Name : .....

University of Baghdad

College of Science

Department of Astronomy and Space

M.Sc. Competition Exam

Date: 18/7/2016

Time:3 Hours

Notes:

- *Answer All Questions*
- *Answer in English*
- ***It is not allowed to consult any other information during the exam except for your own knowledge and what during the exam the assistants will explain.***

Question Number	*Mark*(Numbering)	*Mark*(Written)	Signature.
Q1			
Q2			
Total			
Out of	100		

Q1) ***Mark with circle the correct answer*** **(60 Mark and each question one Mark)**

1- In the horizontal system, the point just above the observer is called the:

a)zenith b)horizon c)celestial pole d)azimuth

2- Mercury, Venus, Earth, and Mars are called:

a) dwarf planets b) satellites c) Jovian planets d) terrestrial planets

3- No two electrons in the same atom can have identical set of four quantum numbers. This statement is known as?

a)Hund's rule b)Pauli's Exclusion principle c)Selection rule d)Binding Energy

4- In Hydrogen spectrum, which one of the following series lies in the ultraviolet region?

a)Ballmer series b)Pfund series c)Lyman series d)Bracket series

5- In order from the hottest to the coolest stars, the order of the stellar spectral sequence is

a) OBAFGKM b) ABFGKMO c) MKGFABO d)OBFGAMK

6- The maximum number of. electrons that can be accommodated by p - orbital is?

a)6 b)2 c)10 d)14

7 - The best estimate of the Hubble constant is

a) 70 m/s/Kpc b)70 km/s/Kpc c) 70 km/s/Mpc d) 70 m/s/Mpc

8- The term Albedo defines:

a) The ability of a body to reflect light b) The brightness of a body

c)The thermal and radio emission of a body d) The total flux incident on the surface

9- The energy required to remove electron from an atom in gaseous state is called?

a)Excitation Energy b)Resonance Energy c)Ionization energy d)Binding Energy

10- The Synodic moon month equal ---.

a) 27.55 days. b) 30 days. c) 29.56 days

11- The Earth rotate about the Sun ----- degree/ day.

a) 13 b) 4 c) 0.99

12- One Astronomical unit is approximately -------- km

a) 150 million b)147 million c) 152 million d)154 million

13 -What is the degree of degeneracy for free particle in the three dimensional box when ($\ell^2+m^2+n^2=21$).

a) 3 b) 5 c) 8 d) 6

14- The two electrons present in an orbital are distinguished by

a) Principal quantum number b) Magnetic quantum number

c)Spin quantum number d) Azimuthal quantum number

15- Uncertainty principle

$\Delta x\, \Delta p \leq \hbar$ b)$\Delta p\, \Delta t \leq \lambda$ c)$\Delta E\, \Delta t \geq \pi$ d)$\Delta x\, \Delta t < \hbar$

16- If the time difference between the thunder and the lightning is 0.2sec. So, the distance between the observer and a cloud is .....

a)63m b)64m c)65m d)66m

17- If an apex angle of prism is 45° and the index of refraction is 1.6. So, the minimum deviation angle of prism (δ_m) is .....

a) 27° b) 28° c) 29° d) 30°

18- The optical path of light passing through 10cm of oil (n_{oil}=1.47) is .....

a) 14.9cm b) 14.8cm c) 14.7cm d) 14.6cm

19- The relation $n1 \sin \theta 1 = n2 \sin \theta 2$, which applies as a ray of light strikes an interface between two media, is known as:

a) Gauss' law b) Snell's law c) Faraday's law d) Law of sine's

20-Which of the following stars is hottest?

a) M star. b) F star. c) G star. d) O star.

21. A single disturbance that moves from point to point through a medium is called a .

a) period b) periodic wave c) wavelength d) pulse

22- Refracting telescopes always contain which one of the following?

a)mirrors b)lenses c)television systems d) film

23-Galaxies are classified as

a)Spiral b) Elliptical c) Irregular d) All of the Above

24- If the particles of the medium are vibrating to and fro in the same direction of energy transport, then the wave is a _____ wave.

a) longitudinal b) sound c) standing d) transverse

25- Main sequence stars obey a relation between

a)mass and luminosity. b)composition and surface temperature.

c)age and size. d) none of these

26-The power amplification needed for a practical radio receiver is of _____.

a)2-8 dB b) 10- 20 dB c) 80-100 dB.

27-Sunspots are dark because:

a)They are cool relative to the gas around them.

b) They contain 10 times as much iron as surrounding region.

c)Nuclear reactions occur in them more slowly than in the surrounding gas.

d) Clouds in the cool corona block our view of the hot photosphere

28-The study of the origin and evolution of the universe is known as:

a)tomography b) cystoscopy c) cryology d) cosmology

29- An emission line which has been shifted to a longer wavelength is said to be

a)Retrograde b)Red shifted c)Blue shifted d)Emission lines cannot be shifted

30- Most stars are composed of

a) about1/4 hydrogen and 3/4 helium. b) mostly iron in their core.

c) about 3/4 hydrogen and 1/4 helium. d) equal parts hydrogen and helium.

