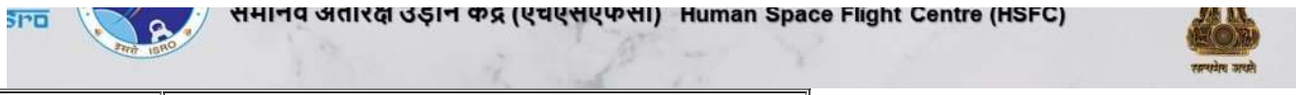
HSFC
Scientist

Previous Year Paper
(IE)
02 Jan, 2025

Adda247 GET IT ON Google Play



Test Date	02/01/2025
Test Time	9:00 AM - 11:15 AM
Subject	Scientist Engineer(Instrumentation Engineering)

Section : **Discipline Specific Part**

Q.1

1. $|H(j\omega)| = 1/\sqrt{(1+ j\omega)^{2N}}$
2. $|H(j\omega)| = 1/\sqrt{(1+ j\omega)^{N}}$
3. $|H(j\omega)| = 1/\sqrt{(1+ \omega)^{2N}}$
4. $|H(j\omega)| = 1/\sqrt{(1+ j\omega)^{2N}}$

Ans 1. A

2. B

3. C

4. D

Adda247

Test Prime

ALL EXAMS, ONE SUBSCRIPTION

80,000+ Mock Tests

Personalised Report Card

Unlimited Re-Attempt

600+ Exam Covered

20,000+ Previous Year Papers

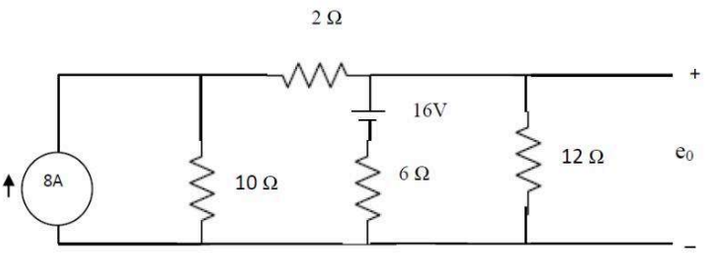
500% Refund

IBPS · NABARD · INDIAN RAILWAYS

ATTEMPT FREE MOCK NOW

Q.2

Voltage e_0 in the figure is



. 48 V

. 24 V

. 36 V

. 28 V

Ans 1. A

2. B

3. C

4. D

Question ID : **8199733939**
Option 1 ID : **81997315153**
Option 2 ID : **81997315154**
Option 3 ID : **81997315155**
Option 4 ID : **81997315156**
Status : **Answered**
Chosen Option : **3**

Q.3

ohm. What should be the minimum permissible insulation resistance
veen the terminals so that the measured resistance is within 0.1% the
ked value?

. 1000Mohm

. 1Mohm

. 10Mohm

. 100Mohm

Ans 1. A

2. B

3. C

4. D

Q.4

omes low indicating that the data is present at the port latch:

. $\overline{WR}$

. $\overline{DS}$

. $\overline{OBF}$

. $\overline{IBF}$

Ans 1. A

2. B

3. C

4. D

Q.5

wing statements is true?

