Unit 9 - Week 7

Course outline

Assessment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-11-04, 23:59 IST.

1) The Green's functions in the context of a free field in *0-D* spacetime are defined by: *1 point*

- $G_n = N\int d\varphi \exp\left(-S\left[\varphi^n\right]\right)$
- $G_n = N\int d\varphi\, \varphi^n \exp\left(-S[\varphi]\right)$
- $G_n = N\int d\varphi \exp\left(S\left[\varphi^n\right]\right)$
- $G_n = \int d\varphi \exp\left(-S\left[\varphi^n\right]\right)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$G_n = N\int d\varphi\, \varphi^n \exp\left(-S[\varphi]\right)$

2) A free field in $0-D$ spacetime is defined by the action $S_0(\varphi) = \frac{1}{2}\mu\varphi^2$. The expression for normalization is: *1 point*

- $\sqrt{\left(\frac{\mu}{2\pi}\right)}$
- $\sqrt{\left(\frac{1}{2\pi\mu}\right)}$
- $\sqrt{\left(\frac{1}{2\pi}\right)}$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\sqrt{\left(\frac{\mu}{2\pi}\right)}$

3) A free field in $0-D$ spacetime is defined by the action $S_0(\varphi) = \frac{1}{2}\mu\varphi^2$. The expression for generating functional for the full Green's functions $Z_0(J)$ is: *1 point*

- $\sqrt{\left(\frac{\mu}{2\pi}\right)}\exp\left(\frac{J^2}{2\mu}\right)$
- $\frac{J^2}{2\mu}$
- $\exp\frac{J^2}{2\mu}$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\exp\frac{J^2}{2\mu}$

4) A free field in $0-D$ spacetime is defined by the action $S_0(\varphi) = \frac{1}{2}\mu\varphi^2$. The expression for the field function $\phi(J)$ is: *1 point*

- $\sqrt{\left(\frac{\mu}{2\pi}\right)}\exp\left(\frac{J^2}{2\mu}\right)$
- $\frac{J^2}{2\mu}$
- $\frac{J}{\mu}$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{J}{\mu}$

5) Which of the following is a candidate for the action integral S of an interacting field defined in 0 dimensional spacetime: *1 point*

- $S[\varphi] = \frac{1}{2}\int dt\left(m^2\varphi^2 + \frac{1}{4!}\lambda\varphi^4\right)$
- $S[\varphi] = \frac{1}{2}\int dt\left[\left(\frac{d\varphi}{dx}\right)^2 - m^2\varphi^2 + \frac{1}{4!}\lambda\varphi^4\right]$
- $S[\varphi] = \frac{1}{2}\int dt\left[\left(\frac{d\varphi}{dx}\right)^2 + \frac{1}{4!}\lambda\varphi^4\right]$
- $S(\varphi) = \frac{1}{2}m^2\varphi^2 + \frac{1}{3!}\omega\varphi^3 + \frac{1}{4!}\lambda\varphi^4$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$S(\varphi) = \frac{1}{2}m^2\varphi^2 + \frac{1}{3!}\omega\varphi^3 + \frac{1}{4!}\lambda\varphi^4$

6) The value of the 0-point connected Green's function for the free field is: *1 point*

- 0
- 1
- $\frac{1}{\mu}$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
0

7) A free field in $0-D$ spacetime is defined by the action $S_0(\varphi) = \frac{1}{2}\mu\varphi^2$. The 2-point Green's function is given by: *1 point*

- $\sqrt{\left(\frac{\mu}{2\pi}\right)}$
- $\frac{J^2}{2\mu}$
- $\frac{J}{\mu}$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the above

8) The Schwinger Dyson equation for the generating functional *Z(J)* is given by: *1 point*

- $S(\varphi)\big|_{\varphi=\left(\frac{\partial}{\partial J}\right)} Z(J) = J$
- $S'\left(\frac{\partial}{\partial J}\right)Z(J) = JZ(J)$
- $\frac{\partial}{\partial J}Z(J) = JZ(J);$
- $S'(\varphi)Z(J) = JZ(J)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$S'\left(\frac{\partial}{\partial J}\right)Z(J) = JZ(J)$

9) $e^{-W(J)}\left(\frac{\partial}{\partial J}\right)\left[e^{W(J)}f(J)\right]$ equals: *1 point*

- $\left[\phi(J) + \frac{\partial}{\partial J}\right]f(J)$
- $f'(J)$
- $\phi(J)f(J)$
- $\left[\phi(J) + \frac{\partial W}{\partial J}\right]f(J)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\left[\phi(J) + \frac{\partial}{\partial J}\right]f(J)$

10) Consider φ^4 theory in $0-D$ spacetime with the action $S(\varphi) = \frac{1}{2}\mu\varphi^2 + \frac{1}{4!}\lambda_4\varphi^4$. The adjoining Feynman diagram (Fig 1) gets evaluated to: *1 point*

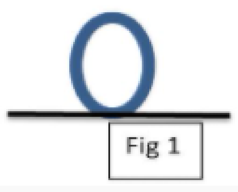

Fig 1

- $-\frac{1}{2}\frac{\lambda_4}{\mu^3}$
- $-\frac{\lambda_4}{\mu^3}$
- $-\frac{\lambda_4}{\mu}$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$-\frac{1}{2}\frac{\lambda_4}{\mu^3}$