$\log_{10}(4.21) = 0.6243$	$\log_{10}(4.22) = 0.6253$	$\log_{10}(4.23) = 0.6263$	$\log_{10}(4.24) = 0.6274$
$\log_{10}(4.25) = 0.6284$	$\log_{10}(4.26) = 0.6294$	$\log_{10}(4.27) = 0.6304$	$\log_{10}(4.28) = 0.6314$	$\log_{10}(4.29) = 0.6325$
$\log_{10}(4.30) = 0.6335$	$\log_{10}(4.31) = 0.6345$	$\log_{10}(4.32) = 0.6355$	$\log_{10}(4.33) = 0.6365$	$\log_{10}(4.34) = 0.6375$
$\log_{10}(4.35) = 0.6385$	$\log_{10}(4.36) = 0.6395$	$\log_{10}(4.37) = 0.6405$	$\log_{10}(4.38) = 0.6415$	$\log_{10}(4.39) = 0.6425$
$\log_{10}(4.40) = 0.6435$	$\log_{10}(4.41) = 0.6444$	$\log_{10}(4.42) = 0.6454$	$\log_{10}(4.43) = 0.6464$	$\log_{10}(4.44) = 0.6474$
$\log_{10}(4.45) = 0.6484$	$\log_{10}(4.46) = 0.6493$	$\log_{10}(4.47) = 0.6503$	$\log_{10}(4.48) = 0.6513$	$\log_{10}(4.49) = 0.6522$
$\log_{10}(4.50) = 0.6532$	$\log_{10}(4.51) = 0.6542$	$\log_{10}(4.52) = 0.6551$	$\log_{10}(4.53) = 0.6561$	$\log_{10}(4.54) = 0.6571$
$\log_{10}(4.55) = 0.6580$	$\log_{10}(4.56) = 0.6590$	$\log_{10}(4.57) = 0.6599$	$\log_{10}(4.58) = 0.6609$	$\log_{10}(4.59) = 0.6618$
$\log_{10}(4.60) = 0.6628$	$\log_{10}(4.61) = 0.6637$	$\log_{10}(4.62) = 0.6646$	$\log_{10}(4.63) = 0.6656$	$\log_{10}(4.64) = 0.6665$
$\log_{10}(4.65) = 0.6675$	$\log_{10}(4.66) = 0.6684$	$\log_{10}(4.67) = 0.6693$	$\log_{10}(4.68) = 0.6702$	$\log_{10}(4.69) = 0.6712$
$\log_{10}(4.70) = 0.6721$	$\log_{10}(4.71) = 0.6730$	$\log_{10}(4.72) = 0.6739$	$\log_{10}(4.73) = 0.6749$	$\log_{10}(4.74) = 0.6758$
$\log_{10}(4.75) = 0.6767$	$\log_{10}(4.76) = 0.6776$	$\log_{10}(4.77) = 0.6785$	$\log_{10}(4.78) = 0.6794$	$\log_{10}(4.79) = 0.6803$
$\log_{10}(4.80) = 0.6812$	$\log_{10}(4.81) = 0.6821$	$\log_{10}(4.82) = 0.6830$	$\log_{10}(4.83) = 0.6839$	$\log_{10}(4.84) = 0.6848$
$\log_{10}(4.85) = 0.6857$	$\log_{10}(4.86) = 0.6866$	$\log_{10}(4.87) = 0.6875$	$\log_{10}(4.88) = 0.6884$	$\log_{10}(4.89) = 0.6893$
$\log_{10}(4.90) = 0.6902$	$\log_{10}(4.91) = 0.6911$	$\log_{10}(4.92) = 0.6920$	$\log_{10}(4.93) = 0.6928$	$\log_{10}(4.94) = 0.6937$
$\log_{10}(4.95) = 0.6946$	$\log_{10}(4.96) = 0.6955$	$\log_{10}(4.97) = 0.6964$	$\log_{10}(4.98) = 0.6972$	$\log_{10}(4.99) = 0.6981$
$\log_{10}(5.00) = 0.6990$	$\log_{10}(5.01) = 0.6998$	$\log_{10}(5.02) = 0.7007$	$\log_{10}(5.03) = 0.7016$	$\log_{10}(5.04) = 0.7024$