A. The linear momentum of the system is conserved

B. The total torque on the system is zero

C. All the particles will be at rest, or in uniform motion.

D. The total angular momentum will be constant.

Ans 1. A

2. B

3. C

4. D

Q.6

A. Internal capacitance of the device

B. External capacitance of the device

C. Coupling capacitance

D. By pass capacitance

Ans 1. A

2. B

3. C

4. D

Q.7

. U-tube manometer

. Well type manometer

. Limp diaphragm

. Bourdon tube

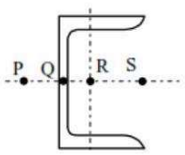
Ans 1. A

2. B

3. C

4. D

Q.8



A. P

B. Q

C. R.

D. S

Ans 1. A

2. B

3. C

4. D

Q.9

. 8 mV

. 6.25 mV

. 20 mV

. 3 mV

Ans 1. A

2. B

3. C

4. D

Q.10

. Pulled down

. Pulled up

. Tristated

. None of the above

Ans 1. A

2. B

3. C

4. D

Q.11

the set of real numbers is

. 4

. 3

. 1

. 2

Ans 1. A

2. B

3. C

4. D

Q.12

pressed in a reversible polytropic process to a final state of 800 kPa,

C. Assume the heat transfer is with the ambient at 25 °C . Find the heat

sfer for the process. Molecular weight of air is 29 gm/mole.

A. 5.32 kJ into the system

B. 5.32 kJ into the surroundings

C. 16.3. kJ into the system

D. 16.3 kJ into the surroundings

Ans 1. A

2. B

3. C

4. D

Q.13

uency of 50kHz is applied across a 20nF capacitor. Calculate the RMS
e of the current through the element.

A. 400mA

B. 800mA

C. 200mA

D. 1600mA

Ans 1. A

2. B

3. C

4. D

Q.14

uency of 4.5 kHz. In a vibration test at 110 Hz, a reading of 5.6V peak
lts. The peak vibration table displacement is:

. +3.2 cm

. -1.1 cm

. +1.1 cm

. -7.84 cm

Ans 1. A

2. B

3. C

4. D

Adda247 GET IT ON Google Play

Q.15

of the CRO is synchronised with the movement?

. Vertical deflection potential

. Time base

. Brightness control

. Filament storage

Ans 1. A

2. B

3. C

4. D

Q.16

ıre of side x units and a circle of radius r units. If the sum of the areas of

;quare and circle so formed is min, then

. r =2x

. x = r

. x = 2r

. 2x =π+r

Ans 1. A

2. B

3. C

4. D

Q.17

A. $t_r = 0.35 / f_{3db}$

B. $t_r = 0.25 / f_{3db}$

C. $t_r = \sqrt{2} / f_{3db}$

D. $t_r = 1 / (f_{3db} \sqrt{2})$

Ans 1. A

2. B

3. C

4. D

Q.18

. All the Eigen values are negative

. All the Eigen values are positive

. All but one Eigen values are negative and one Eigen value is positive

. All but one Eigen values are positive and one Eigen value is negative

Ans 1. A

2. B

3. C

4. D

Q.19

A. Formation of chromium carbides in grain boundaries

B. Diffusion of chromium into grain boundaries

C. Material adjacent to grain boundaries becomes low alloy steel

D. Formation of nickel carbides at grain boundaries

Ans 1. A

2. B

3. C

4. D

Q.20

. 6B16

. 5B16

. 5A16

. none of the above

Ans 1. A

2. B

3. C

4. D

Q.21

) Quick Return Mechanism	(A1) in 3D Printer
) Carriage and apron mechanism	(A2) in Shaper
) Automatic Tool Changer (ATC)	(A3) in Lathe
) Filament extruder	(A4) in CNC Milling machine

