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BSF HCM - RO (Radio Operator) 2019 (22-Sep-2019) Previous Year Paper

Total Time: 3 Hour

Total Marks: 200

Instructions

Sl No.	Section Name	No. of Question	Maximum Marks	Negative Marks	Positive Marks
1	Physics	40	80	0.5	2
2	Mathematics	20	40	0.5	2
3	Chemistry	20	40	0.5	2
4	English & GK	20	40	0.5	2

1.) A total of 180 minutes is allotted for the examination.

2.) The server will set your clock for you. In the top right corner of your screen, a countdown timer will display the remaining time for you to complete the exam. Once the timer reaches zero, the examination will end automatically. The paper need not be submitted when your timer reaches zero.

3.) There will, however, be sectional timing for this exam. You will have to complete each section within the specified time limit. Before moving on to the next section, you must complete the current one within the time limits.

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Physics

1. If the radius of the earth decreases by 1% and its mass remains same, then the acceleration due to gravity. (+2, -0.5)

   a. increase by 1%

   b. decrease by 1%

   c. increase by 2%

   d. decrease by 2%

---

2. A beam of monochromatic light is passing from one medium into another. Which one of the following quantities does not change? (+2, -0.5)

   a. Wavelength

   b. Frequency

   c. Velocity

   d. Amplitude

---

3. Lambert's law is related to (+2, -0.5)

   a. reflection

   b. illumination

   c. interference

   d. refraction

---

4. When light travels from one medium to another, total internal reflection does not occur in which of the following cases. (+2, -0.5)

   a. from glass to water.

   b. from glass to air.

   c. from water to air

   d. from water to glass

---

5. A person standing before a furnace receives most of the heat by (+2, -0.5)

   a. Convection

   b. Conduction

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c. Radiation

d. Conduction and convection

---

6. The resistance of a certain length of wire having a diameter of 6 mm is 5 ohm. The wire is drawn such that diameter becomes 3 mm. The new resistance will be (+2, -0.5)

a. 30 ohms

b. 5 ohms

c. 60 ohms

d. 80 ohms

---

7. Which one of the following pairs is **not** Correctly matched? (+2, -0.5)

a. Capacitances - Coloumb/volt

b. Electric potential - Volt

c. Coulomb force - Coulomb × voltmeter

d. Electric field - Volt/meter

---

8. What is the device that steps up or steps down the voltage? (+2, -0.5)

a. Dynamo

b. Conductor

c. Inductor

d. Transformer

---

9. An equilateral triangle has been constructed with a uniform wire whose resistance per unit length is $4\Omega\ cm^{-1}$. If the length of each side of the triangle is 10 cm, the resistance across any side will be (+2, -0.5)

a. $80/3\Omega$

b. $80/\Omega$

c. $40/\Omega$

d. $40/3\Omega$

---

10. When all the molecules in a magnet arrange themselves in the direction of the magnetic field, the condition is called (+2, -0.5)

a. Permeability

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b. Saturation

c. Retentivity

d. Reluctance

---

11. At the center of a bar, magnetism is **(+2, -0.5)**

a. maximum

b. minimum

c. zero

d. unknown

---

12. The largest voltage one can safely apply across a 50 ohm 0.5 W resistor is: **(+2, -0.5)**

a. 5 V

b. 25 V

c. 100 V

d. 0.01 V

---

13. Time taken by a 100 watt bulb to consume 5000 J of energy is **(+2, -0.5)**

a. 100 s

b. 500 s

c. 40 s

d. 50 s

---

14. The direction of electric current is always opposite to **(+2, -0.5)**

a. direction of conventional current in metallic conductors

b. one ohm

c. the electric work done

d. None of these

---

15. The space between the walls of a thermous flask is a vaccum in order to avoid heat exchange due to **(+2, -0.5)**

a. radiation

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b. convection

c. conduction

d. conduction and convention

---

16. Number of electric lines of force passing through unit area is called (+2, -0.5)

a. electric flux

b. density

c. electric field

d. None of these

---

17. To increase the range of an ammeter we need to connect a suitable (+2, -0.5)

a. low resistance in parallel

b. low resistance in series

c. high resistance in parallel

d. high resistance in series

---

18. A tuning fork vibrates with 2 vibrations in 0.4 seconds. Its frequency is (+2, -0.5)

a. 5

b. 6

c. 8

d. 2.5

---

19. A particle is undergoing simple harmonic motion with a period of 2 seconds and amplitude of 2 meters. Its maximum speed in ms^{-1} is (+2, -0.5)

