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BSF HCM - RM (Radio Mechanic) 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. The torque in induction watt meters is due to **(+2, -0.5)**

   a. Capacitive current

   b. electrostatic effect

   c. hall effect

   d. eddy currents

---

2. Two resistance are: $R_1 = 36\ \Omega \pm 1.89\ \Omega$ and $R_2 = 75\ \Omega \pm 3.75\ \Omega$. The sum $R_1 + R_2$ along with limiting error is **(+2, -0.5)**

   a. $111\ \Omega \pm 1.8\ \Omega$

   b. $111\ \Omega \pm 3.75\ \Omega$

   c. $111 \pm 5.64\ \Omega$

   d. $111\ \Omega \pm 1.95\ \Omega$

---

3. The resistance in the circuit of the moving coil of a dynamometer wattmeter should be **(+2, -0.5)**

   a. very low

   b. low

   c. high

   d. almost zero

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4. The current measured by an ammeter connected in an a.c. circuit is 20 A, the value of maximum current is **(+2, -0.5)**

a. $10\sqrt{2}$ A

b. $10/\sqrt{2}$ A

c. $20\sqrt{2}$ A

d. 20 × 1.11 A

---

5. Thermocouple meter can be used to measure **(+2, -0.5)**

a. D.C only

b. A.C only

c. Both A.C and D.C

d. None of these

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6. Angle between the viscous force and the direction of flow of the liquid is: **(+2, -0.5)**

a. $\pi/2$

b. $\pi/4$

c. π

d. zero

---

7. Clouds float in the air, because of: **(+2, -0.5)**

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a. low viscosity

b. high viscosity

c. low density

d. high density

---

8. Which of the following is not thermo dynamical function: (+2, -0.5)

a. Enthalpy

b. Work done

c. Gibb's energy

d. Internal energy

---

9. In which process, the rate of transfer of heat is maximum: (+2, -0.5)

a. conduction

b. convection

c. Radiation

d. In all, heat is transferred with the same speed

---

10. A cycle tire bursts suddenly. This represents an: (+2, -0.5)

a. Isothermal process

b. Isobaric process

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c. Isochoric process

d. Adiabatic process

---

11. A sample of gas at 0°C. To what temperature must it be raised in order to double the r.m.s speed of molecules: **(+2, -0.5)**

a. 273°C

b. 1092°C

c. 819°C

d. 100°C

---

12. What will be the magnification when the object is placed at 2f from the pole of convex mirror **(+2, -0.5)**

a. +1/3

b. +2/3

c. +1

d. 3/2

---

13. A well cut diamond appears bright because: **(+2, -0.5)**

a. it emit light

b. of large density

c. of total internal reflection

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d. it is crystal

---

14. The focal length of convex lens is 50 cm what is its power **(+2, -0.5)**

a. + 50D

b. -50D

c. -2 D

d. +2 D

---

15. Which of the following properties of the sound waves are affected by changing temperature **(+2, -0.5)**

a. Wave length

b. Frequency

c. Amplitude

d. Intensity

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---

16. One decibel is equal to **(+2, -0.5)**

a. $\frac{1}{10}\text{bel}$

b. 10 bel

c. $\frac{9}{10}\text{bel}$

d. $\frac{1}{9}\text{bel}$

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17. The frequency of S.H.M is 100 Hz. Its time period is **(+2, -0.5)**

a. 100 sec

b. 1 sec

c. 0.1 sec

d. 0.01 sec

---

18. An echo is heard due to the **(+2, -0.5)**

a. reflection of sound waves

b. refraction of sound waves

c. interference of sound waves

d. resonance

---

19. Radio carbon dating technique is used to estimate the age of **(+2, -0.5)**

a. rocks

b. soil

c. fossils

d. buildings

---

20. Enriched uranium means uranium that has been enriched in isotope **(+2, -0.5)**

a. uranium-233

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b. uranium-235

c. uranium-238

d. uranium-239

---

21. The Young's modulus of a rod of length L and radius R is Y. The rod is cut into two parts of equal length L/2, then Young's modulus of each part will be **(+2, -0.5)**