A. 1-A1, 2-A2, 3-A3, 4-A4

B. 1-A2, 2-A3, 3-A4, 4-A1

C. 1-A4, 2-A1, 3-A3, 4-A2

D. 1-A4, 2-A3, 3-A2, 4-A1

Ans 1. A

2. B

3. C

4. D

Q.22

A. An accelerated charge

B. A dc current carrying wire

C. A permanent magnet

D. An electric field changing in time linearly

Ans 1. A

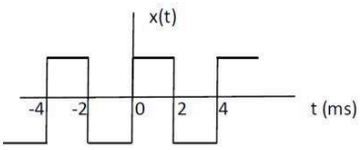
2. B

3. C

4. D

Q.23

uency of fifth harmonic of its spectrum is



. 40Hz

. 200 Hz

. 250 Hz

. 1250 Hz

Ans 1. A

2. B

3. C

4. D

Q.24

. MCS-51

. Motorola 68HC11

. ATMEL 16Cxx

. ATMEL 17Cxx

Ans 1. A

2. B

3. C

4. D

Q.25

. Interior of the circle of radius $r<\infty$

. Exterior of the circle of radius $r<\infty$

. Exterior of the circle of radius $r>0$

. Exterior of the circle of radius $r<1$

Ans 1. A

2. B

3. C

4. D

Q.26

. Odd and Odd

. Even and even

. Odd and even

. Even and odd

Ans 1. A

2. B

3. C

4. D

Adda247 GET IT ON Google Play

Q.27

A. Metals higher in the electrochemical series are less prone to corrosion

B. Corrosion is more rapid and highly localized if the anodic area is large and the cathodic area is small

C. The smaller the grain of the metal, the lesser the solubility and hence lesser the corrosion

D. A decrease in hydrogen overpotential increases the solubility and hence increases the corrosion

Ans 1. A
2. B
3. C
4. D

Q.28

. Carrier amplifier
. Chopper amplifier
. Instrumentation amplifier
). Operational amplifier

Ans 1. A
2. B
3. C
4. D

Q.29

. ductility

. endurance limit

. yield strength

. toughness

Ans 1. A

2. B

3. C

4. D

Q.30

e for a ductile material.

pper Yield point, (ii). Elastic limit, (iii). Proportionality limit, (iv). Lower

l point, (v). Breaking point, (vi). Ultimate point

A. iii, ii, i, iv, v, vi

B. iii, ii, iv, i, v, vi

C. iii, ii, i, iv, vi, v

D. iii, ii, i, iv, v, vi

Ans 1. A

2. B

3. C

4. D

Q.31

orbed from 220 V r.m.s and 50 Hz source connected in this circuit if the

tance and choke are connected i) in series ii). in parallel

. i) 154 W, ii)110 W

. i)100.09 W, ii)200.09 W

. i) 110.089 W, ii)220 W

. None of the above

Ans 1. A

2. B

3. C

4. D

Q.32

tant and the static sensitivity are.

. 8,5

. 8/5,5

. 5/8,8

. 5,8

Ans 1. A

2. B

3. C

4. D

Q.33

ıwıdth 300Hz to 300kHz. For a constant (dc) pressure of 100kPa the

dy state o/p of the sensor in millivolt is

. 150 mV

. 200 mV

. 100 mv

. 0

Ans
1. A
2. B
3. C
4. D

Q.34

A. Photoelectric effect
B. Seebeck effect
C. piezoelectric effect
D. Lorentz force

Ans
1. A
2. B
3. C
4. D

Adda247

Q.35

)0 mA to a 50 Ohm load. What is the percentage voltage regulation of

)ly ?

. 1%

. 2%

. 4%

. 3%

Ans 1. A

2. B

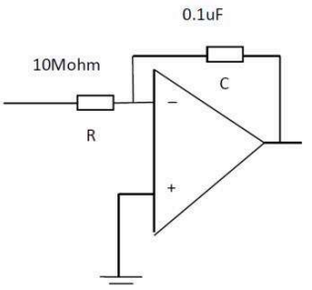
3. C

4. D

Q.36

w. An input of 4 Sin 100t V is applied. Calculate the time in which o/p V_o

hes 20mV



. 10.47msec

. 6.47msec

. 5.47msec

. 3.47msec

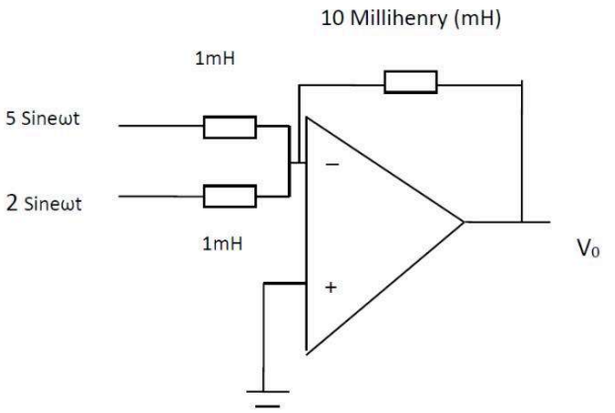
Ans 1. A

2. B

3. C

4. D

Q.37



. 7 sin ωt Volt
. 3 sin ωt Volt
. -70 sin ωt Volt
. -10 sin ωt Volt

Ans 1. A
2. B
3. C
4. D

Q.38

ɔsite in direction:

A. Their total angular momentum could be varying, although their total linear momentum is constant

B. Their total angular momentum will be zero

C. Their total angular momentum will be a constant

D. Both total angular momentum and total linear momentum will remain constant.

Ans 1. A

2. B

3. C

4. D

Q.39

temperature" is supported by

A. Zeroth law of thermodynamics

B. First law of thermodynamics

C. Second law of thermodynamics

D. Third law of thermodynamics

Ans 1. A

2. B

3. C

4. D

Q.40

ıgh an absorbing medium its intensity

A. increases exponentially as the length of the medium increases

B. decreases linearly as the length of the medium increases

C. decreases exponentially as the length of the medium increases

D. increases linearly as the length of the medium increases

Ans 1. A

2. B

3. C

4. D

Q.41

ıded with a transfer function ----------. The output will

ɔit an inverse response when there is

. 1/(λs+1), a ramp input

. (λs+1)/k , no input

. $1/(\lambda s+1)^2$, a step set point change

. k/s, a step input

where k = constant

Ans 1. A

2. B

3. C

4. D

Q.42

output is 0x00FF?

A. 2.52V to 2.75V

B. 0.3296 V to 0.3306V

C. 0. 5903V to 0.6023V

D. 3.75V to 3.7625V

Ans 1. A

2. B

3. C

4. D

Q.43

ige is 25 V What is the no load output voltage of the supply

. 25.5

. 26

. 25.75

. 28

Ans 1. A

2. B

3. C

4. D

Adda247 GET IT ON Google Play

Q.44

. Atrial depolarisation

. Atrial repolarisation

. Repolarisation of ventricles

. Depolarisation of ventricles

Ans 1. A

2. B

3. C

4. D

Q.45

d.

A. Its angular momentum will be a constant for any observer, the magnitude however will vary depending on the observer.

B. Its angular momentum will be zero for any observer.

C. Its angular momentum will be a constant for any observer, the magnitude depending on the observer, but with the same direction.

D. There exists an observer for whom the block will have a non-zero torque.

Ans 1. A

2. B

3. C

4. D

Q.46

A. 1

B. 0

C. A

D. ABCD

Ans 1. A

2. B

3. C

4. D

Q.47

...ness 't' and a Young's Modulus 'E', the mechanical strain ε_{max} is given by:

. $4Fl^3/Ebt^3$

. $6Fl/Ebt^2$

. $Fl^3/4Ebt^2$

. $3FL/2Ebt^2$

Ans 1. A

2. B

3. C

4. D

Adda247 GET IT ON Google Play

Q.48

lected across the secondary of a step down transformer having a turn of 4:1. The maximum power output for a zero signal collector of 160mA

. 14.4W

. 18.9W

. 12.3W

. 28.5W

Ans 1. A

2. B

3. C

4. D

Q.49

The value of $\lim_{x\to 0}$ ____ is

x

. ∞

. 1

. 0

. 2

Ans 1. A

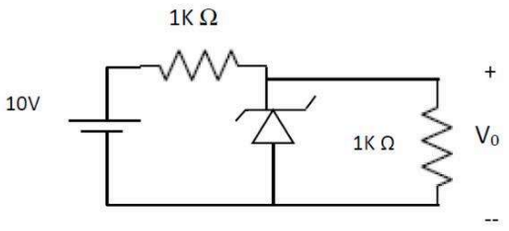
2. B

3. C

4. D

Q.50

The output voltage V_0 in volts is



. 6 V

. 5 V

. 0

. None of the above

Ans 1. A

2. B

3. C

4. D

Q.51

m to a turbine, where electric power is generated. The overall efficiency
ne turbine–generator is 80 percent and the frictional head loss in the
em is 10m of water. Estimate the electric power output of this plant