a. 4π

b. 2π

c. $\pi/2$

d. π

---

20. An object executes simple harmonic motion with amplitude A. Its acceleration will be maximum when the displacement is (+2, -0.5)

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a. A/4

b. 0

c. A/2

d. A

---

21. Which among the following is a form of Energy **(+2, -0.5)**

a. Light

b. Pressure

c. Momentum

d. Power

---

22. One fermi meter is equal to **(+2, -0.5)**

a. 10^{-15} m

b. 10^{15} m

c. 10^{-12} m

d. 10^{12} m

---

23. Two masses of 1 kg and 4 kg have same Kinetic energy. What is the ratio of their momentum? **(+2, -0.5)**

a. $\frac{1}{2}$

b. $\frac{1}{4}$

c. 2

d. 4

---

24. If two forces of 5N each are acting along X and Y-axis then the magnitude and direction of resultant is **(+2, -0.5)**

a. $5\sqrt{2}, \pi/3$

b. $5\sqrt{2}, \pi/4$

c. $-5\sqrt{2}, \pi/3$

d. $-5\sqrt{2}, \pi/4$

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25. The vector product of force (F) and distance (r) from the centre of action represents: (+2, -0.5)

a. Kinetic Energy

b. Work

c. Potential energy

d. Torque

---

26. A body executing uniform circular motion has at any instant its velocity vector and acceleration vector (+2, -0.5)

a. along the same direction

b. opposite direction

c. normal to each other

d. not related to each other

---

27. The flying of bird is a consequence of Newton's (+2, -0.5)

a. First law

b. Second law

c. Third law of motion

d. Both (B) and (C)

---

28. A pendulum clock be taken from the earth to a revolving artificial satellite, it will: (+2, -0.5)

a. run slow

b. run fast

c. given the same time

d. stop altogether

---

29. A solid iron ball is heated. Which one of the following will have minimum percentage increase (+2, -0.5)

a. radius

b. surface area

c. volume

d. density

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30. An unpolarised beam is incident at an angle 60° on a glass surface and after reflection it is linearly polarised. The approximate refractive index of the glass is: (+2, -0.5)

a. 1.4

b. 1.5

c. 1.7

d. 1.6

---

31. Just before striking the ground, a 0.5 kg body had a kinetic energy of 980 J. if friction is ignored, from what height it was dropped. (+2, -0.5)

a. 980 m

b. 5.0 m

c. 200 m

d. 24.5 m

---

32. Decibel is (+2, -0.5)

a. a musical instrument

b. The wavelength of noise

c. A measure of sound level

d. A musical note

---

33. Red colour appears during sunrise and sunset because of (+2, -0.5)

a. Refraction

b. Dispersion

c. Scattering

d. Reflection

---

34. The scale of temperature in which the temperature is only positive is: (+2, -0.5)

a. Farenheit

b. Celcius

c. Kelvin

d. Reaumur

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35. A big drop of water is broken into smaller drops, the surface energy: (+2, -0.5)

a. increases

b. decreases

c. remain same

d. can increase as well as decrease

36. In absence of the earth's atmosphere, the sky will appear (+2, -0.5)

a. black

b. red

c. green

d. blue

37. The production of band spectra is caused by: (+2, -0.5)

a. Atomic Nuclei

b. Hot metals

c. Molecules

d. Electrons

38. In order to rectify an alternating current one uses a: (+2, -0.5)

a. Thermocouple

b. Diode

c. Triode

d. Transister

39. Sound waves are not transmitted to long distance because (+2, -0.5)

a. They are absorbed by atmosphere

b. They have constant frequency

c. The height of antenna required should be very high

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d. Velocity of sound waves is very less