a. Y

b. Y/2

c. Y/4

d. 4Y

---

22. The Poission ratio of a material is 0.5. If the longitudinal stress in its uniform rod is 2×10^{-3}, the percentage change in its volume is **(+2, -0.5)**

a. 0.6

b. 0.4

c. 0.2

d. Zero

---

23. A man of 25 kg weight climbs 25 stairs in 20 seconds. If the height of each stair is 40 cm, find the power ($g = 10\ m/s^2$) **(+2, -0.5)**

a. 125 watt

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b. 25 watt

c. 5 watt

d. 100 watt

---

24. If a machine works with the rate of 10 Joule/s then its power will be **(+2, -0.5)**

a. 10 watt

b. 20 watt

c. 60 watt

d. 1 watt

---

25. A ball falls from a height of a 20 m, and then bounces back up to 10 m height. The loss of energy is **(+2, -0.5)**

a. 5%

b. 25%

c. 50%

d. 75%

---

26. The first law of thermodynamics is based on the law of conservation of **(+2, -0.5)**

a. energy

b. mass

c. momentum

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d. None of these

---

27. For 100% efficiency of a Carnot engine the temperature of the source should be **(+2, -0.5)**

a. -273°C

b. 0°C

c. 273°C

d. Infinite

---

28. Which of the following state of the matter have two specific heats? **(+2, -0.5)**

a. solid

b. gas

c. liquid

d. None of these

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29. In international standard system the unit of frequency is **(+2, -0.5)**

a. cm/sec

b. number of cycles/min

c. Hertz

d. meter/sec ^{2}

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30. The kinetic energy possessed by the body is due to its **(+2, -0.5)**

a. position

b. motion

c. reaction

d. None of these

---

31. A capacitor (condenser) is used in an electrical circuit to **(+2, -0.5)**

a. step down voltage

b. step up voltage

c. store electric charge

d. produce electric charge

---

32. Which of the following does not rely on the magnetic effect of current for its working **(+2, -0.5)**

a. fan

b. telephone receiver

c. carbon microphone

d. dynamo

---

33. Which of the following devices convert electrical energy into mechanical energy? **(+2, -0.5)**

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a. dynamo

b. transformer

c. electric motor

d. inductor

---

34. A transformer is a device for **(+2, -0.5)**

a. stepping up (or down) dc voltage

b. generating electricity

c. stepping up (or down) ac voltage

d. converting ac into dc

---

35. 12 V battery has how many plates **(+2, -0.5)**

a. 15, 17, 19, 27

b. 27, 28, 29, 30

c. 7, 9, 11, 17

d. 30, 31, 32, 33

---

36. In an AC circuit, SCR works like a _____ **(+2, -0.5)**

a. transistor

b. alternator

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c. full wave rectifier

d. half wave rectifier

---

37. The Resonance circuits are used in **(+2, -0.5)**

a. rectifiers

b. amplifiers

c. oscillators

d. both amplifiers and oscillators

---

38. The dimensions of EMF are **(+2, -0.5)**

a. $ML^{2}T^{-3}A^{-1}$

b. $ML^{2}T^{2}A^{3}$

c. $M^{-1}T^{3}$

d. $ML^{3}T^{1}A^{3}$

---

39. Magnetic field intensity has the dimensions **(+2, -0.5)**

a. IL

b. $I^{2}L$

c. IL^{-1}

d. IL^{-2}

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40. The current in a circuit is measured using a 150 : 1 CT If the ammeter reads 0.6 A, the circuit current is **(+2, -0.5)**

a. 250 A

b. 90 A

c. 156 A

d. 144 A

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Mathematics

41. In n(A) = 20, n(B) = 35 and n(A ∪ B) = 45, then n (A ∩ B) equals **(+2, -0.5)**

a. 10

b. 15

c. 0

d. None of these

---

42. Value of $\left(\frac{x^4}{x^3}\right)^{3/4}$ is **(+2, -0.5)**

a. x

b. $x^{25/12}$

c. x^{0}

d. $x^{3/4}$

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43. The roots of the equations $x^2 + 2x - 35 = 0$ are **(+2, -0.5)**

a. -5 and -7

b. 5 and 7

c. -5 and 7

d. 5 and -7

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44. At the centre of a circle of 10 cm radius, the angle made by an arc of $12\frac{2}{9}$ cm length is **(+2, -0.5)**