$\log_{10}(5.05) = 0.7033$	$\log_{10}(5.06) = 0.7042$	$\log_{10}(5.07) = 0.7050$	$\log_{10}(5.08) = 0.7059$	$\log_{10}(5.09) = 0.7067$
$\log_{10}(5.10) = 0.7076$	$\log_{10}(5.11) = 0.7084$	$\log_{10}(5.12) = 0.7093$	$\log_{10}(5.13) = 0.7101$	$\log_{10}(5.14) = 0.7110$
$\log_{10}(5.15) = 0.7118$	$\log_{10}(5.16) = 0.7126$	$\log_{10}(5.17) = 0.7135$	$\log_{10}(5.18) = 0.7143$	$\log_{10}(5.19) = 0.7152$
$\log_{10}(5.20) = 0.7160$	$\log_{10}(5.21) = 0.7168$	$\log_{10}(5.22) = 0.7177$	$\log_{10}(5.23) = 0.7185$	$\log_{10}(5.24) = 0.7193$
$\log_{10}(5.25) = 0.7202$	$\log_{10}(5.26) = 0.7210$	$\log_{10}(5.27) = 0.7218$	$\log_{10}(5.28) = 0.7226$	$\log_{10}(5.29) = 0.7235$
$\log_{10}(5.30) = 0.7243$	$\log_{10}(5.31) = 0.7251$	$\log_{10}(5.32) = 0.7259$	$\log_{10}(5.33) = 0.7267$	$\log_{10}(5.34) = 0.7275$
$\log_{10}(5.35) = 0.7284$	$\log_{10}(5.36) = 0.7292$	$\log_{10}(5.37) = 0.7300$	$\log_{10}(5.38) = 0.7308$	$\log_{10}(5.39) = 0.7316$
$\log_{10}(5.40) = 0.7324$	$\log_{10}(5.41) = 0.7332$	$\log_{10}(5.42) = 0.7340$	$\log_{10}(5.43) = 0.7348$	$\log_{10}(5.44) = 0.7356$
$\log_{10}(5.45) = 0.7364$	$\log_{10}(5.46) = 0.7372$	$\log_{10}(5.47) = 0.7380$	$\log_{10}(5.48) = 0.7388$	$\log_{10}(5.49) = 0.7396$

注意：背面有試題

國立中央大學101學年度碩士班考試入學試題卷

所別：天文研究所碩士班 不分組(一般生)　科目：天文學　共 6 頁 第 6 頁
天文研究所碩士班 不分組(在職生)

本科考試可使用計算器，廠牌、功能不拘。

＊請在試卷答案卷（卡）內作答

$\log_{10}(5.50) = 0.7404$	$\log_{10}(5.51) = 0.7412$	$\log_{10}(5.52) = 0.7419$	$\log_{10}(5.53) = 0.7427$	$\log_{10}(5.54) = 0.7435$
$\log_{10}(5.55) = 0.7443$	$\log_{10}(5.56) = 0.7451$	$\log_{10}(5.57) = 0.7459$	$\log_{10}(5.58) = 0.7466$	$\log_{10}(5.59) = 0.7474$
$\log_{10}(5.60) = 0.7482$	$\log_{10}(5.61) = 0.7490$	$\log_{10}(5.62) = 0.7497$	$\log_{10}(5.63) = 0.7505$	$\log_{10}(5.64) = 0.7513$
$\log_{10}(5.65) = 0.7520$	$\log_{10}(5.66) = 0.7528$	$\log_{10}(5.67) = 0.7536$	$\log_{10}(5.68) = 0.7543$	$\log_{10}(5.69) = 0.7551$
$\log_{10}(5.70) = 0.7559$	$\log_{10}(5.71) = 0.7566$	$\log_{10}(5.72) = 0.7574$	$\log_{10}(5.73) = 0.7582$	$\log_{10}(5.74) = 0.7589$
$\log_{10}(5.75) = 0.7597$	$\log_{10}(5.76) = 0.7604$	$\log_{10}(5.77) = 0.7612$	$\log_{10}(5.78) = 0.7619$	$\log_{10}(5.79) = 0.7627$
$\log_{10}(5.80) = 0.7634$	$\log_{10}(5.81) = 0.7642$	$\log_{10}(5.82) = 0.7649$	$\log_{10}(5.83) = 0.7657$	$\log_{10}(5.84) = 0.7664$