. 8.8 MW

. 94.2 MW

. 9.6 MW

. 86.3MW

Ans 1. A

2. B

3. C

4. D

Q.52

wing notations would have a unique representation for zero

. Sign magnitude

. one's complement

. two's complement

. 9's complement

Ans 1. A

2. B

3. C

4. D

Q.53

A. current leads the voltage

B. current lags voltage

C. current is in phase with the voltage

D. none of these

Ans 1. A

2. B

3. C

4. D

Q.54

16 bit ADC. The desired signal is band limited to 50 Hz. What is the sampling frequency?

A. 100.6 Hz

B. 4 kHz

C. 25.6 kHz

D. 11 kHz

Ans 1. A

2. B

3. C

4. D

Adda247 GET IT ON Google Play

Q.55

ection will be

A. $wL^4/8EI$

B. $wL^4/4EI$

C.$wL^4/48EZ$

D. $5/284\ wL^4/8EI$

Ans 1. A

2. B

3. C

4. D

Q.56

ilament has a temperature coefficient of 0.005, what would be the

ent during turn on of the bulb at 30 °C?

. 5.43A

. 0.5A

. 0.543A

. 5.00A

Ans 1. A

2. B

3. C

4. D

Q.57

ductance g_m is given as

A. $\frac{K(V_{GS}-V_T)^2}{V_{DS}}$

B. $2K(V_{GS}-V_T)$

C. $\frac{K(V_{GS}-V_T)^2}{V_{GS}}$

D. $\frac{I_D{}^2}{V_{DS}-V_{GS}}$

Ans 1. A

2. B

3. C

4. D

Q.58

uency (in Hz) satisfying the Nyquist criterion is

. 24 Hz

. 48 Hz

. 16 Hz

. 12 Hz

Ans 1. A

2. B

3. C

4. D

Q.59

. inductance

. capacitance.

. low resistance

. high resistance

Ans 1. A

2. B

3. C

4. D

Q.60

. Electrosurgical cutting

. RF diathermy

. Hemostasis mode

. None of the above

Ans 1. A

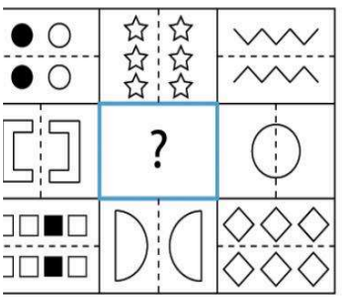
2. B

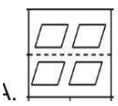
3. C

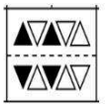
4. D

Section : **Part I**

Q.1



A. 

B. 

C. 

D. 

Ans 1. A

2. B

3. C

4. D

Q.2

uffering from a fatal malaria type.

ses of Action:

e city municipal authority should take immediate steps to carry out

nsive fumigation in Ward X.

ıe people in the area should be advised to take steps to avoid mosquito

.

Only I follow

B. Only II follows

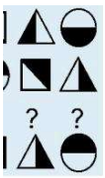
C. Either I or II follows

D. Both I and II follow

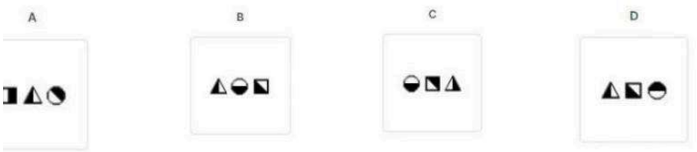
Ans

1. A
2. B
3. C
4. D

Q.3



ose the correct three figures to complete the sequence:



Ans 1. A

2. B

3. C

4. D

Q.4

. The blue litmus paper turned red after I dropped some liquid on it.