a. 60°

b. 65°

c. 70°

d. 75°

---

45. In which of the following cases, a triangle can not be formed with the given length of side? **(+2, -0.5)**

a. 4, 5, 6

b. 5, 8, 12

c. 10, 12, 15

d. 5, 9, 17

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46. The square root of $(3+2\sqrt{2})$ is **(+2, -0.5)**

a. $(\sqrt{3}+\sqrt{8})$

b. $(\sqrt{3}+\sqrt{2})$

c. $(1+\sqrt{2})$

d. $(\sqrt{2}+\sqrt{6})$

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47. A clock rings 12 times in 33 seconds, then in how many seconds it will ring 6 times? **(+2, -0.5)**

a. $\frac{33}{2}$

b. 15

c. 12

d. 22

---

48. For which value of k, there is no solution to the equations - **(+2, -0.5)**

$x - y = 5$

$kx - 4y = 1$

a. 4

b. 2

c. 5

d. Zero

---

49. If ΔABC and ΔDEF are similar and $\angle A = 47°$, $\angle E = 83°$, then $\angle C$ is **(+2, -0.5)**

a. 80°

b. 83°

c. 47°

d. 50°

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50. What is the length of longest rod which can be kept in a room whose length is 30 ft, breadth 24 ft and height 18 ft? **(+2, -0.5)**

a. 25 ft

b. 30 ft

c. 42.66 ft

d. 40 ft

---

51. If $\tan\theta = \frac{4}{3}$ then $\left(\frac{2\sin\theta - 3\cos\theta}{2\sin\theta + 3\cos\theta}\right) = ?$ **(+2, -0.5)**

a. 0

b. -1

c. $-\frac{1}{7}$

d. $-\frac{1}{17}$

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52. For which θ value $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$? **(+2, -0.5)**

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

b. $\frac{\pi}{3}$

c. $\frac{\pi}{4}$

d. $\frac{\pi}{6}$

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53. The value of (1 + cot θ - cosec θ) (1 + tan θ + sec θ) **(+2, -0.5)**