31- In a typical H-R diagram, stars are graphed by these two characteristics

a)Temperature and luminosity b) Luminosity and distance

c) Distance and temperature d) Size and distance

32- Under what condition dose the Winner filter becomes an inverse filter

a)SNR=0 b)SNR=∞ c)SNR=1

33- Which one of the following cannot be polarized?

a)radio waves b) ultraviolet rays c) X-rays d)sound waves

34- The resolving power of a telescope depends on the:

a)focal ratio b)diameter of the objective c) magnification d) focal length

35-In the lowest level of the photosphere of the sun , the temperature is:

a)$1000K^0$ b) $6000K^0$ C)$10000K^0$ D)$13000K^0$

36-Intergalactic gas in galaxy clusters emits large amounts of energy in the form of?

a)γ -Rays b)IR- Rays c)X-Rays

37-More than 90 percent of the mass in galaxy clusters exists in the form of?

a)Dark matter b)Dust c)Gas and dust

38- The sun is located in the _____ of the Milky Way.

a)Bulge b)Bar c) Halo d) Disk

39- Which planet can never be seen on the meridian at midnight?

a) Mars b) Venus c)Jupiter d)Saturn

40- If at a given time of year the night is 24 hours long at the North Pole. How many hours long is the night at the South Pole?

a)24 hours. b)12 hours. c)36 hours. d) There is no night then

41- The most accurate method to determine the distance to a nearby star is

a) radar ranging b)Hubble's law c)stellar parallax d)using Cepheid variables

42- If the following is a 3x3 window in an image:

1	3	2
2	2	3
5	3	4

the window's center value if using median filter is:

a)3 b) 5 c) 4 d)2

43- When you observe the Sun in the sky with your eyes, you are looking at the

a)corona. b) chromosphere. c) photosphere.

44- A satellite signal transmitted from a satellite transponder to earth's station.

a) Uplink b) Downlink c) Terrestrial d) Earthbound

45-.Point on the satellite orbits closest to the earth.

a) Perigee b)Apogee c) Prograde d) Zenith

46- the operation of a bolometer makes of the effect that the _____ of a material varies with the temperature.

a)Capacitance b) Resistance c) inductance

47- a best bolometer for radio astronomy having _____thermal time constant.

a) Long b) very long c) short

48- the brightness of an extended radio source is a

a)quantity similar to the surface brightness in UV astronomy

b) quantity similar to the surface brightness in infrared astronomy

c) quantity similar to the surface brightness in optical astronomy

49- GPS consists of

a)23 earth satellites b)24 earth satellites c)25 earth satellites d)26 earth satellites

50- Astronomers use interferometers to:

a)Observe extremely dim source.

b) Measure the speed of remote objects.

c)Detect radiation that otherwise cannot pass through our atmosphere.

d) Enhance the resolving power in source

51- Which of these is NOT a component of a radio telescope?

a)Antenna b) Amplifier c) Eye piece

52- Suppose that an image of size 64x64 with 96 gray levels has to be transmitted from place to another. The number of bytes will be required:

a) 28672 b)3584 c) 229376 d)5384

53- When neutron degeneracy fails in a high-mass star, it becomes a

a) white dwarf. b) black hole. c)pulsar. d) neutron star

54- One satellite covers longitude of earth up to

a)110° b)120° c)150° d)180°

55- Quasars

a) Are believed to be distant galaxies in which the light from an active nucleus completely swamps the light from its surroundings
b) Are believed to be powered by super-massive black holes.
c) Both A and B
d) Neither A or B

56- pulsar is actually a:

a) Black hole b) white dwarf c) red giant d) neutron star

57- The material between stars is

a) A nebula b) Dark matter c) The interstellar medium d) A vacuum

58- The names of the planets in order of their distance from the Sun are

a)Mercury, Venus, Earth, Jupiter, Mars, Neptune, Uranus, Saturn
b)Mercury, Venus, Earth, Mars, Saturn, Jupiter, Neptune, Uranus
c) Venus, Mercury, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
d) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

59- H-R diagram classifies stars according to

a)Visual magnitude and Spectral class
b) Absolute magnitude and Stellar mass
c) Stellar luminosity and Spectra class

60- The bands of the electromagnetic spectrum, in order of increasing photon energy (decreasing wavelength), are

a) radio, microwave, infrared, optical, ultraviolet, X-ray, gamma-ray
b) gamma-ray, X-ray, ultraviolet, optical, infrarcd, microwave, radio
c) radio, microwave, ultraviolet, optical, infrared, X-ray, gamma-ray
d) gamma-ray, X-ray, infrared, optical, ultraviolet, radio, microwave

Q2) Fill in the Blanks (40 Marks and each question 4 Marks)

1- Shape of milky way is.....

2-According to Bohr's atomic model angular momentum of electron in n^{th} orbit is equal to an integral multiple of.....

3 -What is the name of the star that is the brightest in the sky? .....

4-Comets revolve around :.....

5- The relation between frequency n, wavelength ,and velocity of a wave is .....

6- Most elliptical galaxies contain only.....stars

7- A sound wave traveling at 350 m/s has a frequency of 500 Hz. The wavelength is .....

8- The light-year is a unit of .....

9- Bolometer should respond with..... temperature step to a given power input.

10- LEO satellites are used in .....

Good Luck