$\log_{10}(5.85) = 0.7672$	$\log_{10}(5.86) = 0.7679$	$\log_{10}(5.87) = 0.7686$	$\log_{10}(5.88) = 0.7694$	$\log_{10}(5.89) = 0.7701$
$\log_{10}(5.90) = 0.7709$	$\log_{10}(5.91) = 0.7716$	$\log_{10}(5.92) = 0.7723$	$\log_{10}(5.93) = 0.7731$	$\log_{10}(5.94) = 0.7738$
$\log_{10}(5.95) = 0.7745$	$\log_{10}(5.96) = 0.7752$	$\log_{10}(5.97) = 0.7760$	$\log_{10}(5.98) = 0.7767$	$\log_{10}(5.99) = 0.7774$
$\log_{10}(6.00) = 0.7782$	$\log_{10}(6.01) = 0.7789$	$\log_{10}(6.02) = 0.7796$	$\log_{10}(6.03) = 0.7803$	$\log_{10}(6.04) = 0.7810$
$\log_{10}(6.05) = 0.7818$	$\log_{10}(6.06) = 0.7825$	$\log_{10}(6.07) = 0.7832$	$\log_{10}(6.08) = 0.7839$	$\log_{10}(6.09) = 0.7846$
$\log_{10}(6.10) = 0.7853$	$\log_{10}(6.11) = 0.7860$	$\log_{10}(6.12) = 0.7868$	$\log_{10}(6.13) = 0.7875$	$\log_{10}(6.14) = 0.7882$
$\log_{10}(6.15) = 0.7889$	$\log_{10}(6.16) = 0.7896$	$\log_{10}(6.17) = 0.7903$	$\log_{10}(6.18) = 0.7910$	$\log_{10}(6.19) = 0.7917$
$\log_{10}(6.20) = 0.7924$	$\log_{10}(6.21) = 0.7931$	$\log_{10}(6.22) = 0.7938$	$\log_{10}(6.23) = 0.7945$	$\log_{10}(6.24) = 0.7952$
$\log_{10}(6.25) = 0.7959$	$\log_{10}(6.26) = 0.7966$	$\log_{10}(6.27) = 0.7973$	$\log_{10}(6.28) = 0.7980$	$\log_{10}(6.29) = 0.7987$
$\log_{10}(6.30) = 0.7993$	$\log_{10}(6.31) = 0.8000$	$\log_{10}(6.32) = 0.8007$	$\log_{10}(6.33) = 0.8014$	$\log_{10}(6.34) = 0.8021$
$\log_{10}(6.35) = 0.8028$	$\log_{10}(6.36) = 0.8035$	$\log_{10}(6.37) = 0.8041$	$\log_{10}(6.38) = 0.8048$	$\log_{10}(6.39) = 0.8055$
$\log_{10}(6.40) = 0.8062$	$\log_{10}(6.41) = 0.8069$	$\log_{10}(6.42) = 0.8075$	$\log_{10}(6.43) = 0.8082$	$\log_{10}(6.44) = 0.8089$
$\log_{10}(6.45) = 0.8096$	$\log_{10}(6.46) = 0.8102$	$\log_{10}(6.47) = 0.8109$	$\log_{10}(6.48) = 0.8116$	$\log_{10}(6.49) = 0.8122$
$\log_{10}(6.50) = 0.8129$	$\log_{10}(6.51) = 0.8136$	$\log_{10}(6.52) = 0.8142$	$\log_{10}(6.53) = 0.8149$	$\log_{10}(6.54) = 0.8156$
$\log_{10}(6.55) = 0.8162$	$\log_{10}(6.56) = 0.8169$	$\log_{10}(6.57) = 0.8176$	$\log_{10}(6.58) = 0.8182$	$\log_{10}(6.59) = 0.8189$
$\log_{10}(6.60) = 0.8195$	$\log_{10}(6.61) = 0.8202$	$\log_{10}(6.62) = 0.8209$	$\log_{10}(6.63) = 0.8215$	$\log_{10}(6.64) = 0.8222$