a. 0

b. 1

c. 2

d. 3

---

54. The solution of 3 tan θ + cot θ = cosec θ is - **(+2, -0.5)**

a. $\theta = \frac{\pi}{6}$

b. $\theta = \frac{\pi}{4}$

c. $\theta = \frac{\pi}{3}$

d. θ = 0°

---

55. When $0° \leq \theta \leq 90°$, then solution of $2\cos^2\theta + \sin\theta - 2 = 0$ is **(+2, -0.5)**

a. θ = 30°

b. θ = 60° or 45°

c. θ = 45° or 90°

d. θ = 60° or 90°

---

56. The L.C.M. of $x^2 - 2x - 3$ and $x^3 + x^2 + x + 1$ is **(+2, -0.5)**

a. $(x + 1)(x - 3)(x^2 + 1)$

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b. $(x^2 + 1)(x + 4)$

c. $(x - 1)(x + 3)(x^2 + 1)$

d. $(x^2 + 3)(x - 1)$

---

57. The median of the following distribution is: **(+2, -0.5)**

x	8	5	6	10	9	4	7
f	6	4	5	8	9	6	4

a. 5

b. 7

c. 8

d. 9

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---

58. In the following distribution whose mean is 50, find the missing frequency p : **(+2, -0.5)**

x	10	30	50	70	90
f	17	p	32	24	19

a. 25

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b. 26

c. 27

d. 28

---

59. The ascending order of $\sqrt{2}, \sqrt[3]{4}$ and $\sqrt[4]{6}$ is - **(+2, -0.5)**

a. $\sqrt{2}, \sqrt[3]{4}, \sqrt[4]{6}$

b. $\sqrt[4]{6}, \sqrt[3]{4}, \sqrt{2}$

c. $\sqrt[4]{6}, \sqrt{2}, \sqrt[3]{4}$

d. $\sqrt{2}, \sqrt[4]{6}, \sqrt[3]{4}$

---

60. If α, β are the roots of the equation $x^2 + px + q = 0$, then the value of $\alpha^2 + \beta^2$ **(+2, -0.5)**

a. $p^2 + 2q$

b. $p^2 - 2q$

c. $p(p^2 - 3q)$

d. $p^2 - 4q$

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Chemistry

61. Chemical formula of plaster of paris: **(+2, -0.5)**

a. $CaSO_4$

b. $CaSO_4.2H_2O$

c. $CaSO_4.1/2\ H_2O$

d. $CaSO_4.H_2O$

---

62. In water molecule oxygen is **(+2, -0.5)**

a. sp-hybridized

b. sp^2-hybridized

c. sp^3-hybridized

d. Not hybridized

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---

63. Silver nitrate solution is kept in brown bottle in lab. Because **(+2, -0.5)**

a. It reacts with ordinary bottles

b. Brown bottle cuts the passage of light through it

c. Ordinary bottle retards its decomposition

d. Brown bottle does not react with it.

---

64. The reagent with which both aldehydes & ketones can react easily **(+2, -0.5)**

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a. Fehling reagent

b. Grignard's reagent

c. Schiff's reagent

d. Tollen's reagent

---

65. Rate constant of a reaction depends on **(+2, -0.5)**

a. Initial concentration of reactants

b. Time of reaction

c. Extent of reaction

d. Temperature

---

66. The atomic orbital is **(+2, -0.5)**

a. The circular path of electron

b. Elliptical shaped orbit

c. Three dimensional field around the nucleus

d. The region in which there is maximum probability of finding electron

---

67. How many electrons are there in the last orbit of Chlorine? **(+2, -0.5)**

a. 7

b. 1

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c. 2

d. 4

---

68. The number of elements in the third period of the Periodic Table: **(+2, -0.5)**

a. 18

b. 8

c. 32

d. 2

---

69. While going up in a Group of Periodic Table, the metallic quality **(+2, -0.5)**

a. increases

b. remains the same

c. decreases

d. first increases then decreases

---

70. In the n^{th} orbit of an atom the maximum number of electron is **(+2, -0.5)**

a. n^2

b. $2n^2$

c. n + 2

d. n - 2

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71. Bauxite is ore of (+2, -0.5)

a. Iron

b. Aluminium

c. Silver

d. Zinc

---

72. Which of the following will not give Iodoform test? (+2, -0.5)

a. Acetone

b. Diethyl ketone

c. Ethyl alcohol

d. 2-Pentanol

---

73. Reduction of Ketones by Zn-Hg/HCl is called (+2, -0.5)

a. Wolff-Kishner reduction

b. Rosenmund's reduction

c. Stephen's reduction

d. Clemmensen's reduction

---

74. Which one of the following will not give a red precipitate of Cu_2O when heated with Benedict's solution? (+2, -0.5)

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a. Sucrose

b. Fructose

c. Glucose

d. Maltose

---

75. Which of the following alloys contains chromium? **(+2, -0.5)**

a. Steel

b. Stainless steel

c. Maganalium

d. Brass

---

76. The ion with the strongest polarizing capacity is: **(+2, -0.5)**

a. Ba^{2+}

b. Cs^{-}

c. Ca^{2+}

d. Li^{+}

---

77. The strength of "10 volume H_2O_2" is **(+2, -0.5)**

a. 3%

b. 6%

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c. 9%

d. 12%

---

78. Which of the following is a Lewis acid: **(+2, -0.5)**

a. BF_3

b. B

c. PH_3

d. CO

---

79. The electron affinity of the following elements decreases in the order **(+2, -0.5)**

a. F, Cl, Br, I

b. Cl, F, Br, I

c. I, Br, Cl, F

d. Cl, F, I, Br

---

80. Which one of the following is inter halogen: **(+2, -0.5)**

a. $(CN)_2$

b. KI

c. Br_2

d. ICl

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English & GK

81. **In the Questions below each sentence consists of a word or a phrase which is underlined . The given sentence is followed by four words or phrases. Choose the word nearest in meaning to the underlined part.** **(+2, -0.5)**

Timely first aid resuscitated the patient.

a. soothed

b. revived

c. rescued

d. cured

---

82. **In the Questions below each sentence consists of a word or a phrase which is underlined . The given sentence is followed by four words or phrases. Choose the word nearest in meaning to the underlined part.** **(+2, -0.5)**