---

40. Sparkling of diamond is due to: (+2, -0.5)

a. Reflection

b. Dispersion

c. Total Internal Reflection

d. High refractive index

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Mathematics

41. The number of possible outcomes, when a coin is tossed 6 times, is **(+2, -0.5)**

a. 36

b. 64

c. 12

d. None of these

---

42. In a ΔABC, if $\frac{\tan A - \tan B}{\tan A + \tan B} = \frac{c-b}{c}$, then A is equal to **(+2, -0.5)**

a. 30°

b. 45°

c. 60°

d. 90°

---

43. The principal value of $\sin^{-1}(-\sqrt{3}/2)$ is **(+2, -0.5)**

a. -2π/3

b. -π/3

c. 4π/3

d. 5π/3

---

44. $\cot\left[\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{8}\right] = ?$ **(+2, -0.5)**

a. 3/2

b. -1

c. $\sqrt{2}$

d. $-\sqrt{2}$

---

45. The mean of 18 observation is -7 and if each observation is increased by 3, the mean of the new set is **(+2, -0.5)**

a. 3

b. -3

c. -4

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d. 2

---

46. The arithmetic mean of 9 observations is 100 and that of 6 is 80, the combined mean of all the 15 observations will be **(+2, -0.5)**

a. 100

b. 80

c. 90

d. 92

---

47. The Minimum value of P = 6x + 16y subject to constraints x ≤ 40, y ≤ 20 and x, y ≥ 0 is **(+2, -0.5)**

a. 240

b. 320

c. 0

d. None of these

---

48. If $A = \begin{bmatrix} 1 & -5 & 7 \\ 0 & 7 & 9 \\ 11 & 8 & 9 \end{bmatrix}$, then trace of matrix A is **(+2, -0.5)**

a. 17

b. 25

c. 3

d. 12

---

49. If $f(x) = \log_{x^2} x$, then f'(x) at x = e, is **(+2, -0.5)**

a. 0

b. 1

c. 1/e

d. 1/(2e)

---

50. The normal to a given curve is parallel to x-axis if **(+2, -0.5)**

a. $\frac{dy}{dx} = 0$

b. $\frac{dy}{dx} = 1$

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c. $\frac{dx}{dy} = 0$

d. $\frac{dx}{dy} = 1$

---

51. The value of cosec (-750°) is **(+2, -0.5)**

a. -2

b. 2

c. -3

d. None of these

---

52. sin (π/10) sin (13π/10) = ? **(+2, -0.5)**

a. $\frac{1}{2}$

b. $-\frac{1}{2}$

c. $-\frac{1}{4}$

d. 1

---

53. If n is a +ve integer $4^n - 3n - 1$ is divisible by **(+2, -0.5)**

a. 3

b. 9

c. Both 3 & 9

d. None of the above

---

54. The distance of the point (x, y) from y-axis is **(+2, -0.5)**

a. x

b. y

c. |x|

d. |y|

---

55. The lines $x \cos \alpha + y \sin \alpha = p_1$ and $x \cos \beta + y \sin \beta = p_2$ will be perpendicular if **(+2, -0.5)**

a. $\alpha = \beta$

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b. $|\alpha - \beta| = \frac{\pi}{2}$