$\log_{10}(6.65) = 0.8228$	$\log_{10}(6.66) = 0.8235$	$\log_{10}(6.67) = 0.8241$	$\log_{10}(6.68) = 0.8248$	$\log_{10}(6.69) = 0.8254$
$\log_{10}(6.70) = 0.8261$	$\log_{10}(6.71) = 0.8267$	$\log_{10}(6.72) = 0.8274$	$\log_{10}(6.73) = 0.8280$	$\log_{10}(6.74) = 0.8287$
$\log_{10}(6.75) = 0.8293$	$\log_{10}(6.76) = 0.8299$	$\log_{10}(6.77) = 0.8306$	$\log_{10}(6.78) = 0.8312$	$\log_{10}(6.79) = 0.8319$
$\log_{10}(6.80) = 0.8325$	$\log_{10}(6.81) = 0.8331$	$\log_{10}(6.82) = 0.8338$	$\log_{10}(6.83) = 0.8344$	$\log_{10}(6.84) = 0.8351$
$\log_{10}(6.85) = 0.8357$	$\log_{10}(6.86) = 0.8363$	$\log_{10}(6.87) = 0.8370$	$\log_{10}(6.88) = 0.8376$	$\log_{10}(6.89) = 0.8382$
$\log_{10}(6.90) = 0.8388$	$\log_{10}(6.91) = 0.8395$	$\log_{10}(6.92) = 0.8401$	$\log_{10}(6.93) = 0.8407$	$\log_{10}(6.94) = 0.8414$
$\log_{10}(6.95) = 0.8420$	$\log_{10}(6.96) = 0.8426$	$\log_{10}(6.97) = 0.8432$	$\log_{10}(6.98) = 0.8439$	$\log_{10}(6.99) = 0.8445$
$\log_{10}(7.00) = 0.8451$	$\log_{10}(7.01) = 0.8457$	$\log_{10}(7.02) = 0.8463$	$\log_{10}(7.03) = 0.8470$	$\log_{10}(7.04) = 0.8476$
$\log_{10}(7.05) = 0.8482$	$\log_{10}(7.06) = 0.8488$	$\log_{10}(7.07) = 0.8494$	$\log_{10}(7.08) = 0.8500$	$\log_{10}(7.09) = 0.8506$
$\log_{10}(7.10) = 0.8513$	$\log_{10}(7.11) = 0.8519$	$\log_{10}(7.12) = 0.8525$	$\log_{10}(7.13) = 0.8531$	$\log_{10}(7.14) = 0.8537$
$\log_{10}(7.15) = 0.8543$	$\log_{10}(7.16) = 0.8549$	$\log_{10}(7.17) = 0.8555$	$\log_{10}(7.18) = 0.8561$	$\log_{10}(7.19) = 0.8567$
$\log_{10}(7.20) = 0.8573$	$\log_{10}(7.21) = 0.8579$	$\log_{10}(7.22) = 0.8585$	$\log_{10}(7.23) = 0.8591$	$\log_{10}(7.24) = 0.8597$
$\log_{10}(7.25) = 0.8603$	$\log_{10}(7.26) = 0.8609$	$\log_{10}(7.27) = 0.8615$	$\log_{10}(7.28) = 0.8621$	$\log_{10}(7.29) = 0.8627$
$\log_{10}(7.30) = 0.8633$	$\log_{10}(7.31) = 0.8639$	$\log_{10}(7.32) = 0.8645$	$\log_{10}(7.33) = 0.8651$	$\log_{10}(7.34) = 0.8657$
$\log_{10}(7.35) = 0.8663$	$\log_{10}(7.36) = 0.8669$	$\log_{10}(7.37) = 0.8675$	$\log_{10}(7.38) = 0.8681$	$\log_{10}(7.39) = 0.8686$
$\log_{10}(7.40) = 0.8692$	$\log_{10}(7.41) = 0.8698$	$\log_{10}(7.42) = 0.8704$	$\log_{10}(7.43) = 0.8710$	$\log_{10}(7.44) = 0.8716$
$\log_{10}(7.45) = 0.8722$	$\log_{10}(7.46) = 0.8727$	$\log_{10}(7.47) = 0.8733$	$\log_{10}(7.48) = 0.8739$	$\log_{10}(7.49) = 0.8745$