A. The liquid is acidic

B. Liquid is base

C. Red litmus paper is acid

D. Blue litmus paper is acid

Ans 1. A

2. B

3. C

4. D

Q.5

A. None B. the plant is green C. the plant did not get enough water D. the plant died

Ans 1. A
2. B
3. C
4. D

Q.6

loyees in a small scale industrial unit

No. of working hours	No. of employees
3-5 hours	7
5-7 hours	10
7-9 hours	18
9-11 hours	57
11-13 hours	14
13-15 hours	8

at is the average working hour of an employee?

.5 B. 10.22 C. 11.55 D. 12.5

Ans 1. A
2. B
3. C
4. D

Q.7

ɛtes.

ɔlusions:

ıle athletes can play.

ɔme athletes can play

A. Only conclusion I follows

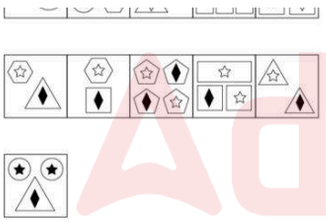
B. Only conclusion II follows

C. Either I or II follows

D. Neither I nor II follows

Ans 1. A
2. B
3. C
4. D

Q.8

B 

vhich set does the above figure belong?

. Set A B. Set B C. Neither A nor B D. All of the above

Ans 1. A
2. B
3. C
4. D

Q.9

the minute hand is

A. 75 degree B. 0 degree C. 15 degree D. 22.5 degree

Ans 1. A
2. B
3. C
4. D

Q.10

the value of P(A /~B) is _____

A. 0.2 B. 0.5 C. 0.8 D. $\frac{1}{3}$

Ans 1. A
2. B
3. C
4. D

Section : **Part II**

Q.11

icable to discrete Random Variables?

A. Gaussian Distribution
B. Poisson Distribution
C. Rayleigh Distribution
D. Exponential Distribution

Ans
1. A
2. B
3. C
4. D

Q.12

ginally density functions?

A. Only if random variables exhibit statistical dependency
B. Only if random variables exhibit statistical independency
C. Only if random variables exhibit deviation from its mean value
D. If random variables do not exhibit deviation from its mean value

Ans
1. A
2. B
3. C
4. D

Q.13

:heap

:lusion:

mangoes are cheap.

olden – coloured mangoes are not cheap.

A. Only conclusion I follows

B. Only conclusion II follows

C. Either I or II follows

D. Neither I nor II follows

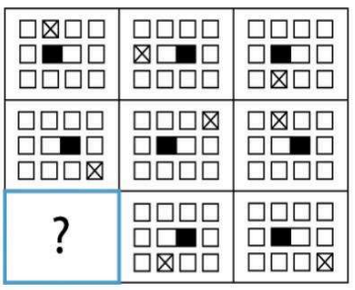
Ans 1. A

2. B

3. C

4. D

Q.14



B. C. D.

Ans 1. A

2. B

3. C

4. D

Q.15

ोर्ण हो गए।

वेश्वविद्यालय प्राधिकरण ने प्रथम वर्ष के छात्र को गणित पढ़ाने के लिए शिक्षक का
ध बंद कर दिया।

A. कारण घटना (ए) है, और प्रभाव घटना (बी) है	B. घटना (बी) कारण है और घटना (ए) उसका प्रभाव है	C. दोनों घटनाएँ (ए) और (बी) स्वतंत्र कारण हैं	D. घटना (ए) और (बी) दोनों स्वतंत्र कारणों के प्रभाव हैं

Ans 1. A
2. B
3. C
4. D

Section : **Descriptive**

Q. 1

der unstable process given by:

$= k_p/(-\tau_u s + 1)$

τ_u is always positive and the pole p_u is also always positive. Draw a e block diagram of the system after the incorporation of the ller.

Q. 2