c. $\alpha = \frac{\pi}{2}$

d. $\alpha \pm \beta = \frac{\pi}{2}$

---

56. The circle $x^2 + y^2 + 4x - 7y + 12 = 0$ cuts an intercept on y-axis of length **(+2, -0.5)**

a. 3

b. 4

c. 7

d. 1

---

57. The length of the chord cut off by y = 2x + 1 from the circle $x^2 + y^2 = 2$ is **(+2, -0.5)**

a. $\frac{5}{6}$

b. $\frac{6}{5}$

c. $\frac{6}{\sqrt{5}}$

d. $\frac{\sqrt{5}}{6}$

---

58. Equation of the circle with centre on the y-axis and passing through the origin and (2, 3) is **(+2, -0.5)**

a. $x^2 + y^2 + 13y = 0$

b. $3x^2 + 3y^2 - 13y = 0$

c. $x^2 + y^2 + 13y + 3 = 0$

d. $6x^2 + 6y^2 - 13y = 0$

---

59. If the roots of the equation $ax^2 + bx + c = 0$ are reciprocal to each other, then **(+2, -0.5)**

a. a + c = 0

b. b = 0

c. a - c = 0

d. None of these

---

60. If a, b, c, d are in HP, then **(+2, -0.5)**

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a. $a + b > c + d$

b. $a + c > b + d$

c. $a + d > b + c$

d. None of these

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61. If a U-238 nucleus splits into two identical parts, the two nuclei so produced will be **(+2, -0.5)**

a. radioactive

b. stable

c. Isotope

d. Isobar

---

62. Hydrogen will not reduce heated **(+2, -0.5)**

a. CuO

b. Fe_2O_3

c. Al_2O_3

d. SnO_2

---

63. Aluminium surface are often 'anodized'. This means the deposition of a layer of **(+2, -0.5)**

a. chromium oxide

b. aluminium oxide

c. nickel oxide

d. zinc oxide

---

64. The most likely pH of an aqueous solution of sodium salt and ethyl alcohol is **(+2, -0.5)**

a. 3

b. 5

c. 7

d. 9

---

65. An element M has a atomic mass 19 and atomic number 9. Its ion is represented as **(+2, -0.5)**

a. M^+

b. M^{2+}

c. M^-

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d. M^{2-}

66. Which one of the following is the oxidation state of oxygen in OF_2 ? (+2, -0.5)

a. +2

b. -2

c. +1

d. -1

67. Which of the following substances can be used for identifying an acid solution? (+2, -0.5)

a. NaCl

b. KNO_3

c. Na_2CO_3

d. K_2SO_4

68. By which process Ethane can be obtained from Hexane? (+2, -0.5)

a. Addition

b. Cracking

c. Substitution

d. Polymerisation

69. Benzene reacts with chlorine in the presence of an iron catalyst to produce (+2, -0.5)

a. benzene hexachloride

b. benzyl chloride

c. chlorobenzene

d. benzoyl chloride

70. Which one of the following sets of chemical elements belongs to the same period? (+2, -0.5)

a. He, Ne, Ar

b. Ni, Cu, Zn

c. Cl, Br, I

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d. Na, Cu, Mg

---

71. Which of the following metals does not form amalgams? (+2, -0.5)

a. Zinc

b. Copper

c. Magnesium

d. Iron

---

72. Which of the following notation represents an isotope? (+2, -0.5)

a. $^{39}K_{19}$

b. $^{23}Na_{11}$

c. $^{14}N_{7}$

d. $^{14}C_{6}$

---

73. The ratio in the weight by which carbon and oxygen combine in a molecule of carbon monoxide is (+2, -0.5)

a. 3 : 4

b. 3 : 3

c. 3 : 2

d. 3 : 1

---

74. Equal volumes of all gases under the same temperature and pressure contain equal number of molecules, according to (+2, -0.5)

a. Avogadro's law

b. Charle's law

c. Boyle's law

d. Graham's law

---

75. The major portion of combustible part of gobar gas is (+2, -0.5)

a. Methane

b. Ethane

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c. Ethylene

d. Acetylene

---

76. Regarding the atom of a chemical element, the magnetic quantum number refers to (+2, -0.5)

a. orientation

b. shape

c. size

d. spin

---

77. The presence of which one of the following in the atmosphere causes acid rain? (+2, -0.5)

a. Oxides of lead

b. Oxides of carbon

c. Oxides of sulphur

d. Hydrocarbon

---

78. The stones formed in human kidney consist mostly of (+2, -0.5)

a. calcium oxalate

b. sodium acetate

c. magnesium sulphate

d. calcium

---

79. Most of the explosions in mines occur due to the mixing of (+2, -0.5)

a. Hydrogen with oxygen

b. Oxygen with acetylene

c. Methane with air

d. Carbon dioxide with ethane

---

80. Which one of the following materials is very hard and very ductile? (+2, -0.5)

a. Carborundum

b. Tungsten

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c. Cast iron

d. Nichrome

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English & GK

81. Directions:**Read the sentences carefully and choose suitable prepositions for the purpose.** **(+2, -0.5)**

She is proud _ _ _ _ _ _ her beauty.