$\log_{10}(7.50) = 0.8751$	$\log_{10}(7.51) = 0.8756$	$\log_{10}(7.52) = 0.8762$	$\log_{10}(7.53) = 0.8768$	$\log_{10}(7.54) = 0.8774$
$\log_{10}(7.55) = 0.8779$	$\log_{10}(7.56) = 0.8785$	$\log_{10}(7.57) = 0.8791$	$\log_{10}(7.58) = 0.8797$	$\log_{10}(7.59) = 0.8802$
$\log_{10}(7.60) = 0.8808$	$\log_{10}(7.61) = 0.8814$	$\log_{10}(7.62) = 0.8820$	$\log_{10}(7.63) = 0.8825$	$\log_{10}(7.64) = 0.8831$
$\log_{10}(7.65) = 0.8837$	$\log_{10}(7.66) = 0.8842$	$\log_{10}(7.67) = 0.8848$	$\log_{10}(7.68) = 0.8854$	$\log_{10}(7.69) = 0.8859$
$\log_{10}(7.70) = 0.8865$	$\log_{10}(7.71) = 0.8871$	$\log_{10}(7.72) = 0.8876$	$\log_{10}(7.73) = 0.8882$	$\log_{10}(7.74) = 0.8887$
$\log_{10}(7.75) = 0.8893$	$\log_{10}(7.76) = 0.8899$	$\log_{10}(7.77) = 0.8904$	$\log_{10}(7.78) = 0.8910$	$\log_{10}(7.79) = 0.8915$
$\log_{10}(7.80) = 0.8921$	$\log_{10}(7.81) = 0.8927$	$\log_{10}(7.82) = 0.8932$	$\log_{10}(7.83) = 0.8938$	$\log_{10}(7.84) = 0.8943$
$\log_{10}(7.85) = 0.8949$	$\log_{10}(7.86) = 0.8954$	$\log_{10}(7.87) = 0.8960$	$\log_{10}(7.88) = 0.8965$	$\log_{10}(7.89) = 0.8971$
$\log_{10}(7.90) = 0.8976$	$\log_{10}(7.91) = 0.8982$	$\log_{10}(7.92) = 0.8987$	$\log_{10}(7.93) = 0.8993$	$\log_{10}(7.94) = 0.8998$
$\log_{10}(7.95) = 0.9004$	$\log_{10}(7.96) = 0.9009$	$\log_{10}(7.97) = 0.9015$	$\log_{10}(7.98) = 0.9020$	$\log_{10}(7.99) = 0.9025$
$\log_{10}(8.00) = 0.9031$	$\log_{10}(8.01) = 0.9036$	$\log_{10}(8.02) = 0.9042$	$\log_{10}(8.03) = 0.9047$	$\log_{10}(8.04) = 0.9053$
$\log_{10}(8.05) = 0.9058$	$\log_{10}(8.06) = 0.9063$	$\log_{10}(8.07) = 0.9069$	$\log_{10}(8.08) = 0.9074$	$\log_{10}(8.09) = 0.9079$
$\log_{10}(8.10) = 0.9085$	$\log_{10}(8.11) = 0.9090$	$\log_{10}(8.12) = 0.9096$	$\log_{10}(8.13) = 0.9101$	$\log_{10}(8.14) = 0.9106$
$\log_{10}(8.15) = 0.9112$	$\log_{10}(8.16) = 0.9117$	$\log_{10}(8.17) = 0.9122$	$\log_{10}(8.18) = 0.9128$	$\log_{10}(8.19) = 0.9133$
$\log_{10}(8.20) = 0.9138$	$\log_{10}(8.21) = 0.9143$	$\log_{10}(8.22) = 0.9149$	$\log_{10}(8.23) = 0.9154$	$\log_{10}(8.24) = 0.9159$
$\log_{10}(8.25) = 0.9165$	$\log_{10}(8.26) = 0.9170$	$\log_{10}(8.27) = 0.9175$	$\log_{10}(8.28) = 0.9180$	$\log_{10}(8.29) = 0.9186$
$\log_{10}(8.30) = 0.9191$	$\log_{10}(8.31) = 0.9196$	$\log_{10}(8.32) = 0.9201$	$\log_{10}(8.33) = 0.9206$	$\log_{10}(8.34) = 0.9212$