His rustic speech and clothes led us to think of him as an ignorant villager.

a. unsophisticated

b. strange

c. old-fashioned

d. unconventional

---

83. **In the Questions below each sentence consists of a word or a phrase which is underlined . The given sentence is followed by four words or phrases. Choose the word nearest in meaning to the underlined part.** **(+2, -0.5)**

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The unprecedented drought in several parts of the country this year led to the onset of various diseases.

a. assault

b. attack

c. outbreak

d. onslaught

---

84. In the Questions below each sentence consists of a word or a phrase which is underlined. The given sentence is followed by four words or phrases. Choose the word nearest in meaning to the underlined part. **(+2, -0.5)**

The thief's shifty eyes betrayed his guilt.

a. wily

b. deceitful

c. slippery

d. crafty

---

85. In the Questions below each sentence consists of a word or a phrase which is underlined. The given sentence is followed by four words or phrases. Choose the word nearest in meaning to the underlined part. **(+2, -0.5)**

His ragged clothes effectively hide the opulent life he leads at home.

a. rich

b. hard-working

c. comfortable

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d. obscure

---

86. In the following Questions choose the one which is most appropriate so that the sentence not only makes sense but is grammatically correct. **(+2, -0.5)**

The good is _____with the bones.

a. buried

b. entered

c. cover

d. fleshed

---

87. In the following Questions choose the one which is most appropriate so that the sentence not only makes sense but is grammatically correct. **(+2, -0.5)**

Dowry is no longer permitted by law even in_____ marriages

a. love

b. bigamous

c. polygamous

d. conventional

---

88. In the following Questions choose the one which is most appropriate so that the sentence not only makes sense but is grammatically correct. **(+2, -0.5)**

When he left after the cocktail party, he was as _____as a judge.

a. sober

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b. drunk

c. wise

d. boring

---

89. **In the following Questions choose the one which is most appropriate so that the sentence not only makes sense but is grammatically correct.** **(+2, -0.5)**

The prisoner was released on _____ of good behaviour.

a. bail

b. parole

c. guarantee

d. ground

---

90. **In the following Questions choose the one which is most appropriate so that the sentence not only makes sense but is grammatically correct.** **(+2, -0.5)**

"Boswell's Life" of Samuel Johnson is considered to be the greatest _____ ever written.

a. novel

b. essay

c. Autobiography

d. biography

---

91. Who took away the peacock throne built by Shahjahan, from India? **(+2, -0.5)**

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a. Ahmad Shah Abdali

b. Zaman Shah

c. Nadir Shah

d. Shah Suja

---

92. The reign of which dynasty is regarded as the 'golden age' of south India? (+2, -0.5)

a. Pandyas

b. Pallavas

c. Cholas

d. Vijayanagar

---

93. Which of the following oceans in the smallest in area (+2, -0.5)

a. The Indian

b. The Pacific

c. The Arctic

d. The Atlantic

---

94. Which zone of the atmosphere makes radio transmission possible? (+2, -0.5)

a. Troposphere

b. Stratosphere

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c. Ionosphere

d. Exosphere

---

95. The primary substance used for vulcanizing rubber is **(+2, -0.5)**

a. Ammonium hydroxide

b. Isoprene

c. Zinc oxide

d. Sulphur

---

96. Soil is eroded by **(+2, -0.5)**

a. Water

b. Wind and water

c. Water, wind, ocean waves and glaciers

d. None of the above

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97. Who is the External Affairs Minister of India? **(+2, -0.5)**

a. Gen V K Singh

b. M J Akbar

c. S Jaishankar

d. None of these

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98. Which among the following states does ***not*** have sea on its border? **(+2, -0.5)**

a. Odisha

b. Telangana

c. West Bengal

d. Gujarat

---

99. Hima Das is a **(+2, -0.5)**

a. Shooter

b. Swimmer

c. Sprinter

d. Weight lifter

---

100. Which Award was awarded to Wing Commander Abhinandan Varthaman? **(+2, -0.5)**

a. Veer Chakra

b. Param Veer Chakra

c. Kirti Chakra

d. None of these

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