a. at

b. on

c. of

d. about

---

82. Directions:**Read the sentences carefully and choose suitable prepositions for the purpose.** **(+2, -0.5)**

They have invited us _ _ _ _ _ _ attend the function.

a. for

b. to

c. upto

d. at

---

83. Directions:**Read the sentence carefully and choose suitable preposition for the purpose.** **(+2, -0.5)**

We offer the heartiest congratulation _ _ _ _ _ your success.

a. at

b. on

c. upon

d. for

---

84. Directions:**Read the sentence carefully and choose suitable preposition for the purpose.** **(+2, -0.5)**

He entered _ _ _ _ _ _ the gate without any difficulty

a. through

b. from

c. in

d. into

---

85. Directions:**Read the sentences carefully and choose suitable prepositions for the purpose.** **(+2, -0.5)**

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This usually tends _ _ _ _ _ _ crumble in the face of the smallest challenge.

a. for

b. to

c. upto

d. at

---

86. **Directions: Write Synonym of the word given in CAPITAL letters.** **(+2, -0.5)**

BELITTLE

a. disparage

b. mock

c. diminish

d. shrink

---

87. Direction: In the following question, out of the four alternatives, select the word similar in meaning to the given word. **(+2, -0.5)**

WEIRD

a. Unnatural

b. Supernatural

c. Hastily

d. Ghost

---

88. Directions: **Write Synonyms of words given in CAPITAL letters.** **(+2, -0.5)**

REMEDY

a. treatment

b. Aggravate

c. redress

d. restorative

---

89. Select the most appropriate synonym of the given word. **(+2, -0.5)**

DAMSEL

a. spinster

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b. maiden

c. bitch

d. witch

---

90. Directions: **Write Synonyms of words given in CAPITAL letters.** (+2, -0.5)

VAGABOND

a. wanderer

b. beggar

c. tramper

d. traveller

---

91. Among the following, which was the capital of Raja Ranjit Singh's kingdom? (+2, -0.5)

a. Amritsar

b. Peshawar

c. Lahore

d. Multan

---

92. The Pallavas built Temples at which of the following places? (+2, -0.5)

a. Seringapatnam

b. Madurai

c. Mahabalipuram

d. Halebid

---

93. The brightest planet seen from the Earth (+2, -0.5)

a. Pluto

b. Saturn

c. Neptune

d. Venus

---

94. The longest river in the world is the (+2, -0.5)

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a. Nile

b. Amazon

c. Brahmaputra

d. Congo

---

95. A solar eclipse occurs when **(+2, -0.5)**

a. the moon comes between the sun and the earth

b. the earth comes between the sun and the moon

c. the sun comes between the earth and the moon

d. the sun, the moon and the earth are not in the same line

---

96. After a shower of rain, a rainbow is seen **(+2, -0.5)**

a. towards the sun

b. opposite to the sun

c. anywhere, irrespective of the position of the sun

d. even in the absence of the sun

---

97. Who is the Vice Chairman of Niti Ayog? **(+2, -0.5)**

a. Shri Suman Bery

b. Dr. Arvind Pangaria

c. N K. Singh

d. None of these

---

98. In which of the following states river Ganga does **not flow** ? **(+2, -0.5)**

a. Bihar

b. Chattisgarh

c. West Bengal

d. Jharkhand

---

99. Who won the Women World Badminton Championship-2019? **(+2, -0.5)**

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a. Saina Nehwal

b. Nozomi Okuhara

c. P V Sindhu

d. None of these

---

100. On 150 th anniversary of Mahatma Gandhi, which movement is to start? **(+2, -0.5)**

a. No tree felling

b. No smoking

c. No plastic use

d. No diesel car

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