$\log_{10}(8.35) = 0.9217$	$\log_{10}(8.36) = 0.9222$	$\log_{10}(8.37) = 0.9227$	$\log_{10}(8.38) = 0.9232$	$\log_{10}(8.39) = 0.9238$
$\log_{10}(8.40) = 0.9243$	$\log_{10}(8.41) = 0.9248$	$\log_{10}(8.42) = 0.9253$	$\log_{10}(8.43) = 0.9258$	$\log_{10}(8.44) = 0.9263$
$\log_{10}(8.45) = 0.9269$	$\log_{10}(8.46) = 0.9274$	$\log_{10}(8.47) = 0.9279$	$\log_{10}(8.48) = 0.9284$	$\log_{10}(8.49) = 0.9289$
$\log_{10}(8.50) = 0.9294$	$\log_{10}(8.51) = 0.9299$	$\log_{10}(8.52) = 0.9304$	$\log_{10}(8.53) = 0.9309$	$\log_{10}(8.54) = 0.9315$
$\log_{10}(8.55) = 0.9320$	$\log_{10}(8.56) = 0.9325$	$\log_{10}(8.57) = 0.9330$	$\log_{10}(8.58) = 0.9335$	$\log_{10}(8.59) = 0.9340$
$\log_{10}(8.60) = 0.9345$	$\log_{10}(8.61) = 0.9350$	$\log_{10}(8.62) = 0.9355$	$\log_{10}(8.63) = 0.9360$	$\log_{10}(8.64) = 0.9365$
$\log_{10}(8.65) = 0.9370$	$\log_{10}(8.66) = 0.9375$	$\log_{10}(8.67) = 0.9380$	$\log_{10}(8.68) = 0.9385$	$\log_{10}(8.69) = 0.9390$
$\log_{10}(8.70) = 0.9395$	$\log_{10}(8.71) = 0.9400$	$\log_{10}(8.72) = 0.9405$	$\log_{10}(8.73) = 0.9410$	$\log_{10}(8.74) = 0.9415$
$\log_{10}(8.75) = 0.9420$	$\log_{10}(8.76) = 0.9425$	$\log_{10}(8.77) = 0.9430$	$\log_{10}(8.78) = 0.9435$	$\log_{10}(8.79) = 0.9440$
$\log_{10}(8.80) = 0.9445$	$\log_{10}(8.81) = 0.9450$	$\log_{10}(8.82) = 0.9455$	$\log_{10}(8.83) = 0.9460$	$\log_{10}(8.84) = 0.9465$
$\log_{10}(8.85) = 0.9469$	$\log_{10}(8.86) = 0.9474$	$\log_{10}(8.87) = 0.9479$	$\log_{10}(8.88) = 0.9484$	$\log_{10}(8.89) = 0.9489$
$\log_{10}(8.90) = 0.9494$	$\log_{10}(8.91) = 0.9499$	$\log_{10}(8.92) = 0.9504$	$\log_{10}(8.93) = 0.9509$	$\log_{10}(8.94) = 0.9513$
$\log_{10}(8.95) = 0.9518$	$\log_{10}(8.96) = 0.9523$	$\log_{10}(8.97) = 0.9528$	$\log_{10}(8.98) = 0.9533$	$\log_{10}(8.99) = 0.9538$
$\log_{10}(9.00) = 0.9542$	$\log_{10}(9.01) = 0.9547$	$\log_{10}(9.02) = 0.9552$	$\log_{10}(9.03) = 0.9557$	$\log_{10}(9.04) = 0.9562$
$\log_{10}(9.05) = 0.9566$	$\log_{10}(9.06) = 0.9571$	$\log_{10}(9.07) = 0.9576$	$\log_{10}(9.08) = 0.9581$	$\log_{10}(9.09) = 0.9586$
$\log_{10}(9.10) = 0.9590$	$\log_{10}(9.11) = 0.9595$	$\log_{10}(9.12) = 0.9600$	$\log_{10}(9.13) = 0.9605$	$\log_{10}(9.14) = 0.9609$
$\log_{10}(9.15) = 0.9614$	$\log_{10}(9.16) = 0.9619$	$\log_{10}(9.17) = 0.9624$	$\log_{10}(9.18) = 0.9628$	$\log_{10}(9.19) = 0.9633$
$\log_{10}(9.20) = 0.9638$	$\log_{10}(9.21) = 0.9643$	$\log_{10}(9.22) = 0.9647$	$\log_{10}(9.23) = 0.9652$	$\log_{10}(9.24) = 0.9657$
$\log_{10}(9.25) = 0.9661$	$\log_{10}(9.26) = 0.9666$	$\log_{10}(9.27) = 0.9671$	$\log_{10}(9.28) = 0.9675$	$\log_{10}(9.29) = 0.9680$
$\log_{10}(9.30) = 0.9685$	$\log_{10}(9.31) = 0.9689$	$\log_{10}(9.32) = 0.9694$	$\log_{10}(9.33) = 0.9699$	$\log_{10}(9.34) = 0.9703$
$\log_{10}(9.35) = 0.9708$	$\log_{10}(9.36) = 0.9713$	$\log_{10}(9.37) = 0.9717$	$\log_{10}(9.38) = 0.9722$	$\log_{10}(9.39) = 0.9727$
$\log_{10}(9.40) = 0.9731$	$\log_{10}(9.41) = 0.9736$	$\log_{10}(9.42) = 0.9741$	$\log_{10}(9.43) = 0.9745$	$\log_{10}(9.44) = 0.9750$
$\log_{10}(9.45) = 0.9754$	$\log_{10}(9.46) = 0.9759$	$\log_{10}(9.47) = 0.9763$	$\log_{10}(9.48) = 0.9768$	$\log_{10}(9.49) = 0.9773$
$\log_{10}(9.50) = 0.9777$	$\log_{10}(9.51) = 0.9782$	$\log_{10}(9.52) = 0.9786$	$\log_{10}(9.53) = 0.9791$	$\log_{10}(9.54) = 0.9795$
$\log_{10}(9.55) = 0.9800$	$\log_{10}(9.56) = 0.9805$	$\log_{10}(9.57) = 0.9809$	$\log_{10}(9.58) = 0.9814$	$\log_{10}(9.59) = 0.9818$
$\log_{10}(9.60) = 0.9823$	$\log_{10}(9.61) = 0.9827$	$\log_{10}(9.62) = 0.9832$	$\log_{10}(9.63) = 0.9836$	$\log_{10}(9.64) = 0.9841$
$\log_{10}(9.65) = 0.9845$	$\log_{10}(9.66) = 0.9850$	$\log_{10}(9.67) = 0.9854$	$\log_{10}(9.68) = 0.9859$	$\log_{10}(9.69) = 0.9863$
$\log_{10}(9.70) = 0.9868$	$\log_{10}(9.71) = 0.9872$	$\log_{10}(9.72) = 0.9877$	$\log_{10}(9.73) = 0.9881$	$\log_{10}(9.74) = 0.9886$
$\log_{10}(9.75) = 0.9890$	$\log_{10}(9.76) = 0.9894$	$\log_{10}(9.77) = 0.9899$	$\log_{10}(9.78) = 0.9903$	$\log_{10}(9.79) = 0.9908$
$\log_{10}(9.80) = 0.9912$	$\log_{10}(9.81) = 0.9917$	$\log_{10}(9.82) = 0.9921$	$\log_{10}(9.83) = 0.9926$	$\log_{10}(9.84) = 0.9930$
$\log_{10}(9.85) = 0.9934$	$\log_{10}(9.86) = 0.9939$	$\log_{10}(9.87) = 0.9943$	$\log_{10}(9.88) = 0.9948$	$\log_{10}(9.89) = 0.9952$
$\log_{10}(9.90) = 0.9956$	$\log_{10}(9.91) = 0.9961$	$\log_{10}(9.92) = 0.9965$	$\log_{10}(9.93) = 0.9969$	$\log_{10}(9.94) = 0.9974$
$\log_{10}(9.95) = 0.9978$	$\log_{10}(9.96) = 0.9983$	$\log_{10}(9.97) = 0.9987$	$\log_{10}(9.98) = 0.9991$	$\log_{10}(9.99) = 0.9996$

注意：背面有試題